

Fighting Myths in Democracy Evaluation by Formal Concept Analysis Framework: Measuring Qualities vs Measuring Defects

Dmitry Zaytsev, Ass. Prof., Department of Public Policy, Higher School of Economics
Sergei Obiedkov, Ass. Prof., Department of Applied Mathematics and Information Science,
Higher School of Economics
Maria Shabanova, Master in Public Policy, Department of Public Policy, Higher School of
Economics
Mikhail Klimushkin, Master student, Department of Applied Mathematics and Information
Science, Higher School of Economics

Abstract

Despite many concepts of democracy we think the most important to understand both democratic development and authoritarian rollback is term “quality”. We argue that to understand change of political regime in some not western states it is better to use concept of “qualities”. And those qualities could be grouped in two major types. First type of qualities shows the changes from normal democratic minimum to democratic maximum possible, which we called excellence qualities, and back. And second group is the democracy defects that go from average level of democracy to pseudo-democracy and other variants of semi-democratic development, which is characteristic of hybrid regimes, and could be viewed as complete authoritarian.

Formal concept analysis (FCA) framework allows us to see how specific qualities and defects are correlate and connected with functioning of certain institutions and behavior of certain actors. In the paper we demonstrate unique opportunities of FCA as a tool to conceptualize, operationalize, aggregate and visualize democratic development and authoritarian rollback based on discourse analysis of texts about “democracies with adjectives” and international ratings, indices.

Also, FCA provide tool to compare different ratings of democracy evaluation that allows showing “zone of agreement” between different agencies that measure democratic development. These provide more confident knowledge on quality of democracy, level of democratic practices in different states.

Introduction

Any study of democracy and democratization presents the researcher with a number of analytical challenges, or tasks, which need to be resolved with consideration of existing opportunities and limitations. G.L. Munck and J. Verkuilen in their work outlined three major challenges for a researcher seeking to quantify and measure the level of democracy in a country. These challenges are conceptualization, operationalization, and aggregation¹. We consider that, firstly, these challenges are intrinsic for any deep research in social studies, especially for such a complex phenomenon as democracy and such a process as democratization. Secondly, these challenges are characteristic not only to quantitative research, but also to qualitative paradigms of data collection and analysis. Thirdly, the challenges in democracy studies should be identified in more detailed stages: conceptualization, operationalization, measurement, aggregation, visualization, and interpretation.

¹ G. L. Munck, J. Verkuilen. Conceptualizing and measuring democracy. Evaluating Alternative Indices. Comparative Political Studies, Vol. 35 No. 1, February 2002 5-34.

Addressing these tasks in relation to democracy studies results in multiple ratings and indices of democracies which compare different countries or world regions. Even if the research does not result in a linear rating of democracy level of the countries, the researchers try to give a 'quantitative' assessment of the democracy level and to compare countries on this basis.

Each new rating and index of democracy attempts to solve the above-mentioned problems; previous resolutions of the challenges by other researchers are implied or outright stated to be unsatisfactory. As a result, ratings and indices of democracy and democratization keep multiplying. Out of the ongoing projects directly concerned with evaluation of democracy and democratization, we would like to note Polity IV, The Transformation Index of Bertelsmann Stiftung, Freedom House's (FH) Freedom in the World and Nations in Transit, The Economist Intelligence Unit's Democracy Index.

«The Polity IV Project continues the Polity research tradition of coding the authority characteristics of states in the world system for purposes of comparative, quantitative analysis...The Polity conceptual scheme ... examines concomitant qualities of democratic and autocratic authority in governing institutions, rather than discreet and mutually exclusive forms of governance. This perspective envisions a spectrum of governing authority that spans from fully institutionalized autocracies through mixed, or incoherent, authority regimes (termed "anocracies") to fully institutionalized democracies...The Polity IV dataset covers all major, independent states in the global system (i.e., states with total population of 500,000 or more in the most recent year; currently 164 countries) over the period 1800-2010»².

«The Transformation Index of Bertelsmann Stiftung (BTI) publishes two rankings, the Status Index and the Management Index, both of which are based on in-depth assessments of 128 countries...The Status Index explores the state of development achieved by 128 countries on their way to democracy under the rule of law and a market economy flanked by sociopolitical safeguards. In contrast to minimalist definitions of electoral democracy, the BTI's understanding of democracy includes the rule of law and representativeness»³. The website gives access to index data for years 2003-2010.

«Freedom in the World, Freedom House's flagship publication, is the standard-setting comparative assessment of global political rights and civil liberties. Published annually since 1972, the survey ratings and narrative reports on 195 countries and 14 related and disputed territories are used by policymakers, the media, international corporations, civic activists, and human rights defenders to monitor trends in democracy and track improvements and setbacks in freedom worldwide. The Freedom in the World data and reports are available in their entirety on the Freedom House website»⁴.

«Nations in Transit is the only comprehensive, comparative, and multidimensional study of reform in the former Communist states of Europe and Eurasia. Nations in Transit tracks the reform record of 29 countries and administrative areas and provides Freedom House's most in-depth data about this vast and important region. The 2011 edition covers events from January 1 through December 31, 2010. It is an updated edition of surveys published in 2010, 2009, 2008, 2007, 2006, 2005, 2004, 2003, 2002, 2001, 1999-2000, 1998, 1997, and 1995»⁵.

«The Democracy Index is an index compiled by the Economist Intelligence Unit that measures the state of democracy in 167 countries, of which 166 are sovereign states and 165 are UN member states. The Economist Intelligence Unit's Democracy Index is based on 60 indicators grouped in five different categories: electoral process and pluralism, civil liberties,

² <http://www.systemicpeace.org/polity/polity4.htm>

³ <http://www.bertelsmann-transformation-index.de/en/>

⁴ <http://www.freedomhouse.org/report-types/freedom-world>

⁵ <http://www.freedomhouse.org/report-types/nations-transit>

functioning of government, political participation and political culture. The Index was first produced in 2006, with updates produced in 2008, 2010 and 2011»⁶.

Several more notable and widely known projects were completed several years ago. It goes for Vanhanen's index of democracy⁷, Democracy Index of Center for the study of Democratic Governance (CSDG), Institutional Basis of Democracy Index by Moscow State Institute of International Relations (MGIMO)⁸.

Such research projects may have different ultimate goals: the desire to build an ideal rating of democracy and democratization as well as an effort to enhance knowledge in a specific area of democracy studies or to fulfill an applied task.

However, we think that the existing ratings already make for an enormous amount of data, and we should address them first before producing new indices and ratings to address existing or new research tasks. A comprehensive analysis of the existing data and ratings, both quantitatively and qualitatively, will foster knowledge discovery in the studies of democracy and democratization, will provide an opportunity for alternative hypotheses and theories of democratic development.

Democracy is a complex phenomenon, and its evaluation in ratings is a meld of quantitative and qualitative data, methods of assessing the level of democracy in different countries. Given this, comprehensive approaches and frameworks of data analysis have a special importance in democracy research, as they need to function within the merge of quantitative and qualitative paradigms or even to surpass their usual synthesis.

Such framework for analysis is Formal Concept Analysis (FCA). While not offering an ultimate solution on the spot, these particular frameworks are fit to provide alternative ways of addressing the challenges of democracy measurement and evaluation, to suggest hypotheses for further study and to offer the tool for researching democracy issues.

Before showing the possibilities of FCA for addressing the challenges of democracy studies, we will give a short presentation of the framework.

A Short Introduction into Formal Concept Analysis

Formal concept analysis (FCA)⁹ provides tools for understanding the structure of data given as a set of objects with certain descriptions (e.g., in terms of attributes they possess), which is done by representing the data as a hierarchy of concepts, or more exactly, a concept lattice (in the sense of lattice theory¹⁰). Every concept has extent (the set of objects that fall under the concept) and intent (a set of attributes or features that together are necessary and sufficient for an object to be an instance of the concept). Concepts are ordered in terms of being more general or less general (i.e., covering more objects or fewer objects).

The concept lattice, being a rather universal structure, provides a wealth of information about the relations among objects and attributes, which made possible applications in areas ranging from history and sociology¹¹ to epistemic community detection¹² and social network

⁶ http://www.eiu.com/Handlers/WhitepaperHandler.ashx?fi=Democracy_Index_Final_Dec_2011.pdf&mode=wp

⁷ <http://www.prio.no/CSCW/Datasets/Governance/Vanhanens-index-of-democracy/>

⁸ Political atlas of modernity: experience of multidimensional statistical analysis of political systems Moscow, MGIMO, 2007.

⁹ Ganter, B., Wille, R.: Formal Concept Analysis: Mathematical foundations. Springer, Berlin (1999)

¹⁰ Birkhoff G.: Lattice theory. Amer. Math. Soc. Coll. Publ., Providence, R.I. (1973)

¹¹ Mohr, J.W., Duquenne, V.: The duality of culture and practice: Poverty relief in New York City, 1888{1917. Theory and Society 26, 305{356 (1997)

¹² Roth, C., Obiedkov, S.A., Kourie, D.G.: Towards concise representation for taxonomies of epistemic communities. In: Ben Yahia, S., Mephu Nguifo, E., Belohlavek, R. (eds.) CLA. Lecture Notes in Computer Science, vol. 4923, pp. 240-255. Springer (2006)

analysis¹³ to machine learning¹⁴ and ontology construction¹⁵. Indeed, it can help in processing a wide class of data types (for example, any data represented as a table). Besides structural representation of data, the concept lattice provides a framework in which various data analysis and knowledge acquisition techniques can be formulated.

We briefly introduce necessary mathematical definitions¹⁶ and then explain them less formally. Given a (formal) context $K = (G; M; I)$, where G is called a set of objects, M is called a set of attributes, and the binary relation $I \subseteq G \times M$ specifies which objects have which attributes, the derivation operators $(\cdot)'$ are defined for $A \subseteq G$ and $B \subseteq M$ as follows:

$$A' = \{m \in M \mid \forall g \in A : gIm\} \quad B' = \{g \in G \mid \forall m \in B : gIm\}$$

In words, A' is the set of attributes common to all objects of A and B' is the set of objects sharing all attributes of B .

If this does not result in ambiguity, $(\cdot)'$ is used instead of $(\cdot)''$. The double application of $(\cdot)'$ is a closure operator, i.e., $(\cdot)''$ is extensive, idempotent, and monotonous. Therefore, sets A'' and B'' are said to be closed.

A (formal) concept of the context $(G; M; I)$ is a pair $(A; B)$, where $A \subseteq G$, $B \subseteq M$, $A = B'$, and $B = A'$. In this case, we also have $A = A''$ and $B = B''$. The set A is called the extent and B is called the intent of the concept (A, B) .

A concept (A, B) is a subconcept of (C, D) if $A \subseteq C$ (equivalently, $D \subseteq B$). The concept (C, D) is then called a superconcept of (A, B) . We write $(A, B) \leq (C, D)$ and define the relations \geq , $<$, and $>$ as usual. If $(A, B) < (C, D)$ and there is no (E, F) such that $(A; B) < (E; F) < (C; D)$, then $(A; B)$ is a lower neighbor of $(C; D)$ and $(C; D)$ is an upper neighbor of $(A; B)$; notation: $(A; B) \prec (C; D)$ and $(C; D) \succ (A; B)$.

The set of all concepts ordered by \leq forms a lattice, which is denoted by $\beta(K)$ and called the concept lattice of the context K . The relation \prec defines edges in the covering graph of $\beta(K)$.

Speaking less formally, the context makes precise the scope of the discussion by specifying the domain to which it applies (listing all the objects of this domain) and defining the terms in which it is going to be discussed (listing the attributes to be used in object descriptions). For example, if we wish to analyze democratic development, one thing we need to do is to specify the geographical (e.g., Central and Eastern Europe) or otherwise restricted (e.g., the third-world countries) area under consideration and to divide this area into individual entities subject to democratic development. We can talk about countries, but we could instead choose to talk about regions (such as Balkan countries as a whole, CIS countries, etc.) or - perhaps, less easily in this case - about certain areas within each country, thus, controlling the level of granularity. These entities are the objects of our context.

We also need to identify and fix a set of parameters of democratic development to be used in our discussion. These are the attributes of the context, and they can also be different with respect to granularity. For instance, we could use four parameters, such as (1) Freedom of Expression and Belief, (2) Associational and Organizational Rights, (3) Rule of law, and (4) Personal Autonomy and Individual Rights to evaluate civil liberties in each country (as does the

¹³ Freeman, L.: Cliques, Galois lattices, and the structure of human social groups. *Social Networks* 18, 173{187 (1996)

¹⁴ Ganter, B., Kuznetsov, S.: Formalizing hypotheses with concepts. In: Ganter, B., Mineau, G. (eds.) *Conceptual Structures: Logical, Linguistic, and Computational Issues*, Lecture Notes in Computer Science, vol. 1867, pp. 342{356. Springer Berlin / Heidelberg (2000)

¹⁵ Stumme, G., Maedche, A.: FCA-MERGE: bottom-up merging of ontologies. In: *Proceedings of the 17th international joint conference on Artificial intelligence - Volume 1*. pp. 225{230. Morgan Kaufmann Publishers Inc., San Francisco, CA, USA (2001)

¹⁶ Ganter, B., Wille, R.: *Formal Concept Analysis: Mathematical foundations*. Springer, Berlin (1999)

Freedom House in its “Freedom in the World” rating), or we could use just a single parameter for the same purpose. Besides selecting a level of granularity for parameters, we may also decide to take or not to take a particular parameter into account (an example is political culture, which features as a separate parameter in the Democracy Index of the Economist Intelligence Unit, but not in the “Freedom in the World” rating).

A formal concept is usually visualized by means of a cross-table, where rows correspond to objects, columns correspond to attributes. An otherwise empty cell contains a cross if the respective object has the respective attribute.

A formal concept of a formal context is a mathematization of the old philosophical tradition (see Logic of Port Royal¹⁷) of characterizing a concept through of its extension (or extent) and intension (or intent), so that the extension consists of precisely all objects having all attributes of the intension and the intension contains exactly all attributes shared by all objects of the extension. To give an (oversimplified) example, one can hypothesize a concept whose extent consists of all countries with low level of personal autonomy and individual rights. Assuming that the latter is an attribute of our context, the intent of this concept will contain this very attribute, but also all other attributes shared by such countries in the context - e.g., “inadequate enforcement of rule of law” if every country with low level of personal autonomy and individual rights in our context exhibits this trait, too.

This leads us to the notion of an implication, which is, formally, an expression $A \rightarrow B$, where $A; B \subseteq M$ are attribute subsets. It holds in the context is $A' \subseteq B'$, i.e., every object of the context that has all attributes from A also has all attributes from B . A simple example of an implication is

$$\{\text{“low level of personal autonomy and individual rights”}\} \rightarrow \{\text{“inadequate enforcement of rule of law”}\},$$

which may or may not hold in a particular context. A is called the premise and B the conclusion of the implication $A \rightarrow B$. Neither A nor B has to be single-element, although they both are in the above example.

Note that concepts and implications are inherently context-dependent. In particular, the extent of a concept depends on our choice of attributes used to describe the objects, while the intent depends on the objects included in the context. One concept is more general than another one if the extent of the former covers all objects from the extent of the latter and some other objects. Clearly, the intent of a more general concept should be narrower (i.e., should contain fewer attributes) than the intent of a less general concept: a larger set of object shares a smaller set of attributes. This generality order is captured by the subconcept - superconcept \leq relation defined above. This relation has some special properties, and, mathematically, is a partial order, which means that two different concepts cannot both be more general than the other, but they can be incomparable. In addition, this partial order is a lattice: every two concepts have a unique least general generalization and a unique most general specification.

Concept lattices are visualized with line diagrams, where every node corresponds to a concept and more general concepts are placed above less general ones. Two concepts are connected with a line if one is more general than the other and there is no concept between the two. We will see examples of line diagrams in the next sections.

FCA is not a technique but a framework, i.e. it is a broader methodological framework for data analysis which can be applicable to a variety of disciplines from history to computer science. Among other things, FCA can be used in comparative research and case studies. The matrix of objects and attributes can be built also for comparative inter-country social analysis. FCA is not aimed at discovering cause-and-effect relations. However, the main result of using

¹⁷ Arnauld, A., Nicole, P.: La logique ou l'art de penser. Contenant outre les regles communes, plusieurs observations nouvelles, propres a former le jugement chez Charles Savreux (1662).

FCA - the hierarchy of objects and attributes - allows to draw conclusions about the relations between the attributes, their mutual influence; it enables the researcher to build 'fuzzy typologies' of objects and attributes, and to determine the sequence of the objects depending on their set of attributes and the extent to which they have them.

Furthermore, FCA give the researcher a possibility to combine qualitative and quantitative data and, moreover, to transcend the limitations of solely qualitative or quantitative paradigms of data analysis.

So, FCA looks very promising in terms of addressing the research tasks which require analysis of complex and multifold processes in contemporary societies.

Conceptualization of democracy studies and democratization research with the use of FCA

The challenge of conceptualization in democracy studies is to avoid "including theoretically irrelevant and excluding theoretically important factors and properties"¹⁸ when defining democracy. This challenge is usually described in the bulk of research literature as the dilemma between minimalist and maximalist conceptions of democracy¹⁹. We think that the issues within democracy theory are even more complicated. Concerning the applicability of definition for empirical research, the best account of existing theoretical approaches to conceptualizing democracy was offered Collier and Steven Levitsky²⁰ (see Table 1).

All in all, there are five major theoretical schemes for conceptualizing democracy. Each of them has a hull of theoretical and empirical research to back it²¹. We will give only an outline of these schemes and traditions of democracy definition, and will compare them with the selected democracy ratings. We will consider the definition traditions from the smallest number of included properties to the highest.

The first group of approaches (**Electoralist Definition**) gives the 'minimalist' definition of democracy initially proposed by Schmitter: free and fair election procedure based on universal suffrage. It is interesting to note that among the contemporary democracy ratings only Vanhanen's index of democracy relies on such a definition.

The second tradition of defining democracy (**Procedural Minimum Definition**) includes elections and guarantees of basic civil freedoms (freedom of speech, association, and assembly) in its essential list. The third tradition (**Expanded Procedural Minimum Definition**) follows closely the second one, adding the condition of independency of elected powers and the ability of elected officials to have real impact. Researchers working within this tradition use Robert Dahl's work as their basis. It is worth noting, that we do not know democracy ratings using the second tradition's definition, while Dahl's legacy is relatively popular in the creation of indices, e.g. Polity IV and Institutional Basis of Democracy Index by MGIMO.

The fourth tradition - Prototypical Conception of Established Industrial Democracy - proved to be most widely used by developers of ratings and indices. It includes the features of R. Dahl's poliarchy as well as additional political, economic, and social features associated with industrial democracy. More accurately, these additional properties are characteristic rather of liberal democracy than industrial one, such as guarantees of citizens' security, low corruption level, protections for minority rights, and, finally, widespread notion of participatory political culture.

¹⁸ G. L. Munck, J. Verkuilen. Conceptualizing and measuring democracy. Evaluating Alternative Indices. Comparative Political Studies, Vol. 35 No. 1, February 2002. P.8.

¹⁹ Political atlas of modernity: experience of multidimensional statistical analysis of political systems Moscow, MGIMO, 2007. P. 148-160.

²⁰ David Collier and Steven Levitsky. Democracy "with adjectives": Conceptual Innovation in Comparative Research. Working Paper #230 - August 1996.

²¹ Ibid.

The last but not the least tradition of democracy definitions (**Maximalist Definition/Conception**) focuses not on institutional and procedural features of democracy but on its political and social prerequisites and conditions: socioeconomic equality; and/ or high levels of popular participation in economic, social, and political institutions. Relevant examples of the ratings and indices for this tradition combine political and economic indicators, e.g. BTI Status Index.

Table 1. Democracy ratings and corresponding schemes of democracy conceptualization

Associated Meanings	Electoralist Definition	Procedural Minimum Definition	Expanded Procedural Minimum Definition	Prototypical Conception of Established Industrial Democracy	Maximalist Definition/ Conception
Reasonably competitive elections, devoid of massive fraud, with broad suffrage	Yes	Yes	Yes	Yes	Often not included
Basic civil liberties: Freedom of speech, assembly, and association		Yes	Yes	Yes	Often not included
Elected governments have effective power to govern			Yes	Yes	Often not included
Additional political, economic, and social features associated with industrial democracy				Yes	Often not included
Socioeconomic equality; and/ or high levels of popular participation in economic, social, and political institutions					Yes
EXAMPLES OF INDEXES	Vanhanen's index of democracy	-	Polity IV Institutional Basis of Democracy Index by MGIMO	BTI Democracy Index FH Freedom in the World FH Nations in Transit Economist Democracy Index Democracy Index of CSDG	BTI Status Index

The above-presented table reflects the existing discourse about defining democracy. The most heated discussions in contemporary scientific and analytical discourse about democracy focus on the concept of liberal democracy and challenges of achieving it for ‘non-western’ societies.

Recent research efforts draw a conclusion that the overwhelming majority of countries have achieved the democratic minimum, i.e. change of government through competitive elections. At the same time, the ‘grey zone’ of countries without major features of liberal democracy is growing²². The extension of the grey zone can be explained by the concept of ‘transplantation vs. nurturing of democratic institutions’²³. According to it, the spreading of democracy to the countries with little to no regard for democratic values and for political participation culture takes the form of transplantation of institutions. As a result, the institutions do not take root and are rejected because these countries do not have the necessary basis of democratic values and culture. In such cases democratic institutions become mere simulacra and imitation, and are displaced by informal – often authoritarian – political practices²⁴.

It is the analysis of this ‘grey zone’ which is of particular interest for those who study democracy and democratization. Such interest has led to a growing discourse of ‘democracies with adjectives’. When finding a new example of deviation from the model of liberal democracy, researchers who mainly use the method of case studies tend to scrutinize these cases in great detail, and add a new adjective in front of ‘democracy’ to describe it. Such descriptions multiply: as by the count of David Collier and Steven Levitsky, there are more than 550 ‘democracies with adjectives’, i.e. certainly more than the ‘grey zone’ countries, and even exceeding the total number of countries in the world!

This article does not aim to analyze in detail all such definitions. We only seek to demonstrate the possibilities offered by FCA for conceptualizing democracy, specifically – non-liberal democracy. We selected 55 texts for analysis, each of them suggesting definitions of ‘democracies with adjectives’ which are related to conceptualizing the ‘grey zone’ or ‘defective democracies’²⁵.

The criteria for selection of texts served several parameters: texts had to contain the concepts of “democracy with adjectives”, to be devoted to the problems of modern non-liberal democracies, to have a broad geographical coverage, to have a high citation rate (determined through Scopus database), to belong to the authors widely recognized in political science, and to be modern and relevant (publications of 1990-s and 2000-s). Almost every text was based on a case-study of a country or group of countries.²⁶

Formal Concept Analysis (FCA) framework and special computer programs allow us to build “lattices”. To build a lattice we single out the most frequent words (not counting the prepositions etc.) that appeared in each text. Lattice show us these words and shows connections: which of these words appear in how many texts. This technique is known as tf weight.

The second technique for singling out key words in the text is a tfidf weight - when lattice is built on the base of the most frequent words that are unique for each text. The computer

²² See e.g. International Actors, Democratization and the rule of Law. Anchoring democracy? Ed. by A.Magen and L. Morlino. Routledge. 2008.

²³ Proceedings of the conference HSE "Public Policy Institute: transplantation or cultivation", May 13, 2005. Electronic resource. <http://gpir.narod.ru/ve/661903.htm>. Access is free. Date of visit: 06/05/2010.

²⁴ Merkel W., Croissant A. Formale Institutionen und informale Regeln in defekten Demokratien. – Politische Vierteljahresschrift, 2000, Bd. 41, № 1.

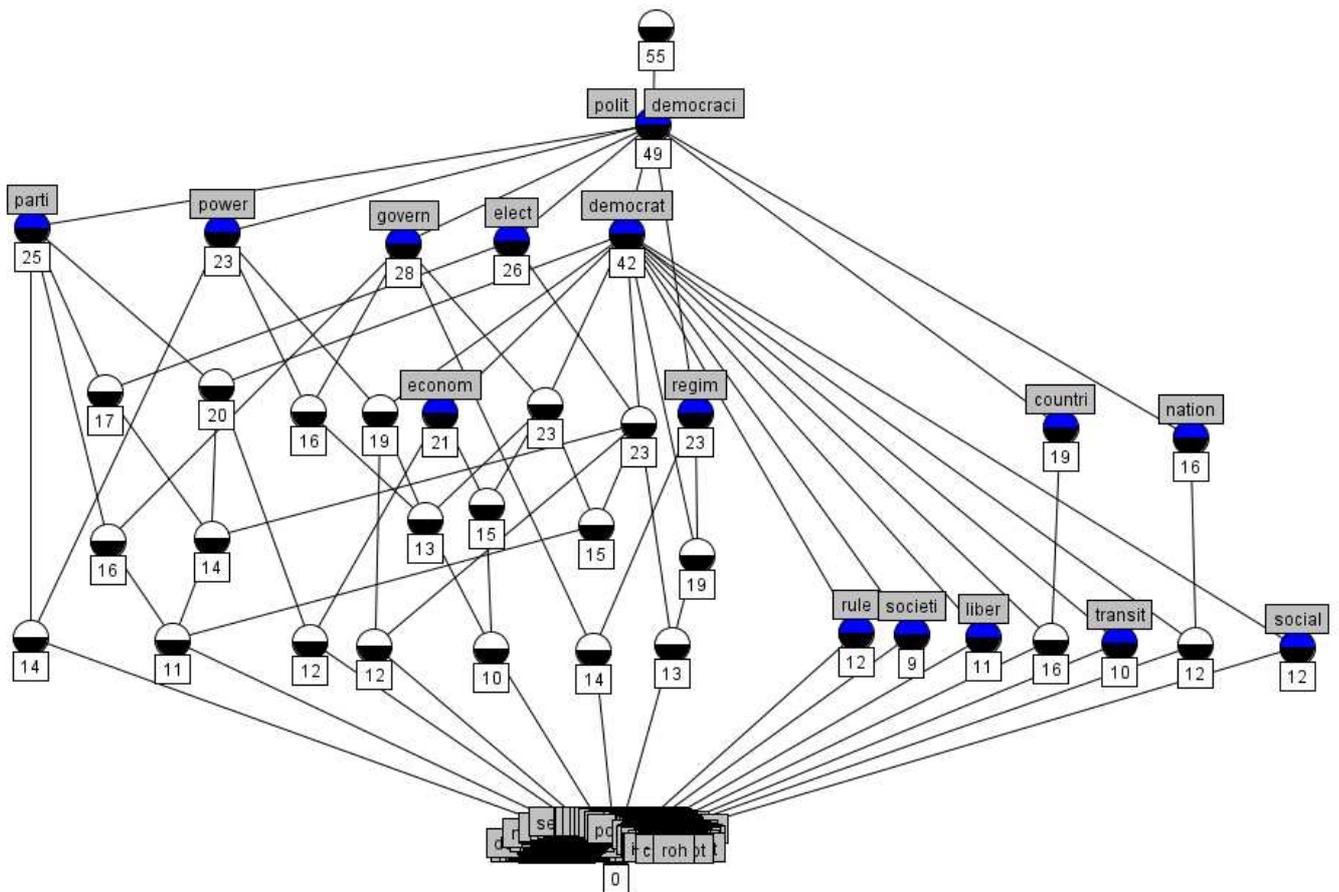
²⁵ Ibid.

²⁶ For further details see: Elena Sheetova, Kristina Popova, Anastasia Novokreshchenova, “Democracy with adjectives”: analyzing alternative discourses // Chapter Three. Models of Democracy Evaluation. Ed. by Dmitry Zaytsev, Sergey Obiedkov // Russia and the Council of Europe: Topics for Common Agenda. A Look from Norway. Academic Papers of the 10th International Session of the HSE Russian — European Centre for Multidisciplinary Research. Oslo, 1-8 August, 2010. Edited by Nina Belyaeva. INTEL CORP. Moscow. 2011

software chose the most frequent words that appeared in all of the texts and then compared them to the list of words which characterized this specific text. Lattice in this case show us which of the words are unique for the text and based on the hypothesis that key words in the documents of one type are the words that are not used in another documents.

Figure 1 shows the lattice built with the use of tf weight for 55 texts about non-liberal or defective democracies.

Figure 1.



Results of the analysis allow to confirm the hypothesis that contemporary scientific discourse about democracy is dominated by Expanded Procedural Minimum Definition. This conceptualization of democracy can be called the hegemonic discourse in terms of discourse analysis²⁷. (Such concepts as «partii», «power», «govern», «elect», «democrat», «regime» intersect with each other, which means that in many texts they are used together, and constitute the key concepts defining the discourse about democracy).

On the contrary, the discourse of Prototypical Conception of Established Industrial Democracy is not established firmly. Analysis of the lattice (Fig.1) allows us to put forward such a hypothesis. On the one hand, there are groups of texts which pay attention to such concepts as «rule», «societi», «liber», «naton», «social», i.e. which highlight the flaws related to rule of law, respect for the laws, social problems, lack of wide social basis for liberal values, and challenges of building a nation-state. On the other hand, these texts do not correlate with each other,

²⁷ Jorgensen M., Phillips L. Discourse Analysis as Theory and Method. SAGE Publications, 2002

meaning that authors focus on specific features deviating from Prototypical Conception of Established Industrial Democracy without creating a system of these features and relations between them. However, the trend towards the development of this particular conceptualization of democracy should be noted; it lends to a note about the necessity to rethink the conceptualization of democratic changes.

It goes without doubt that these are not definitive conclusions, but the hypotheses which need to be verified and detailed through knowledge discovery; further research on discourse of defective democracies may either support or disprove these hypotheses. However, this example demonstrates the possibilities of FCA for knowledge discovery: in search for new hypotheses, their verification and interpretation of the acquired data.

Another important aspect of conceptualization challenge is the understanding of democratization. In recent years there is a widespread notion about the crises of the transition paradigm in the literature on democracy studies²⁸. “While the ‘transitologists’ of the 1970s and 1980s investigated the conditions and modes of transition from dictatorship to democracy, the ‘consolidologists’ of the 1990s concentrated on the inquiring into causes, conditions and models of the consolidation of young democracies. Most recently, the questions of whether democracy is working, how ‘good’ or ‘bad’ a democracy is, and of the conceptual issues of diminished subtypes of democracy (illiberal, defective democracies and so on) have begun to become the new predominant trend in democracy theory and democratization studies”²⁹. This change of paradigm is driven by the understanding of complexity of democratization process. Democratic changes are neither linear nor caused by a single factor; these processes need to be studied and measured with the complexity taken into account, which requires a change of tools for analysis.

Transition paradigm had a linear and simplified view of democratization: as a fixed succession of stages – liberalization, democratization, consolidation. It no longer can explain complex (non)democratic changes which are happening in countries of established democracy and in flawed democracies³⁰.

Theory of political transformations (or of democracy consolidation) which came to substitute the transition paradigm in reality did little more than a mere upgrade. It left untouched the linear logic of democratic changes which was characteristic of transition theory. ‘Consolidologists’ suggested that democracy may need more than three stages to reach its liberal form. Democratization and introduction of democratic institutions is not necessarily followed by consolidation of democracy. Instead, the political regime may drift from one semi-authoritarian state into another, thus bringing quasi-democratic or authoritarian consolidation. Although some researchers³¹ say that semi-authoritarian consolidation can last for a long time, and, moreover, the country can get stuck in the vicious circle of nondemocratic consolidation forever – the conceptual and methodological core of ‘consolidologists’ holds into the old linear paradigm of democratic change. It is demonstrated conclusively by the fact that the ultimate aim for both ‘transitologists’ and ‘consolidologists’ is the same – achievement of consolidated democracy.

We think that a new theory of democratization is needed – a theory of democratic development. This term is increasingly used in the research literature³². This concept presupposes a constant process of development: as the ‘ideal democracy’ is unachievable, all the countries can only be considered striving to achieve it; some are ahead of the others on the road, but it

²⁸ Carothers T. The End of the Transition Paradigm. *Journal of Democracy*, V. 13, N. 1, January 2002. P. 5-21.

²⁹ Merkel M, Croissant A. Conclusion: Good and Defective Democracies. *Democratization* 11, 5. P. 199-213.

³⁰ Carothers T. The End of the Transition Paradigm. *Journal of Democracy*, V. 13, N. 1, January 2002. P. 5-21.

³¹ Diamond L.J. Thinking About Hybrid Regimes. *Journal of Democracy*, V. 13, N. 2, April 2002. P. 21-35.

³² O'Dwyer, Conor. *Runaway State-Building: Patronage Politics and Democratic Development*. Johns Hopkins University Press, 2006. Reilly, Benjamin. *Political Parties in Conflict-Prone Societies: Regulation, Engineering and Democratic Development*, United Nations University Press, 2008. Levy, Daniel C., and Kathleen Bruhn. *Mexico: The Struggle for Democratic Development (2nd Edition)*, University of California Press, 2006.

does not give any guarantees that they will not stagger aside on their way. Besides, according to this concept, there are several alternative ways of democratic development.

Theory of democratic development also alleviates the contradictions between the two competing definitions and discourses of democracy: Expanded Procedural Minimum Definition and Prototypical Conception of Established Industrial Democracy; it even measures them against Maximalist Definition. It is of particular importance for the study of democratic development to distinguish between two types of democracy characteristics. The first type comprises the *features* of “quality” of democracy³³ and its flaws / “defects”, i.e. deviations from the needed quality level and features. The second type is comprised of the *factors* which influence the changes in democracy features, one way or another. Features of democracy are more similar to R. Dahl’s “democratic institutes” which are a basis of procedural definitions of democracy. Factors are the aspects of broader relations and concepts, such as liberal industrial democracy; socio-political and economic conditions of established democracies or their lack, etc.

In our research it is FCA which allowed us to formulate the need for a new conceptualization of democracy – namely, theory of democratic development. We built lattices on the basis of Freedom House’s dynamic tables of democracy rating – and they showed different paths of development to the more advanced democratic state of the polity.

Researchers of democracy face new challenges of conceptualizing democracy and democratic development, and it requires analytical tools unlike the traditional quantitative and qualitative methods of data analysis. We believe that developing methods like FCA, applying and combining them will foster new hypotheses and their verification. As a result, it will contribute to acquisition of knowledge about democracy and democratization without reducing the complexity of these phenomena.

Operationalisation of democracy study parameters

The challenges for operationalisation of democracy study parameters are two-fold: to avoid redundancy and selecting non-essential indicators, and to avoid conflation, i.e. combining several important indicators into one³⁴. Besides, parameters of democratic development can be detailed through different indicators. For instance, in BTI Democracy Index the “Rule of Law” parameters is divided into several indicators: separation of powers, independent judiciary, prosecution of office abuse, civil rights. Firstly, there is definitely a conflation present: “Civil rights” should be a parameter equal to “Rule of Law”, as it is present in Freedom House’s index. Secondly, detailing of parameter “Rule of Law” can be contested too. Freedom House’s rating divides Rule of Law into the following parameters: independent judiciary; the rule of law prevails in civil and criminal matters; police under direct civilian control; protection from political terror; laws, policies, and practices guarantee equal treatment. The only overlap between these two operationalisations of “Rule of law” is the indicator “independent judiciary”, the rest of them differ. On the one side, these differences can be viewed as a problem of conceptualization – though not of democracy itself, but of its parameter Rule of law. On the other side, they can be viewed as a problem of operationalisation – an omission of important aspects of the parameter. Often the reduction of parameter is caused not by the challenges of conceptualization, but rather by difficulties of measuring the selected parameters. Researchers compromise by omitting some of the indicators, thus diminishing the scope of the selected parameter.

Furthermore, addressing the challenges of operationalisation is complicated by close interrelations between the selected parameters of democracy. It becomes apparent already

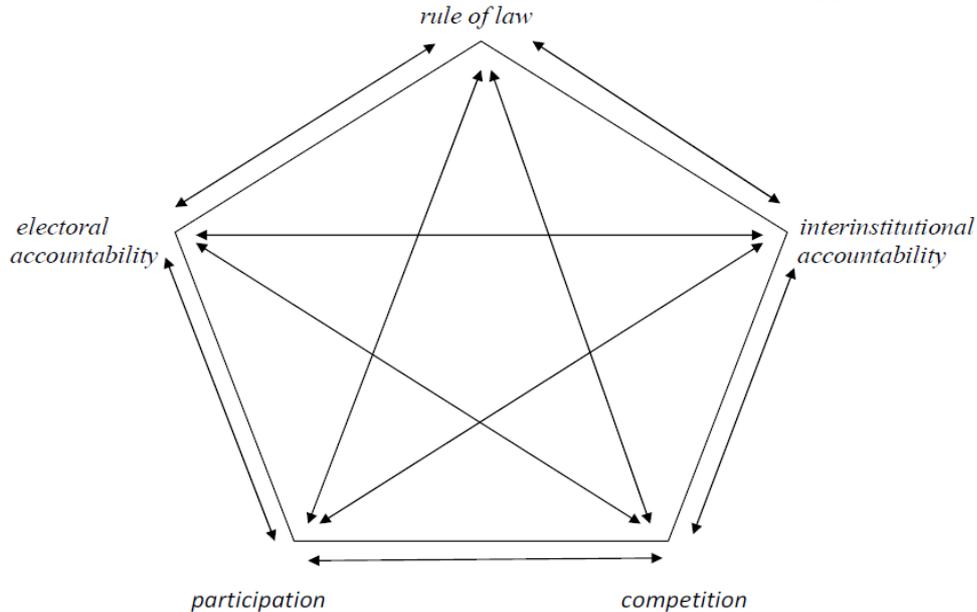
³³ Assessing the Quality of Democracy. Larry Diamond, ed. - Stanford University. Leonardo Morlino, ed. Published by Johns Hopkins University Press, 2005.

³⁴ G. L. Munck, J. Verkuilen. Conceptualizing and measuring democracy. Evaluating Alternative Indices. Comparative Political Studies, Vol. 35 No. 1, February 2002. P.8.

during the conceptualization stage. For example, when L.Morlino selects democratic qualities (rule of law, electoral accountability, inter-institutional accountability, participation, competition), he speaks about interrelations between them (see Table 2).

This, in its turn, creates further difficulties for operationalisation of the selected parameters. The closer they are related to each other, the higher are the chances that detailing will reveal indicators which can be attributed to several parameters at once. As a result, the researcher is faced with a task of determining unique indicators for each parameter. Thus, the challenge of operationalisation can be summed up as a competent and thought-through reduction of democracy development parameters.

Table 2. Democratic qualities: connections among procedural dimensions



We believe that FCA provides the tools to perform such a reduction of parameters of democratic development. We will demonstrate this on example of the texts about “democracies with adjectives”. Each of them is a separate concept which defines the specific type of non-liberal democracy by examining country-cases and their specific features. A research team consisting of several authors did a discourse-analysis of 30 texts and concepts of “democracy with adjectives”, and outlined their specific features. Thus we built an object-attributes matrix, with object being the concepts of ‘democracy with adjectives’ and with attributes being their features. All in all there are 30 objects (concepts and cases) and 45 attributes (features and parameters of non-liberal democracies). The results of processing this matrix can be seen in the lattice on Figure 2.

However, it is not the lattice itself which is most interesting, but the Implications and Association rules, which can be shown with the help of FCA software - Concept Explorer (see Appendix 1, 2). It is the analysis of implications and association rules for the features of defective democracies which allows us to perform the reduction by selecting “core” indicators within the discourse of ‘democracies with adjectives’.

We will count indicators as ‘core’ if they satisfy the following conditions: (1) they are related to a large number of objects (concepts of ‘democracies with adjectives’), i.e. are characteristic of at least half of the concepts; (2) they are premises rather than conclusions within implications and association rules. The first rule helps us to choose several implications, and from this set we choose attributes according rule (2). These rules help us to identify not very general and not very unique parameters, which can differentiate objects into several groups/types.

If we rigidly apply these conditions during selection process and exclude the conditions which appear as ‘conclusions’ within implication sets even once, we can reduce 45 parameters of democratic development to 7:

1. Weakness of formal institutions/personalizm
2. Violation of freedom of association
3. Violation of check and balances system
4. Restriction of civil liberties
5. Defects of feedback mechanism
6. Governmental interventions in economy
7. Military - fourth power

It is worth noting that some prominent parameters which are widely-used in ratings of democratic development, for instance, political competition, turned out to be the conclusions within implication sets more rather than the premises. We can draw a conclusion that seemingly inalienable and basic parameters of democracy such as political competition may in fact be derived from other, more narrow parameters. The latter, in turn, are easier to operationalize without falling into the traps of redundancy and conflation.

Other parameters, widely used in ratings, such as Rule of Law, turned out to be less popular in texts about defective democracies. It may be showing that evaluation of democratic development in developing countries should differ from evaluation of established democracies. The same applies to operationalisation of parameters.

The opportunities offered by FCA for generating implications on the basis of object-attributes matrix can be used when we have a hypothesis which looks like:

$$A, B, C \rightarrow Y$$

FCA allows to put forward similar hypotheses based on the analysis of cases from the objects-attributes matrix. For instance, the above-presented material allows to formulate such a hypothesis:

Hypothesis (1):

Weakness of formal institutions/personalizm, Violation of freedom of association, Violation of check and balances system, Restriction of civil liberties, Defects of feedback mechanism, Governmental interventions in economy, Military - fourth power \rightarrow Defective, Illiberal Democracy

Formulation of such a hypothesis opens up the opportunities for further analysis: which cases should be selected? how to calibrate membership? does the case need to satisfy all conditions to reach the outcome? what combination of conditions results in the outcome? Is there a major condition or conditions for the outcome?

Challenges of measurement of democracy study parameters

Challenges of measurement of democracy parameters are connected with the selection of measurable indicators; with selection of measurement level; with recording and publicizing of coding rules, coding process, and disaggregate data. These challenges require a rigorous

adherence to the principles of validity, reliability, and replicability of procedures in working with data³⁵.

We believe that one of the major problems in working with democracy development ratings is the necessity to use data of different type, measurement level and scale: quantitative and qualitative data, metric, range and nominal variables; expert opinions, statistical data and polls data. Moreover, data in the ratings is predominantly qualitative or mixed, and relies heavily on expert assessments because it is hard to find statistical data for many parameters of democratic development (e.g. rule of law or political culture).

That is why researchers face the task of bringing the different measurement levels, scales and types of data to a common standard – and doing it in line with the principles of validity, reliability and replication of research procedure.

FCA can hardly be of help for selection of indicators and selection of measurement level, but they can be useful to clarify the coding rules and to select the common standard for the data.

Let us demonstrate the possibilities offered by FCA on the basis of hypothesis №1 – we will create a basis for a new rating of democratic development. Our analysis showed that in order to achieve higher validity we need to assess separately the level of democratic development of established democracies and of developing countries, and the parameters for such assessment should be different as well. As we are focusing on defective democracies, we need to select relevant cases. However, some countries are disputable, and some researchers consider them defective democracies while others argues them to be authoritarian regimes (e.g. Russia). That is why we need to amend the tested model:

Hypothesis (2):

Not Free and not Fair Elections, Weakness of formal institutions/personalism, Violation of freedom of association, Violation of checks and balances system, Restriction of civil liberties, Defects of feedback mechanism → Autocracy

We excluded two parameters from the model: “Governmental interventions in economy” and “Military as fourth power”. The former is closer to a factor than a feature of democratic development, and the latter is characteristic of a limited number of cases – from Latin America only – while non-liberal democracies are spread not only in that region.

We will demonstrate the analytical opportunities given by FCA on the cases of post-Soviet countries (see Table 3).

To measure the indicator ‘Not Free and Fair Elections’ we took the parameter with the same name from BTI Democracy Index (BTI index). This indicator is measured on a 10-point scale, with 1 being the lowest and 10 being the highest value.

For measurement of of ‘Weakness of formal institutions/personalism’ we again used the parameter from BTI Democracy Index (BTI index). It is called ‘Stability of Democratic Institutions’ and is the arithmetic average of two indicators – ‘Performance of democratic institutions’ and ‘Commitment to democratic institutions’. These two indicators are also measured on a 10-point scale, with 1 being the lowest and 10 – the highest value.

‘Violation of freedom of association’ is based on the ‘Association / assembly rights’ of BTI index. The indicator has a 10-point scale, with 1 being the lowest value.

‘Violation of checks and balances system’ is based on ‘Separation of powers’ from BTI index, with the same 10-point scale as earlier.

To measure ‘Restriction of civil liberties’ we used parameter ‘Civil Liberties’ from Freedom House’s rating. The average of the political rights and civil liberties ratings, known as the freedom rating, determines the overall status: Free (1.0 to 2.5), Partly Free (3.0 to 5.0), or Not Free (5.5 to 7.0). Civil Liberties indicator has the similar scale from 1 to 7.

³⁵ G. L. Munck, J. Verkuilen. Conceptualizing and measuring democracy. Evaluating Alternative Indices. Comparative Political Studies, Vol. 35 No. 1, February 2002. P.8.

Defects of feedback mechanism are going to be measured with the help of 'Political Participation' from the Economist's rating. "The Economist Intelligence Unit's index of democracy, on a 0 to 10 scale, is based on the ratings for 60 indicators grouped in five categories: electoral process and pluralism; civil liberties; the functioning of government; political participation; and political culture. Each category has a rating on a 0 to 10 scale, and the overall index of democracy is the simple average of the five category indexes"³⁶.

Table 3. Initial data of democracy development ratings

№	Countries/ Indicators (Source)	Free and Fair Elections (BTI index)	Formal institutions/personalizm (BTI index)	Freedom of association (BTI index)	Checks and balances system (BTI index)	Civil liberties (Freedom house)	Feedback mechanism (Economist)
1	Armenia	5	2	5	4	4	3,89
2	Azerbaijan	4	2	4	4	5	3,33
3	Belarus	2	2	4	2	6	3,89
4	Estonia	9	10	10	10	1	5
5	Georgia	7	6,5	7	5	3	4,44
6	Kazakhstan	3	2	4	3	5	3,33
7	Kyrgyzstan	4	2	4	3	5	4,44
8	Latvia	9	9,5	10	10	2	5,56
9	Lithuania	10	10	10	10	1	5,56
10	Moldova	6	7	7	5	3	5,56
11	Russia	6	5	4	4	5	5
12	Tajikistan	3	2	4	3	5	2,22
13	Turkmenistan	2	1	1	2	7	2,22
14	Ukraine	8	6,5	8	6	3	5
15	Uzbekistan	2	1	2	2	7	2,22

It is easy to notice from this example that building an index of democratic development, or even for a simple comparison, we need to standardize the data for it to be on comparable scale.

It can be made by standardizing the data entries on the scale of 0...1, where 0 is the membership in the group of countries with the lowest parameters of democratic development, and 1 is the highest positive condition (see Table 4). Here the negation rule is in power, so, e.g. Belarus membership score "0,2" in free and fair elections countries subset means Belarus membership score "0,8" in not free and fair elections countries subset.

Table 4. Standardizing data of democracy development ratings

№	Countries / Indicators (Source)	Free and Fair Elections (BTI index)	Formal institutions/personalizm (BTI index)	Freedom of association (BTI index)	Checks and balances system (BTI index)	Civil liberties (Freedom house)	Feedback mechanism (Economist)
1	Armenia	0,5	0,2	0,5	0,4	0,5	0,389
2	Azerbaijan	0,4	0,2	0,4	0,4	0,33	0,333
3	Belarus	0,2	0,2	0,4	0,2	0,17	0,389
4	Estonia	0,9	1	1	1	1	0,5
5	Georgia	0,7	0,65	0,7	0,5	0,67	0,444
6	Kazakhstan	0,3	0,2	0,4	0,3	0,33	0,333
7	Kyrgyzstan	0,4	0,2	0,4	0,3	0,33	0,444

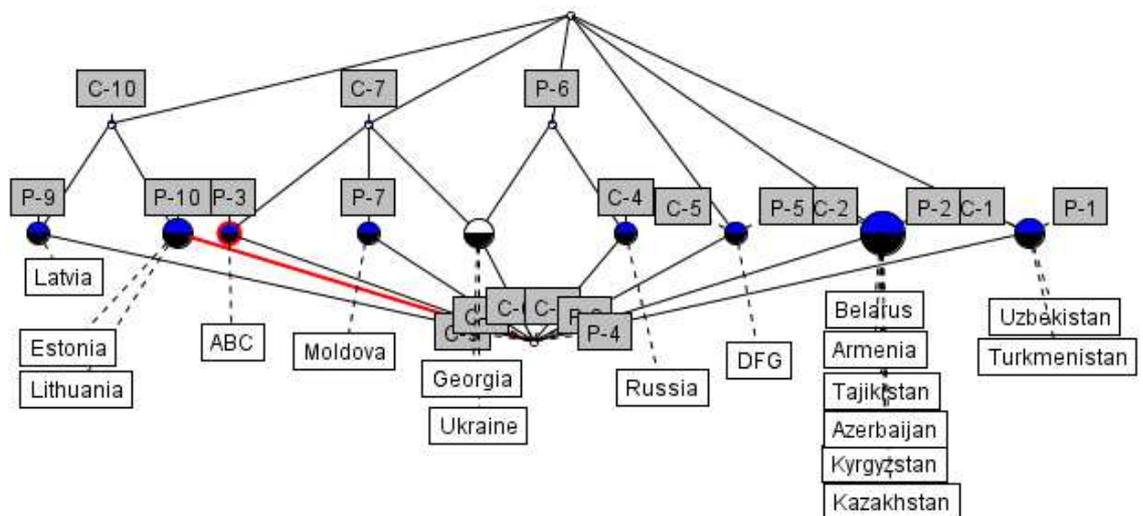
³⁶ http://www.eiu.com/Handlers/WhitepaperHandler.ashx?fi=Democracy_Index_Final_Dec_2011.pdf&mode=wp

8	Latvia	0,9	0,95	1	1	0,83	0,556
9	Lithuania	1	1	1	1	1	0,556
10	Moldova	0,6	0,7	0,7	0,5	0,67	0,556
11	Russia	0,6	0,5	0,4	0,4	0,33	0,5
12	Tajikistan	0,3	0,2	0,4	0,3	0,33	0,222
13	Turkmenistan	0,2	0,1	0,1	0,2	0	0,222
14	Ukraine	0,8	0,65	0,8	0,6	0,67	0,5
15	Uzbekistan	0,2	0,1	0,2	0,2	0	0,222

We believe that FCA can also be useful for gradating the parameters of democratic development, as it allows to keep the information about the structure and hierarchy of objects and properties. Let us illustrate this by applying FCA to the parameter ‘Weakness of formal institutions/personalism’. This parameter is comprised of two indicators ‘Performance of democratic institutions’ and ‘Commitment to democratic institutions’, and is derived as their arithmetic average. The lattice shows the structure of the data performed by two indicators without their reduction to the average (see Figure 3)

The country cases on the lattice are spread in the same way if they were spread out according to their averaged parameters. However, if the country ABC had parameters P-3 and C-7, their average would have been 5, and ABC would be in the same sub-set as Russia and another hypothetical country DFG (P-5 и C-5). The lattice allows to see such cases, and the decision about attributing the country to the specific set is taken consciously by researcher.

Figure 3. Lattice on Formal institutions / personalizm (BTI index)*



*P – Performance of democratic institutions, C - Commitment to democratic institutions

Challenges of data aggregation

Challenges of data aggregation for ratings of democratic development are related to the choice of aggregation level, aggregation rules, and the clarity of these rules. Besides that, aggregation should be valid and replicable, and not overly complicated and work-consuming³⁷. In practice the usual aggregation rule is averaging of indicators by finding the arithmetic average or by adding up the values.

³⁷ G. L. Munck, J. Verkuilen. Conceptualizing and measuring democracy. Evaluating Alternative Indices. Comparative Political Studies, Vol. 35 No. 1, February 2002. P.8.

A possible rating of democratic development for the post-Soviet countries on the basis of data which we presented earlier is presented in Table 5.

Table 5. Rating of democratic development

Rating	№	Countries / Indicators (Source)	Free and Fair Elections (BTI index)	Formal institutions/personalism (BTI index)	Freedom of association (BTI index)	Checks and balances system (BTI index)	Civil liberties (Freedom house)	Feedback mechanism (Economist)	Average score (Y)
1	9	Lithuania	1	1	1	1	1	0,556	0,93
2	4	Estonia	0,9	1	1	1	1	0,5	0,90
3	8	Latvia	0,9	0,95	1	1	0,83	0,556	0,87
4	14	Ukraine	0,8	0,65	0,8	0,6	0,67	0,5	0,67
5	10	Moldova	0,6	0,7	0,7	0,5	0,67	0,556	0,62
6	5	Georgia	0,7	0,65	0,7	0,5	0,67	0,444	0,61
7	11	Russia	0,6	0,5	0,4	0,4	0,33	0,5	0,46
8	1	Armenia	0,5	0,2	0,5	0,4	0,5	0,389	0,41
9	7	Kyrgyzstan	0,4	0,2	0,4	0,3	0,33	0,444	0,35
10	2	Azerbaijan	0,4	0,2	0,4	0,4	0,33	0,333	0,34
11	6	Kazakhstan	0,3	0,2	0,4	0,3	0,33	0,333	0,31
12	12	Tajikistan	0,3	0,2	0,4	0,3	0,33	0,222	0,29
13	3	Belarus	0,2	0,2	0,4	0,2	0,17	0,389	0,26
14	15	Uzbekistan	0,2	0,1	0,2	0,2	0	0,222	0,15
15	13	Turkmenistan	0,2	0,1	0,1	0,2	0	0,222	0,14

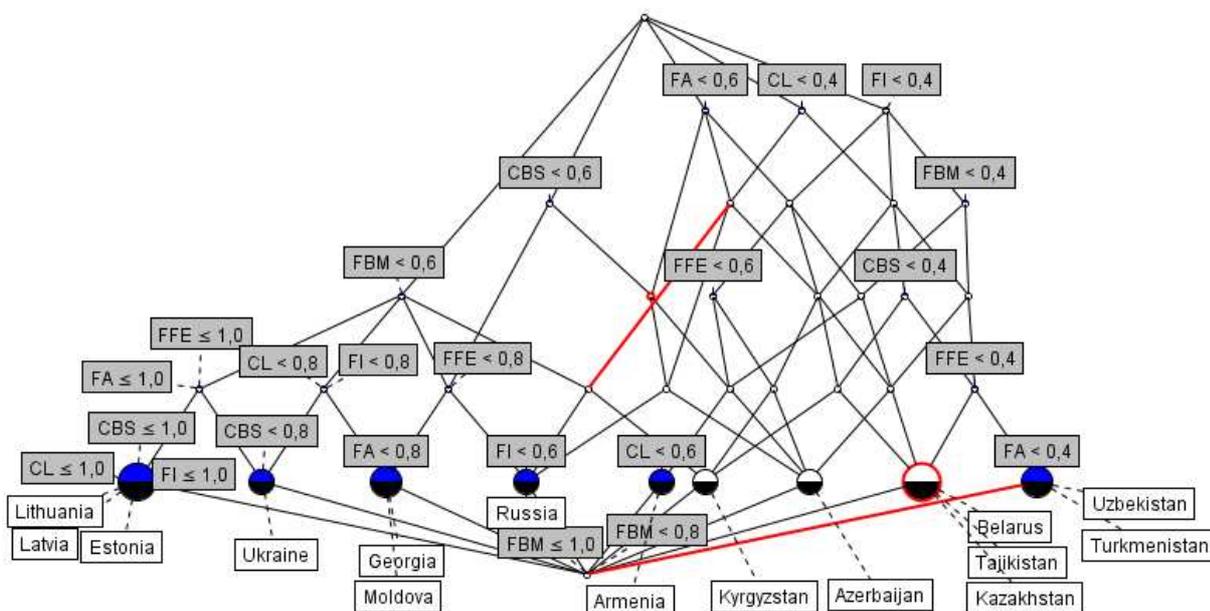
The next step common for such ratings is to group the countries into 3-4 types. Similarly, we can group our 15 cases into 4 groups depending on their average score of index (Y). For instance, we pick the following intervals: $0 \leq Y < 0,4$; $0,4 \leq Y < 0,6$; $0,6 \leq Y < 0,8$; $0,8 \leq Y < 1,0$. Each of the intervals corresponds to a certain degree of democratic development:

$0 \leq Y < 0,4$; Autocracy
 $0,4 \leq Y < 0,6$; Soft Autocracy
 $0,6 \leq Y < 0,8$; Defective Democracy
 $0,8 \leq Y < 1,0$ Full Democracy

Out of 15 cases most countries are autocracies (7 - Kyrgyzstan, Azerbaijan, Kazakhstan, Tajikistan, Belarus, Uzbekistan, Turkmenistan), 2 countries are soft autocracies (Russia, Armenia), only two qualify as defective democracies (Ukraine, Moldova, Georgia), and three can be rated as full democracies (Lithuania, Estonia, Latvia).

Further we will demonstrate the analytical opportunities offered by FCA for addressing the issues of aggregation without averaging the data. Lattice allows to see the structure and hierarchy of data (objects and attributes), and information is presented not as a linear rating but as a system of properties according to the worsening of democracy parameters (see Figure 4).

Figure 4. Lattice of democratic development indicators (index)*



*FFE - Free and Fair Elections, FI - Formal Institutions/personalism, FA - Freedom of Association, CBS - Checks and Balances System, CL - Civil Liberties, FBM – Feed Back Mechanism

Firstly, lattice allows not only to build ‘fuzzy’ typologies of objects, but also to see which particular parameters of democracy are problematic for the country and why one country (or group of countries) has a less-developed democracy than another country (or groups of countries).

Thus, the data is not simply averaged, as in usual aggregation, but is presented in more detail. For instance, Lithuania, Estonia, and Latvia experience problems only with the feedback mechanism, but Ukraine is behind them not only on feedback, but also on the checks and balances system, civil liberties, formal institutions. Georgia and Moldova in comparison to Ukraine have lower scores on checks and balances system, Free and Fair Elections, and freedom of association. Russia is behind Georgia and Moldova on such parameters as formal institutions/personalism, freedom of association, and civil liberties. Comparison of Russia and Armenia is even more interesting: Armenia lags behind on Free and Fair Elections, formal institutions/personalism, and feedback mechanism, but has better scores on civil liberties.

Kyrgyzstan is behind Armenia on checks and balances system and civil liberties, but is ahead of Armenia on feedback mechanism. Azerbaijan is similar to Kyrgyzstan, but the former has relatively better scores on checks and balances system, and the latter is slightly ahead on feedback mechanism. Kazakhstan, Tajikistan, and Belarus are behind Azerbaijan on situation with checks and balances system and Free and Fair Elections. Uzbekistan and Turkmenistan have low scores on all parameters, but are behind the previous country-cases on freedom of association.

Secondly, FCA can build implications. For example, there is an interesting implication
 $FFE < 0,4 \rightarrow FI < 0,4 \text{ CBS} < 0,4 \text{ CL} < 0,4 \text{ FBM} < 0,4.$

That is, if the principle of free and fair elections is violated, almost all other parameters of democracy are diminished (except the freedom of association which, as we saw on the lattice, is the last to be discarded).

Challenges of results visualization

Traditional ways of visualizing ratings³⁸ of democratic development are (1) the tables with integral (average) scores where countries are indexed according to this score (the rating per se); (2) maps with color table for certain scores or groups of scores which are based on an interval scale; (3) diagrams, typically for demonstration of rating dynamics; (4) leaf diagrams which show profiles of the index for different countries.

FCA offers an alternative way of visualization which shows not only the average score and the linear rating, but the more detailed scores of indicators and, more importantly, hierarchy and structure of objects and properties. It gives the researcher access to a larger scope of information which enhances the opportunities for interpretation of results.

It allows us to see more information and give more opportunities for data interpretation. In this with lattice only leaf diagrams can compete, but leaf diagrams limited by few objects and attitudes that they can show without the quality of the figure. FCA gives opportunity to show on one figure more objects (cases), more attitudes (features) and connections between them (implications).

FCA can work with truth tables (where independent variables and depended outcome is presented); in particular FCA allows to visualize truth table in lattice, and soft – Concept Explorer – produce implications. Comparison of resulting implication with hypothesis can be interesting research result. To demonstrate FCA opportunities by adding in the example below new parameter - depended variable Y (table 6).

We chose Institutional Basis of Democracy Index by MGIMO as a parameter of democratic development or membership to democracy/autocracy set (Y). It is interesting to explore how the indicators taken from a broad conceptualization of democracy (as liberal democracy) are related to the index which was based on a narrower concept (taking into account only institutional parameters)³⁹.

Table 6. Data of democracy development ratings ('conditions' and 'outcome')

Rating	№	Countries / Indicators (Source)	Free and Fair Elections (BTI index)	Weakness of formal institutions/personalism (BTI index)	Violation of freedom of association (BTI index)	Violation of checks and balances system (BTI index)	Restriction of civil liberties (Freedom house)	Defects of feedback mechanism (Economist)	Level of democracy development (Y)
1	9	Lithuania	1	1	1	1	1	0,556	0,669
2	4	Estonia	0,9	1	1	1	1	0,5	0,603
3	8	Latvia	0,9	0,95	1	1	0,83	0,556	0,623
4	14	Ukraine	0,8	0,65	0,8	0,6	0,67	0,5	0,646
5	10	Moldova	0,6	0,7	0,7	0,5	0,67	0,556	0,564
6	5	Georgia	0,7	0,65	0,7	0,5	0,67	0,444	0,179
7	11	Russia	0,6	0,5	0,4	0,4	0,33	0,5	0,524
8	1	Armenia	0,5	0,2	0,5	0,4	0,5	0,389	0,586
9	7	Kyrgyzstan	0,4	0,2	0,4	0,3	0,33	0,444	0,21
10	2	Azerbaijan	0,4	0,2	0,4	0,4	0,33	0,333	0,346
11	6	Kazakhstan	0,3	0,2	0,4	0,3	0,33	0,333	0,21
12	12	Tajikistan	0,3	0,2	0,4	0,3	0,33	0,222	0,105

³⁸ Nikolaenko S., Belianova E., Smorodinov O. Problems of using of international ratings: society, state, economy. Moscow, 2009. Political atlas of modernity: experience of multidimensional statistical analysis of political systems Moscow, MGIMO, 2007.

³⁹ Political atlas of modernity: experience of multidimensional statistical analysis of political systems Moscow, MGIMO, 2007.

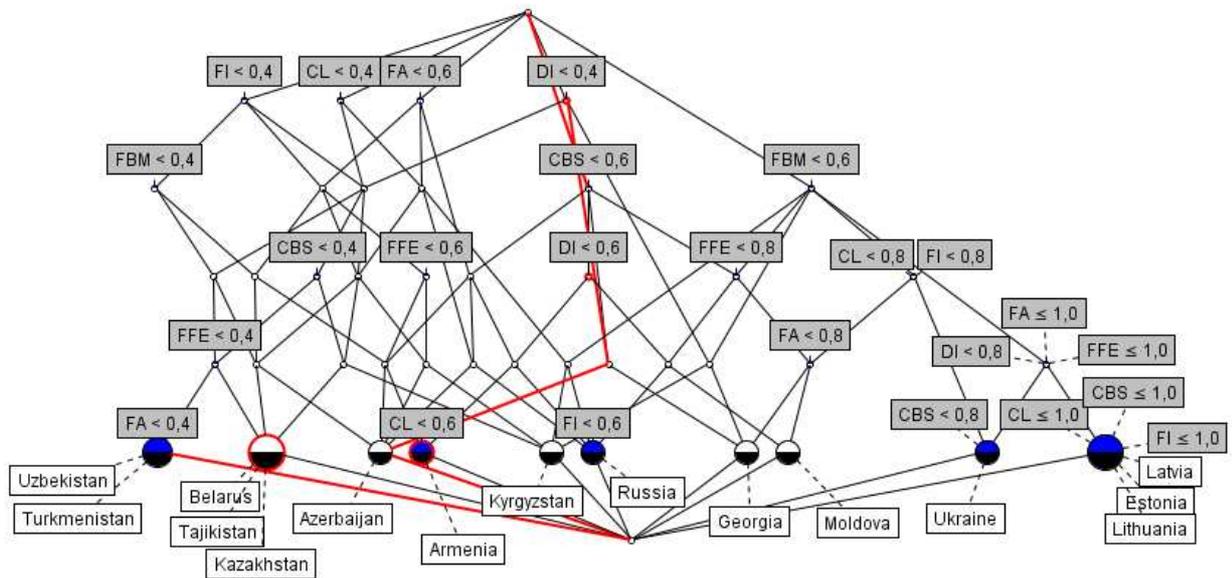
13	3	Belarus	0,2	0,2	0,4	0,2	0,17	0,389	0,223
14	15	Uzbekistan	0,2	0,1	0,2	0,2	0	0,222	0,187
15	13	Turkmenistan	0,2	0,1	0,1	0,2	0	0,222	0,003

Let us turn again to the hypothesis:

Not Free and not Fair Elections, Weakness of formal institutions/personalism, Violation of freedom of association, Violation of checks and balances system, Restriction of civil liberties, Defects of feedback mechanism => Autocracy

FCA allows to visualize Table 6 as a lattice (see Figure 5).

*Figure 5. Lattice build on 'conditions' and 'outcomes' data**



*DI - Institutional Basis of Democracy Index

Most interesting for checking the hypothesis are the implications (see Appendix 3), and the following implication in particular:

$$1 < 7 > FI < 0,4 + CL < 0,4 \rightarrow DI < 0,4,$$

where the first value – is the sequence number, the second value is the number of objects which satisfy $FI < 0,4 + CL < 0,4$;

We see that flaws of formal institutions/personalism and of freedom of association are the precondition for autocracy. Thus, the hypothesis was partially confirmed:

Weakness of formal institutions/personalism, Restriction of civil liberties → Autocracy

Interpretation alternatives

Interpretation of results in studying democracy and other complex social phenomena is still more of an art and craft than a science, even when the interpretation is based on empirical data and research results. There is an easy explanation for it: the existing methods cannot embrace the social phenomena in all their complexity and multifold nature.

The methods presented in this article do not claim to have such an all-embracing capability, but we can say that they are the first step towards studying and measuring social processes and phenomena in all their unreduced complexity. These methods are also not a substitute for traditional quantitative and qualitative methods; on the contrary, they are based on more traditional methods and use them as a starting point. It allows to find new directions for interpretation – not only for the results of democracy ratings analysis, but more universal conclusions as well.

Let us sum up FCA's knowledge discovery potential.

Firstly, it allows to create 'fuzzy' typologies of objects and properties. This was demonstrated earlier through analyzing the flaws of democratic development and the typology of countries according to their level of democratic development.

Secondly, it allows to see implications (relations between the indicators); to verify hypotheses about dependent variables, including complex interrelations which involve several factors and addition of new ones.

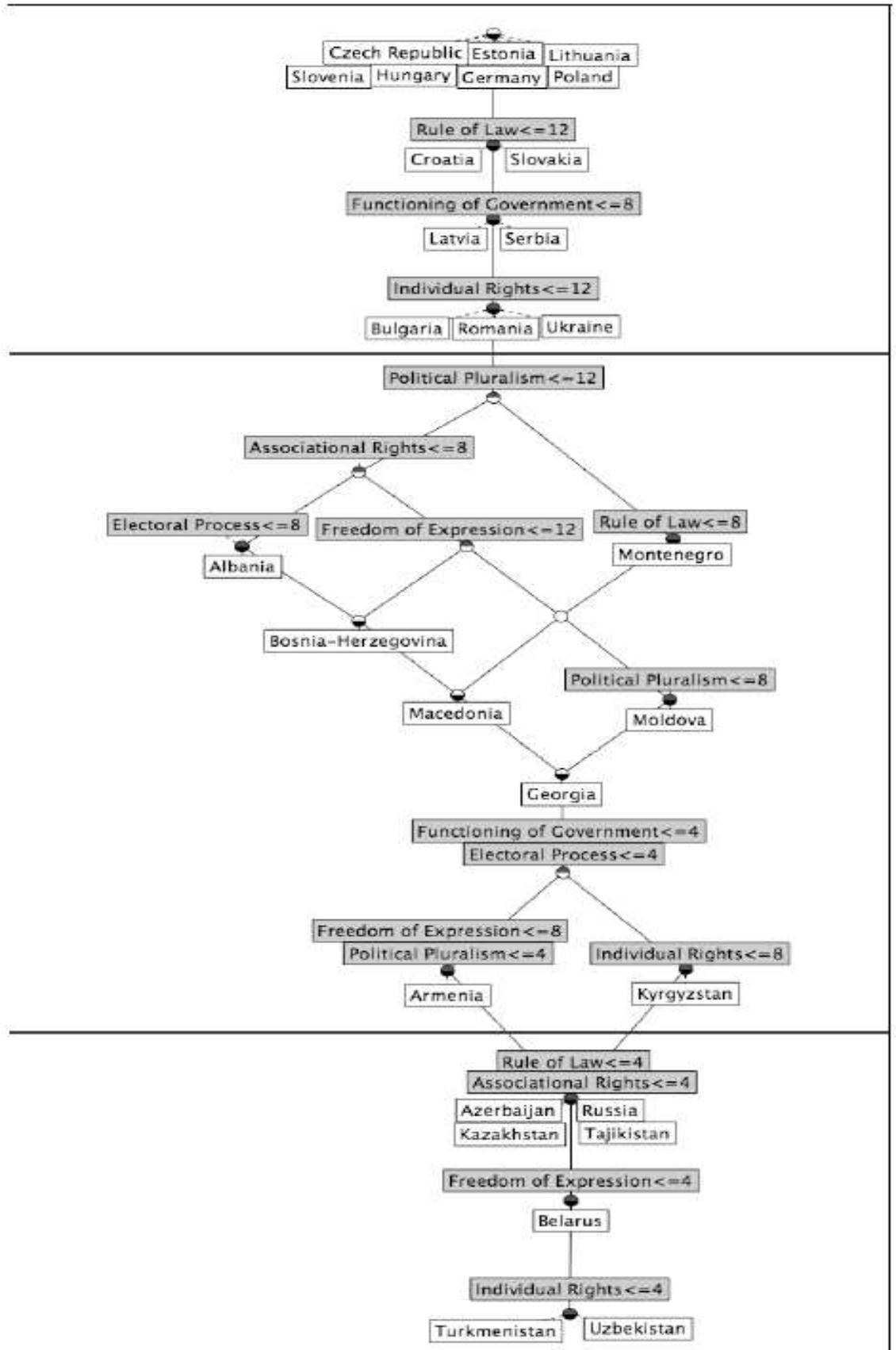
Thirdly, it allows to define "core" attributes which are not very general and not very unique parameters, which can differentiate objects into several groups/types.

Fourthly, it provides opportunity for defining the paths of socio-political changes, within the paradigm of multi-path political development (alternative to the theory of path dependency).

We have already shown through earlier examples how these opportunities for generating alternative interpretations can be used, and will not repeat them here. However, we see fitting to give one more venue of possible interpretation of results with the help of FCA.

Being in the first place a highly practical tool for exploring the data, the concept lattice can also help formulate theoretical hypotheses, thus, supporting the process of scientific discovery. For example, the concept lattices in Figure 6 suggest a particular order in which parameters deteriorate with the decline of democracy.

Figure 6. The line diagram of the concept lattice of the 2009 “Freedom in the World” rating divided into three parts corresponding to the Free (top), Partly Free (middle), and Not Free (bottom) categories.



The two fastest and, thus, crucial for holding the system together are Functioning of Government and Electoral Process. These parameters refer to the features that constitute the framework of political process in the country. Their decline is closely followed by a regress in Associational and Organizational Rights, Political Pluralism and Participation, and Rule of Law, i.e., parameters related to the activity of civil society and citizen participation. The last to be restricted are the features related more to a personal sphere than to political activities: Personal Autonomy and Individual Rights and Freedom of Expression and Beliefs. Of course, to verify this hypothesis it would be necessary to study data from different sources related to other countries and other time periods.

Also application of lattices is to compare ratings coming from different sources (such as Freedom House or Economist Intelligence Unit etc.). Different organizations will most likely use different sets of parameters and may even give different meanings to identically named parameters, which complicates comparison. Nevertheless, the duality between the extensional and intentional characterization of lattice nodes should help us identify similarities and differences between ratings and the meanings of the parameters used there in.

As FCA provides rich possibilities for data analysis and interpretation, we plan to develop this approach in our further research.

Conclusions

In this article we showed how FCA can help in addressing the research tasks of evaluating democratic development, such as: conceptualization, operationalisation, measurement, aggregation, visualization, and interpretation of results.

FCA proved useful for finding solutions to problems of conceptualization, operationalisation, aggregation, visualization, and interpretation of results.

FCA allows to combine quantitative and qualitative data and to work in both these paradigms of data collection and analysis, which is a definite advantage of the methods. Moreover, they have a shared basis and logic for building matrixes out of initial data, which makes it easier to use them simultaneously for data processing and data analysis of average samples.

FCA allows to put forward a hypothesis about correlation and interdependency, which other methods can verify. Achieving the same results by using different methods will strengthen our research findings. Another point, FCA has less steps of initial data transformation than another techniques. And this is the most common claim of quantitative researchers – using the data that were transformed several times. FCA can minimize this kind of critics.

Thus combining FCA with traditional methods and analytical tools by all means will broaden analytical and interpretative strength of our conclusions in relation to knowledge discovery about complex social processes and phenomena.

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Appendices

Appendix 1. Implication sets of “democracy with adjectives” attributes

- 1 < 27 > Weakness of formal institutions/personalizm ==> Defects of political competition;
- 2 < 22 > Violation of check and balances system Restriction of civil liberties ==> Defects of political competition;
- 3 < 20 > Violation of freedom of association Restriction of civil liberties ==> Restriction on independence of media;
- 4 < 20 > Defects of feedback mechanism ==> Defects of political competition;
- 5 < 19 > Restriction on independence of media Restriction of civil liberties Defects of political competition ==> Violation of freedom of association;
- 6 < 18 > Governmental interventions in economy ==> Defects of political competition;
- 7 < 18 > Military - fourth power ==> Military have political role;
- 8 < 17 > Supremacy of Military jurisdiction ==> Military - fourth power Military have political role;
- 9 < 14 > Restriction on independence of media Dominance of not elected political actors ==> Violation of freedom of association Defects of political competition;
- 10 < 14 > Violation of freedom of association Dominance of not elected political actors ==> Restriction on independence of media Defects of political competition;
- 11 < 14 > Dominance of not elected political actors Violation of check and balances system ==> Defects of political competition Military have political role;
- 12 < 14 > Violation of check and balances system Defects of political competition Defects of feedback mechanism ==> Weakness of formal institutions/personalizm;
- 13 < 14 > Defects of political competition Weakness of formal institutions/personalizm Defects of feedback mechanism ==> Violation of check and balances system;
- 14 < 14 > Violation of check and balances system Military have political role ==> Dominance of not elected political actors Defects of political competition;
- 15 < 14 > Restriction of civil liberties Military have political role ==> Defects of political competition;
- 16 < 14 > Dominance of not elected political actors Defects of political competition Military have political role ==> Violation of check and balances system;
- 17 < 13 > Defects of political competition Military - fourth power Military have political role ==> Restriction of civil liberties;
- 18 < 13 > Dominance of not elected political actors Military - fourth power Military have political role ==> Supremacy of Military jurisdiction;
- 19 < 12 > Restriction on independence of media Violation of freedom of association Violation of check and balances system Defects of political competition ==> Dominance of not elected political actors Restriction of civil liberties Military regime in emergency situation Military - fourth power Military have political role Restricted legislature Supremacy of Military jurisdiction;
- 20 < 12 > Dominance of not elected political actors Restriction of civil liberties Defects of political competition ==> Restriction on independence of media Violation of freedom of association Violation of check and balances system Military regime in emergency situation Military - fourth power Military have political role Restricted legislature Supremacy of Military jurisdiction;
- 21 < 12 > Military regime in emergency situation ==> Restriction on independence of media Violation of freedom of association Dominance of not elected political actors Violation of check and balances system Restriction of civil liberties Defects of political competition Military - fourth power Military have political role Restricted legislature Supremacy of Military jurisdiction;

22 < 12 > Restriction on independence of media Military have political role ==> Violation of freedom of association Dominance of not elected political actors Violation of check and balances system Restriction of civil liberties Defects of political competition Military regime in emergency situation Military - fourth power Restricted legislature Supremacy of Military jurisdiction;

23 < 12 > Violation of freedom of association Military have political role ==> Restriction on independence of media Dominance of not elected political actors Violation of check and balances system Restriction of civil liberties Defects of political competition Military regime in emergency situation Military - fourth power Restricted legislature Supremacy of Military jurisdiction;

24 < 12 > Restricted legislature ==> Restriction on independence of media Violation of freedom of association Dominance of not elected political actors Violation of check and balances system Restriction of civil liberties Defects of political competition Military regime in emergency situation Military - fourth power Military have political role Supremacy of Military jurisdiction;

25 < 12 > Restriction of civil liberties Defects of political competition Military - fourth power Military have political role Supremacy of Military jurisdiction ==> Restriction on independence of media Violation of freedom of association Dominance of not elected political actors Violation of check and balances system Military regime in emergency situation Restricted legislature;

26 < 10 > Restriction on freedom of speech and information Restriction on independence of media ==> Violation of freedom of association;

27 < 10 > Restriction on freedom of speech and information Violation of freedom of association ==> Restriction on independence of media;

28 < 10 > Violation of check and balances system Restriction of civil liberties Defects of political competition Weakness of formal institutions/personalizm ==> Defects of feedback mechanism;

29 < 8 > Restriction on freedom of speech and information Restriction of civil liberties ==> Restriction on independence of media Violation of freedom of association;

30 < 7 > Restriction on freedom of speech and information Defects of political competition ==> Restriction on independence of media Violation of freedom of association Restriction of civil liberties Governmental interventions in economy;

31 < 7 > Restriction on independence of media Defects of political competition Governmental interventions in economy ==> Restriction on freedom of speech and information Violation of freedom of association Restriction of civil liberties;

32 < 6 > Clientelism ==> Violation of check and balances system Defects of political competition Weakness of formal institutions/personalizm;

33 < 6 > Few people that are in power ==> Violation of check and balances system Defects of political competition Weakness of formal institutions/personalizm;

34 < 5 > Dominance of not elected political actors Ineffective governance ==> Restriction of civil liberties Elitism Limited sovereignty;

35 < 5 > Restriction of civil liberties Elitism ==> Dominance of not elected political actors Ineffective governance Limited sovereignty;

36 < 5 > Ineffective governance Elitism ==> Dominance of not elected political actors Restriction of civil liberties Limited sovereignty;

37 < 5 > Dominance of not elected political actors Limited sovereignty ==> Restriction of civil liberties Ineffective governance Elitism;

38 < 5 > Ineffective governance Limited sovereignty ==> Dominance of not elected political actors Restriction of civil liberties Elitism;

39 < 5 > Elitism Limited sovereignty ==> Dominance of not elected political actors Restriction of civil liberties Ineffective governance;

40 < 5 > Intervention of the USA ==> Military - fourth power Military have political role
Supremacy of Military jurisdiction;

41 < 4 > Defects of political competition Ineffective governance ==> Violation of check
and balances system Restriction of civil liberties Weakness of formal institutions/personalizer
Defects of feedback mechanism Clientelism Absence of democracy success;

42 < 4 > Violation of check and balances system Defects of political competition
Weakness of formal institutions/personalizer Defects of feedback mechanism Clientelism ==>
Restriction of civil liberties Ineffective governance Absence of democracy success;

43 < 4 > Absence of democracy success ==> Violation of check and balances system
Restriction of civil liberties Defects of political competition Weakness of formal
institutions/personalizer Defects of feedback mechanism Ineffective governance Clientelism;

44 < 4 > Violation of check and balances system Elitism ==> Defects of political
competition Weakness of formal institutions/personalizer Few people that are in power;

45 < 4 > Defects of political competition Elitism ==> Violation of check and balances
system Weakness of formal institutions/personalizer Few people that are in power;

46 < 4 > Defects of political competition Violation in party system ==> Violation of
check and balances system;

47 < 3 > Restriction of right on assize ==> Restriction on independence of media
Restriction of civil liberties Restriction of minorities rights;

48 < 3 > Restriction of minorities rights ==> Restriction on independence of media
Restriction of civil liberties Restriction of right on assize;

49 < 3 > Violation of Rule of Law ==> Restriction on independence of media Violation
of freedom of association Violation of check and balances system;

50 < 2 > Restriction on freedom of speech and information Restriction on independence
of media Violation of freedom of association Violation of check and balances system ==>
Violation of Rule of Law;

51 < 2 > Violation of check and balances system Defects of political competition
Governmental interventions in economy ==> Violation of freedom of association Weakness of
formal institutions/personalizer Defects of feedback mechanism Few people that are in power
Elitism;

52 < 2 > Restriction on independence of media Violation of freedom of association
Defects of political competition Weakness of formal institutions/personalizer ==> Dominance of
not elected political actors;

53 < 2 > Restriction on independence of media Violation of check and balances system
Defects of political competition Weakness of formal institutions/personalizer ==> Defects of
feedback mechanism Strength of democratic substitutions Few people that are in power
Manipulation through mass-media;

54 < 2 > Violation of freedom of association Violation of check and balances system
Defects of political competition Weakness of formal institutions/personalizer ==> Governmental
interventions in economy Defects of feedback mechanism Few people that are in power Elitism;

55 < 2 > Violation of freedom of association Defects of political competition
Governmental interventions in economy Weakness of formal institutions/personalizer ==>
Violation of check and balances system Defects of feedback mechanism Few people that are in
power Elitism;

56 < 2 > Restriction on independence of media Defects of political competition Defects
of feedback mechanism ==> Violation of check and balances system Weakness of formal
institutions/personalizer Strength of democratic substitutions Few people that are in power
Manipulation through mass-media;

57 < 2 > Violation of freedom of association Defects of political competition Defects of
feedback mechanism ==> Violation of check and balances system Governmental interventions in
economy Weakness of formal institutions/personalizer Few people that are in power Elitism;

58 < 2 > Defects of political competition Governmental interventions in economy Defects of feedback mechanism ==> Violation of freedom of association Violation of check and balances system Weakness of formal institutions/personalizm Few people that are in power Elitism;

59 < 2 > Political crisis ==> Dominance of not elected political actors Economy stagnation Increase of external debt;

60 < 2 > Dominance of not elected political actors Economy stagnation ==> Political crisis Increase of external debt;

61 < 2 > Restriction of civil liberties Economy stagnation ==> Defects of political competition Defects of feedback mechanism Limited sovereignty Military have political role No consensus about the rules;

62 < 2 > Defects of political competition Economy stagnation ==> Restriction of civil liberties Defects of feedback mechanism Limited sovereignty Military have political role No consensus about the rules;

63 < 2 > Increase of external debt ==> Dominance of not elected political actors Political crisis Economy stagnation;

64 < 2 > Strength of democratic substitutions ==> Restriction on independence of media Violation of check and balances system Defects of political competition Weakness of formal institutions/personalizm Defects of feedback mechanism Few people that are in power Manipulation through mass-media;

65 < 2 > Violation of check and balances system Defects of political competition Weakness of formal institutions/personalizm Clientelism Few people that are in power ==> Dominance of not elected political actors Elitism Violation in party system Military have political role Elite transit from old to new regime;

66 < 2 > Violation of freedom of association Elitism ==> Violation of check and balances system Defects of political competition Governmental interventions in economy Weakness of formal institutions/personalizm Defects of feedback mechanism Few people that are in power;

67 < 2 > Violation of check and balances system Defects of political competition Weakness of formal institutions/personalizm Defects of feedback mechanism Few people that are in power Elitism ==> Violation of freedom of association Governmental interventions in economy;

68 < 2 > Non-recognition of compromise ==> Limited sovereignty Full uncertainty of democratic procedures;

69 < 2 > Defects of political competition Limited sovereignty ==> Restriction of civil liberties Defects of feedback mechanism Economy stagnation Military have political role No consensus about the rules;

70 < 2 > Economy stagnation Limited sovereignty ==> Restriction of civil liberties Defects of political competition Defects of feedback mechanism Military have political role No consensus about the rules;

71 < 2 > Full uncertainty of democratic procedures ==> Non-recognition of compromise Limited sovereignty;

72 < 2 > Corruption ==> Violation of check and balances system Ineffective governance;

73 < 2 > Dominance of not elected political actors Violation in party system ==> Violation of check and balances system Defects of political competition Weakness of formal institutions/personalizm Clientelism Few people that are in power Elitism Military have political role Elite transit from old to new regime;

74 < 2 > Violation of check and balances system Defects of political competition Weakness of formal institutions/personalizm Violation in party system ==> Dominance of not elected political actors Clientelism Few people that are in power Elitism Military have political role Elite transit from old to new regime;

75 < 2 > Elitism Violation in party system ==> Dominance of not elected political actors Violation of check and balances system Defects of political competition Weakness of formal

institutions/personalism Clientelism Few people that are in power Military have political role
Elite transit from old to new regime;

76 < 2 > Manipulation through mass-media ==> Restriction on independence of media
Violation of check and balances system Defects of political competition Weakness of formal
institutions/personalism Defects of feedback mechanism Strength of democratic substitutions
Few people that are in power;

77 < 2 > Defects of political competition Weakness of formal institutions/personalism
Military have political role ==> Dominance of not elected political actors Violation of check and
balances system Clientelism Few people that are in power Elitism Violation in party system Elite
transit from old to new regime;

78 < 2 > Defects of political competition Defects of feedback mechanism Military have
political role ==> Restriction of civil liberties Economy stagnation Limited sovereignty No
consensus about the rules;

79 < 2 > Economy stagnation Military have political role ==> Restriction of civil liberties
Defects of political competition Defects of feedback mechanism Limited sovereignty No
consensus about the rules;

80 < 2 > Elitism Military have political role ==> Dominance of not elected political
actors Violation of check and balances system Defects of political competition Weakness of
formal institutions/personalism Clientelism Few people that are in power Violation in party
system Elite transit from old to new regime;

81 < 2 > Limited sovereignty Military have political role ==> Restriction of civil liberties
Defects of political competition Defects of feedback mechanism Economy stagnation No
consensus about the rules;

82 < 2 > Violation in party system Military have political role ==> Dominance of not
elected political actors Violation of check and balances system Defects of political competition
Weakness of formal institutions/personalism Clientelism Few people that are in power Elitism
Elite transit from old to new regime;

83 < 2 > No consensus about the rules ==> Restriction of civil liberties Defects of
political competition Defects of feedback mechanism Economy stagnation Limited sovereignty
Military have political role;

84 < 2 > Elite transit from old to new regime ==> Dominance of not elected political
actors Violation of check and balances system Defects of political competition Weakness of
formal institutions/personalism Clientelism Few people that are in power Elitism Violation in
party system Military have political role;

85 < 2 > Collectivism ==> Strength of religion as political platform Political role of
religious groups/elite;

86 < 2 > Political role of religious groups/elite ==> Strength of religion as political
platform Collectivism;

87 < 2 > Restrictions based on racial principles ==> Restriction of universal suffrage
Restriction of civil liberties;

88 < 2 > Restriction of universal suffrage Restriction of civil liberties ==> Restrictions
based on racial principles;

89 < 1 > Violation of independent judiciary principle ==> Restriction on freedom of
speech and information Restriction on independence of media Violation of freedom of
association Restriction of civil liberties Restriction equality before the court principle Restriction
of right on assize Restriction of minorities rights;

90 < 1 > Restriction on freedom of speech and information Restriction equality before the
court principle ==> Restriction on independence of media Violation of freedom of association
Restriction of civil liberties Violation of independent judiciary principle Restriction of right on
assize Restriction of minorities rights;

91 < 1 > Restriction on independence of media Restriction equality before the court
principle ==> Restriction on freedom of speech and information Violation of freedom of

association Restriction of civil liberties Violation of independent judiciary principle Restriction of right on assize Restriction of minorities rights;

92 < 1 > Violation of freedom of association Restriction equality before the court principle ==> Restriction on freedom of speech and information Restriction on independence of media Restriction of civil liberties Violation of independent judiciary principle Restriction of right on assize Restriction of minorities rights;

93 < 1 > Restriction of civil liberties Restriction equality before the court principle ==> Restriction on freedom of speech and information Restriction on independence of media Violation of freedom of association Violation of independent judiciary principle Restriction of right on assize Restriction of minorities rights;

94 < 1 > Restriction on independence of media Violation of freedom of association Restriction of civil liberties Restriction of right on assize Restriction of minorities rights ==> Restriction on freedom of speech and information Violation of independent judiciary principle Restriction equality before the court principle;

95 < 1 > Absence of democratic mentality ==> Dominance of not elected political actors;

96 < 1 > Restriction on freedom of speech and information Violation in party system ==> Violation of check and balances system;

97 < 1 > Restriction on independence of media Violation in party system ==> Violation of check and balances system;

98 < 1 > Restriction equality before the court principle Military have political role ==> Military - fourth power Supremacy of Military jurisdiction Intervention of the USA;

Appendix 2. Association Rules of “democracy with adjectives” attributes

1 < 27 > Weakness of formal institutions/personalizm =[100%]==> < 27 > Defects of political competition;

2 < 27 > Violation of freedom of association =[93%]==> < 25 > Restriction on independence of media;

3 < 31 > Restriction on independence of media =[81%]==> < 25 > Violation of freedom of association;

4 < 27 > Violation of freedom of association =[85%]==> < 23 > Defects of political competition;

5 < 22 > Violation of check and balances system Restriction of civil liberties =[100%]==> < 22 > Defects of political competition;

6 < 23 > Violation of freedom of association Defects of political competition =[91%]==> < 21 > Restriction on independence of media;

7 < 23 > Restriction on independence of media Defects of political competition =[91%]==> < 21 > Violation of freedom of association;

8 < 20 > Violation of freedom of association Restriction of civil liberties =[100%]==> < 20 > Restriction on independence of media;

9 < 20 > Defects of feedback mechanism =[100%]==> < 20 > Defects of political competition;

10 < 22 > Restriction on independence of media Restriction of civil liberties =[91%]==> < 20 > Violation of freedom of association;

11 < 19 > Restriction on independence of media Restriction of civil liberties Defects of political competition =[100%]==> < 19 > Violation of freedom of association;

12 < 20 > Restriction on independence of media Violation of freedom of association Restriction of civil liberties =[95%]==> < 19 > Defects of political competition;

13 < 21 > Restriction on independence of media Violation of freedom of association Defects of political competition =[90%]==> < 19 > Restriction of civil liberties;

14 < 18 > Governmental interventions in economy =[100%]==> < 18 > Defects of political competition;

15 < 18 > Military - fourth power =[100%]=> < 18 > Military have political role;
16 < 21 > Military have political role =[86%]=> < 18 > Military - fourth power;
17 < 17 > Supremacy of Military jurisdiction =[100%]=> < 17 > Military - fourth power
Military have political role;
18 < 18 > Military - fourth power Military have political role =[94%]=> < 17 >
Supremacy of Military jurisdiction;
19 < 18 > Defects of political competition Governmental interventions in economy
=[89%]=> < 16 > Restriction of civil liberties;
20 < 17 > Violation of freedom of association Violation of check and balances system
=[88%]=> < 15 > Restriction on independence of media;
21 < 18 > Restriction on independence of media Violation of check and balances system
=[83%]=> < 15 > Violation of freedom of association;
22 < 14 > Restriction on independence of media Dominance of not elected political actors
=[100%]=> < 14 > Violation of freedom of association Defects of political competition;
23 < 14 > Violation of freedom of association Dominance of not elected political actors
=[100%]=> < 14 > Restriction on independence of media Defects of political competition;
24 < 14 > Dominance of not elected political actors Violation of check and balances
system =[100%]=> < 14 > Defects of political competition Military have political role;
25 < 14 > Dominance of not elected political actors Defects of political competition
Military have political role =[100%]=> < 14 > Violation of check and balances system;
26 < 14 > Violation of check and balances system Defects of political competition
Defects of feedback mechanism =[100%]=> < 14 > Weakness of formal
institutions/personalizm;
27 < 14 > Violation of check and balances system Military have political role =[100%]=>
< 14 > Dominance of not elected political actors Defects of political competition;
28 < 14 > Restriction of civil liberties Military have political role =[100%]=> < 14 >
Defects of political competition;
29 < 14 > Defects of political competition Weakness of formal institutions/personalizm
Defects of feedback mechanism =[100%]=> < 14 > Violation of check and balances system;
30 < 15 > Dominance of not elected political actors Military have political role
=[93%]=> < 14 > Violation of check and balances system Defects of political competition;
31 < 16 > Defects of political competition Military have political role =[88%]=> < 14 >
Restriction of civil liberties;
32 < 16 > Defects of political competition Military have political role =[88%]=> < 14 >
Dominance of not elected political actors Violation of check and balances system;
33 < 16 > Violation of check and balances system Defects of political competition
Weakness of formal institutions/personalizm =[88%]=> < 14 > Defects of feedback mechanism;
34 < 16 > Dominance of not elected political actors Defects of political competition
=[88%]=> < 14 > Violation of check and balances system Military have political role;
35 < 16 > Dominance of not elected political actors Defects of political competition
=[88%]=> < 14 > Restriction on independence of media Violation of freedom of association;
36 < 17 > Violation of freedom of association Violation of check and balances system
=[82%]=> < 14 > Defects of political competition;
37 < 13 > Dominance of not elected political actors Military - fourth power Military have
political role =[100%]=> < 13 > Supremacy of Military jurisdiction;
38 < 13 > Defects of political competition Military - fourth power Military have political
role =[100%]=> < 13 > Restriction of civil liberties;
39 < 14 > Restriction of civil liberties Defects of political competition Military have
political role =[93%]=> < 13 > Military - fourth power;
40 < 12 > Restriction on independence of media Violation of freedom of association
Violation of check and balances system Defects of political competition =[100%]=> < 12 >
Dominance of not elected political actors Restriction of civil liberties Military regime in

emergency situation Military - fourth power Military have political role Restricted legislature Supremacy of Military jurisdiction;

41 < 12 > Restriction on independence of media Military have political role =[100%]=> < 12 > Violation of freedom of association Dominance of not elected political actors Violation of check and balances system Restriction of civil liberties Defects of political competition Military regime in emergency situation Military - fourth power Restricted legislature Supremacy of Military jurisdiction;

42 < 12 > Violation of freedom of association Military have political role =[100%]=> < 12 > Restriction on independence of media Dominance of not elected political actors Violation of check and balances system Restriction of civil liberties Defects of political competition Military regime in emergency situation Military - fourth power Restricted legislature Supremacy of Military jurisdiction;

43 < 12 > Dominance of not elected political actors Restriction of civil liberties Defects of political competition =[100%]=> < 12 > Restriction on independence of media Violation of freedom of association Violation of check and balances system Military regime in emergency situation Military - fourth power Military have political role Restricted legislature Supremacy of Military jurisdiction;

44 < 12 > Restriction of civil liberties Defects of political competition Military - fourth power Military have political role Supremacy of Military jurisdiction =[100%]=> < 12 > Restriction on independence of media Violation of freedom of association Dominance of not elected political actors Violation of check and balances system Military regime in emergency situation Restricted legislature;

45 < 12 > Military regime in emergency situation =[100%]=> < 12 > Restriction on independence of media Violation of freedom of association Dominance of not elected political actors Violation of check and balances system Restriction of civil liberties Defects of political competition Military - fourth power Military have political role Restricted legislature Supremacy of Military jurisdiction;

46 < 12 > Restricted legislature =[100%]=> < 12 > Restriction on independence of media Violation of freedom of association Dominance of not elected political actors Violation of check and balances system Restriction of civil liberties Defects of political competition Military regime in emergency situation Military - fourth power Military have political role Supremacy of Military jurisdiction;

47 < 13 > Dominance of not elected political actors Military - fourth power Military have political role Supremacy of Military jurisdiction =[92%]=> < 12 > Restriction on independence of media Violation of freedom of association Violation of check and balances system Restriction of civil liberties Defects of political competition Military regime in emergency situation Restricted legislature;

48 < 13 > Restriction of civil liberties Defects of political competition Military - fourth power Military have political role =[92%]=> < 12 > Restriction on independence of media Violation of freedom of association Dominance of not elected political actors Violation of check and balances system Military regime in emergency situation Restricted legislature Supremacy of Military jurisdiction;

49 < 14 > Violation of freedom of association Violation of check and balances system Defects of political competition =[86%]=> < 12 > Restriction on independence of media Dominance of not elected political actors Restriction of civil liberties Military regime in emergency situation Military - fourth power Military have political role Restricted legislature Supremacy of Military jurisdiction;

50 < 14 > Restriction on independence of media Violation of check and balances system Defects of political competition =[86%]=> < 12 > Violation of freedom of association Dominance of not elected political actors Restriction of civil liberties Military regime in emergency situation Military - fourth power Military have political role Restricted legislature Supremacy of Military jurisdiction;

51 < 10 > Restriction on freedom of speech and information Restriction on independence of media =[100%]=> < 10 > Violation of freedom of association;

52 < 10 > Restriction on freedom of speech and information Violation of freedom of association =[100%]=> < 10 > Restriction on independence of media;

53 < 10 > Violation of check and balances system Restriction of civil liberties Defects of political competition Weakness of formal institutions/personalizm =[100%]=> < 10 > Defects of feedback mechanism;

54 < 11 > Restriction on freedom of speech and information =[91%]=> < 10 > Restriction on independence of media Violation of freedom of association;

55 < 12 > Restriction of civil liberties Defects of political competition Defects of feedback mechanism =[83%]=> < 10 > Violation of check and balances system Weakness of formal institutions/personalizm;

56 < 11 > Ineffective governance =[82%]=> < 9 > Restriction of civil liberties;

57 < 11 > Defects of political competition Governmental interventions in economy Weakness of formal institutions/personalizm =[82%]=> < 9 > Restriction of civil liberties;

58 < 8 > Restriction on freedom of speech and information Restriction of civil liberties =[100%]=> < 8 > Restriction on independence of media Violation of freedom of association;

59 < 10 > Restriction on freedom of speech and information Restriction on independence of media Violation of freedom of association =[80%]=> < 8 > Restriction of civil liberties;

60 < 7 > Restriction on freedom of speech and information Defects of political competition =[100%]=> < 7 > Restriction on independence of media Violation of freedom of association Restriction of civil liberties Governmental interventions in economy;

61 < 7 > Restriction on independence of media Defects of political competition Governmental interventions in economy =[100%]=> < 7 > Restriction on freedom of speech and information Violation of freedom of association Restriction of civil liberties;

62 < 8 > Restriction on freedom of speech and information Restriction on independence of media Violation of freedom of association Restriction of civil liberties =[88%]=> < 7 > Defects of political competition Governmental interventions in economy;

63 < 6 > Clientelism =[100%]=> < 6 > Violation of check and balances system Defects of political competition Weakness of formal institutions/personalizm;

64 < 6 > Few people that are in power =[100%]=> < 6 > Violation of check and balances system Defects of political competition Weakness of formal institutions/personalizm;

65 < 5 > Dominance of not elected political actors Ineffective governance =[100%]=> < 5 > Restriction of civil liberties Elitism Limited sovereignty;

66 < 5 > Dominance of not elected political actors Limited sovereignty =[100%]=> < 5 > Restriction of civil liberties Ineffective governance Elitism;

67 < 5 > Restriction of civil liberties Elitism =[100%]=> < 5 > Dominance of not elected political actors Ineffective governance Limited sovereignty;

68 < 5 > Ineffective governance Elitism =[100%]=> < 5 > Dominance of not elected political actors Restriction of civil liberties Limited sovereignty;

69 < 5 > Ineffective governance Limited sovereignty =[100%]=> < 5 > Dominance of not elected political actors Restriction of civil liberties Elitism;

70 < 5 > Elitism Limited sovereignty =[100%]=> < 5 > Dominance of not elected political actors Restriction of civil liberties Ineffective governance;

71 < 5 > Intervention of the USA =[100%]=> < 5 > Military - fourth power Military have political role Supremacy of Military jurisdiction;

72 < 4 > Violation of check and balances system Defects of political competition Weakness of formal institutions/personalizm Defects of feedback mechanism Clientelism =[100%]=> < 4 > Restriction of civil liberties Ineffective governance Absence of democracy success;

73 < 4 > Violation of check and balances system Elitism =[100%]=> < 4 > Defects of political competition Weakness of formal institutions/personalizm Few people that are in power;

74 < 4 > Defects of political competition Ineffective governance =[100%]=> < 4 > Violation of check and balances system Restriction of civil liberties Weakness of formal institutions/personalizm Defects of feedback mechanism Clientelism Absence of democracy success;

75 < 4 > Defects of political competition Elitism =[100%]=> < 4 > Violation of check and balances system Weakness of formal institutions/personalizm Few people that are in power;

76 < 4 > Defects of political competition Violation in party system =[100%]=> < 4 > Violation of check and balances system;

77 < 4 > Absence of democracy success =[100%]=> < 4 > Violation of check and balances system Restriction of civil liberties Defects of political competition Weakness of formal institutions/personalizm Defects of feedback mechanism Ineffective governance Clientelism;

78 < 3 > Restriction of right on assize =[100%]=> < 3 > Restriction on independence of media Restriction of civil liberties Restriction of minorities rights;

79 < 3 > Restriction of minorities rights =[100%]=> < 3 > Restriction on independence of media Restriction of civil liberties Restriction of right on assize;

80 < 3 > Violation of Rule of Law =[100%]=> < 3 > Restriction on independence of media Violation of freedom of association Violation of check and balances system;

81 < 2 > Restriction of universal suffrage Restriction of civil liberties =[100%]=> < 2 > Restrictions based on racial principles;

82 < 2 > Restriction on freedom of speech and information Restriction on independence of media Violation of freedom of association Violation of check and balances system =[100%]=> < 2 > Violation of Rule of Law;

83 < 2 > Restriction on independence of media Violation of freedom of association Defects of political competition Weakness of formal institutions/personalizm =[100%]=> < 2 > Dominance of not elected political actors;

84 < 2 > Restriction on independence of media Violation of check and balances system Defects of political competition Weakness of formal institutions/personalizm =[100%]=> < 2 > Defects of feedback mechanism Strength of democratic substitutions Few people that are in power Manipulation through mass-media;

85 < 2 > Restriction on independence of media Defects of political competition Defects of feedback mechanism =[100%]=> < 2 > Violation of check and balances system Weakness of formal institutions/personalizm Strength of democratic substitutions Few people that are in power Manipulation through mass-media;

86 < 2 > Violation of freedom of association Violation of check and balances system Defects of political competition Weakness of formal institutions/personalizm =[100%]=> < 2 > Governmental interventions in economy Defects of feedback mechanism Few people that are in power Elitism;

87 < 2 > Violation of freedom of association Defects of political competition Governmental interventions in economy Weakness of formal institutions/personalizm =[100%]=> < 2 > Violation of check and balances system Defects of feedback mechanism Few people that are in power Elitism;

88 < 2 > Violation of freedom of association Defects of political competition Defects of feedback mechanism =[100%]=> < 2 > Violation of check and balances system Governmental interventions in economy Weakness of formal institutions/personalizm Few people that are in power Elitism;

89 < 2 > Violation of freedom of association Elitism =[100%]=> < 2 > Violation of check and balances system Defects of political competition Governmental interventions in economy Weakness of formal institutions/personalizm Defects of feedback mechanism Few people that are in power;

90 < 2 > Dominance of not elected political actors Economy stagnation =[100%]=> < 2 > Political crisis Increase of external debt;

91 < 2 > Dominance of not elected political actors Violation in party system =[100%]=>
< 2 > Violation of check and balances system Defects of political competition Weakness of
formal institutions/personalizm Clientelism Few people that are in power Elitism Military have
political role Elite transit from old to new regime;

92 < 2 > Violation of check and balances system Defects of political competition
Governmental interventions in economy =[100%]=> < 2 > Violation of freedom of association
Weakness of formal institutions/personalizm Defects of feedback mechanism Few people that
are in power Elitism;

93 < 2 > Violation of check and balances system Defects of political competition
Weakness of formal institutions/personalizm Defects of feedback mechanism Few people that
are in power Elitism =[100%]=> < 2 > Violation of freedom of association Governmental
interventions in economy;

94 < 2 > Violation of check and balances system Defects of political competition
Weakness of formal institutions/personalizm Clientelism Few people that are in power
=[100%]=> < 2 > Dominance of not elected political actors Elitism Violation in party system
Military have political role Elite transit from old to new regime;

95 < 2 > Violation of check and balances system Defects of political competition
Weakness of formal institutions/personalizm Violation in party system =[100%]=> < 2 >
Dominance of not elected political actors Clientelism Few people that are in power Elitism
Military have political role Elite transit from old to new regime;

96 < 2 > Restriction of civil liberties Economy stagnation =[100%]=> < 2 > Defects of
political competition Defects of feedback mechanism Limited sovereignty Military have political
role No consensus about the rules;

97 < 2 > Defects of political competition Governmental interventions in economy Defects
of feedback mechanism =[100%]=> < 2 > Violation of freedom of association Violation of check
and balances system Weakness of formal institutions/personalizm Few people that are in power
Elitism;

98 < 2 > Defects of political competition Weakness of formal institutions/personalizm
Military have political role =[100%]=> < 2 > Dominance of not elected political actors Violation
of check and balances system Clientelism Few people that are in power Elitism Violation in
party system Elite transit from old to new regime;

99 < 2 > Defects of political competition Defects of feedback mechanism Military have
political role =[100%]=> < 2 > Restriction of civil liberties Economy stagnation Limited
sovereignty No consensus about the rules;

100 < 2 > Defects of political competition Economy stagnation =[100%]=> < 2 >
Restriction of civil liberties Defects of feedback mechanism Limited sovereignty Military have
political role No consensus about the rules;

101 < 2 > Defects of political competition Limited sovereignty =[100%]=> < 2 >
Restriction of civil liberties Defects of feedback mechanism Economy stagnation Military have
political role No consensus about the rules;

102 < 2 > Political crisis =[100%]=> < 2 > Dominance of not elected political actors
Economy stagnation Increase of external debt;

103 < 2 > Economy stagnation Limited sovereignty =[100%]=> < 2 > Restriction of civil
liberties Defects of political competition Defects of feedback mechanism Military have political
role No consensus about the rules;

104 < 2 > Economy stagnation Military have political role =[100%]=> < 2 > Restriction
of civil liberties Defects of political competition Defects of feedback mechanism Limited
sovereignty No consensus about the rules;

105 < 2 > Increase of external debt =[100%]=> < 2 > Dominance of not elected political
actors Political crisis Economy stagnation;

106 < 2 > Strength of democratic substitutions =[100%]=> < 2 > Restriction on
independence of media Violation of check and balances system Defects of political competition

Weakness of formal institutions/personalizm Defects of feedback mechanism Few people that are in power Manipulation through mass-media;

107 < 2 > Elitism Violation in party system =[100%]=> < 2 > Dominance of not elected political actors Violation of check and balances system Defects of political competition Weakness of formal institutions/personalizm Clientelism Few people that are in power Military have political role Elite transit from old to new regime;

108 < 2 > Elitism Military have political role =[100%]=> < 2 > Dominance of not elected political actors Violation of check and balances system Defects of political competition Weakness of formal institutions/personalizm Clientelism Few people that are in power Violation in party system Elite transit from old to new regime;

109 < 2 > Non-recognition of compromise =[100%]=> < 2 > Limited sovereignty Full uncertainty of democratic procedures;

110 < 2 > Limited sovereignty Military have political role =[100%]=> < 2 > Restriction of civil liberties Defects of political competition Defects of feedback mechanism Economy stagnation No consensus about the rules;

111 < 2 > Full uncertainty of democratic procedures =[100%]=> < 2 > Non-recognition of compromise Limited sovereignty;

112 < 2 > Corruption =[100%]=> < 2 > Violation of check and balances system Ineffective governance;

113 < 2 > Violation in party system Military have political role =[100%]=> < 2 > Dominance of not elected political actors Violation of check and balances system Defects of political competition Weakness of formal institutions/personalizm Clientelism Few people that are in power Elitism Elite transit from old to new regime;

114 < 2 > Manipulation through mass-media =[100%]=> < 2 > Restriction on independence of media Violation of check and balances system Defects of political competition Weakness of formal institutions/personalizm Defects of feedback mechanism Strength of democratic substitutions Few people that are in power;

115 < 2 > No consensus about the rules =[100%]=> < 2 > Restriction of civil liberties Defects of political competition Defects of feedback mechanism Economy stagnation Limited sovereignty Military have political role;

116 < 2 > Elite transit from old to new regime =[100%]=> < 2 > Dominance of not elected political actors Violation of check and balances system Defects of political competition Weakness of formal institutions/personalizm Clientelism Few people that are in power Elitism Violation in party system Military have political role;

117 < 2 > Collectivism =[100%]=> < 2 > Strength of religion as political platform Political role of religious groups/elite;

118 < 2 > Political role of religious groups/elite =[100%]=> < 2 > Strength of religion as political platform Collectivism;

119 < 2 > Restrictions based on racial principles =[100%]=> < 2 > Restriction of universal suffrage Restriction of civil liberties;

120 < 1 > Restriction on freedom of speech and information Restriction equality before the court principle =[100%]=> < 1 > Restriction on independence of media Violation of freedom of association Restriction of civil liberties Violation of independent judiciary principle Restriction of right on assize Restriction of minorities rights;

121 < 1 > Restriction on freedom of speech and information Violation in party system =[100%]=> < 1 > Violation of check and balances system;

122 < 1 > Restriction on independence of media Violation of freedom of association Restriction of civil liberties Restriction of right on assize Restriction of minorities rights =[100%]=> < 1 > Restriction on freedom of speech and information Violation of independent judiciary principle Restriction equality before the court principle;

123 < 1 > Restriction on independence of media Restriction equality before the court principle =[100%]=> < 1 > Restriction on freedom of speech and information Violation of

freedom of association Restriction of civil liberties Violation of independent judiciary principle
Restriction of right on assize Restriction of minorities rights;

124 < 1 > Restriction on independence of media Violation in party system =[100%]=> < 1 > Violation of check and balances system;

125 < 1 > Violation of freedom of association Restriction equality before the court principle =[100%]=> < 1 > Restriction on freedom of speech and information Restriction on independence of media Restriction of civil liberties Violation of independent judiciary principle Restriction of right on assize Restriction of minorities rights;

126 < 1 > Restriction of civil liberties Restriction equality before the court principle =[100%]=> < 1 > Restriction on freedom of speech and information Restriction on independence of media Violation of freedom of association Violation of independent judiciary principle Restriction of right on assize Restriction of minorities rights;

127 < 1 > Violation of independent judiciary principle =[100%]=> < 1 > Restriction on freedom of speech and information Restriction on independence of media Violation of freedom of association Restriction of civil liberties Restriction equality before the court principle Restriction of right on assize Restriction of minorities rights;

128 < 1 > Restriction equality before the court principle Military have political role =[100%]=> < 1 > Military - fourth power Supremacy of Military jurisdiction Intervention of the USA;

129 < 1 > Absence of democratic mentality =[100%]=> < 1 > Dominance of not elected political actors;

Appendix 3. Implication sets of democracy - autocracy attributes*

*FFE - Free and Fair Elections, FI - Formal Institutions/personalizm, FA - Freedom of Association, CBS - Checks and Balances System, CL - Civil Liberties, FBM – Feed Back Mechanism, DI - Institutional Basis of Democracy Index

1 < 7 > FI < 0,4 CL < 0,4 ==> DI < 0,4;

2 < 7 > FBM < 0,4 ==> FI < 0,4;

3 < 7 > FI < 0,4 DI < 0,4 ==> CL < 0,4;

4 < 7 > CL < 0,4 DI < 0,4 ==> FI < 0,4;

5 < 6 > CBS < 0,4 ==> FI < 0,4 CL < 0,4 DI < 0,4;

6 < 5 > FFE < 0,4 ==> FI < 0,4 CBS < 0,4 CL < 0,4 FBM < 0,4 DI < 0,4;

7 < 5 > FA < 0,6 DI < 0,4 ==> FI < 0,4 CL < 0,4;

8 < 5 > FI < 0,4 CBS < 0,4 CL < 0,4 FBM < 0,4 DI < 0,4 ==> FFE < 0,4;

9 < 4 > FFE ≤ 1,0 ==> FA ≤ 1,0 FBM < 0,6 DI < 0,8;

10 < 4 > FA ≤ 1,0 ==> FFE ≤ 1,0 FBM < 0,6 DI < 0,8;

11 < 4 > DI < 0,8 ==> FFE ≤ 1,0 FA ≤ 1,0 FBM < 0,6;

12 < 3 > FFE < 0,6 ==> FI < 0,4 FA < 0,6;

13 < 3 > FFE < 0,8 ==> CBS < 0,6 FBM < 0,6;

14 < 3 > FI < 0,8 ==> CL < 0,8 FBM < 0,6;

15 < 3 > FI ≤ 1,0 ==> FFE ≤ 1,0 FA ≤ 1,0 CBS ≤ 1,0 CL ≤ 1,0 FBM < 0,6 DI < 0,8;

16 < 3 > CBS ≤ 1,0 ==> FFE ≤ 1,0 FI ≤ 1,0 FA ≤ 1,0 CL ≤ 1,0 FBM < 0,6 DI < 0,8;

17 < 3 > CL < 0,8 ==> FI < 0,8 FBM < 0,6;

18 < 3 > CL ≤ 1,0 ==> FFE ≤ 1,0 FI ≤ 1,0 FA ≤ 1,0 CBS ≤ 1,0 FBM < 0,6 DI < 0,8;

19 < 3 > CBS < 0,6 FBM < 0,6 ==> FFE < 0,8;

20 < 3 > DI < 0,6 ==> CBS < 0,6;

21 < 2 > FA < 0,4 ==> FFE < 0,4 FI < 0,4 CBS < 0,4 CL < 0,4 FBM < 0,4 DI < 0,4;

22 < 2 > FA < 0,8 ==> FFE < 0,8 FI < 0,8 CBS < 0,6 CL < 0,8 FBM < 0,6;

23 < 2 > FI < 0,4 CBS < 0,6 ==> FFE < 0,6 FA < 0,6 FBM < 0,4;

24 < 2 > CBS < 0,6 CL < 0,4 ==> FA < 0,6;

25 < 2 > FFE < 0,6 FI < 0,4 FA < 0,6 FBM < 0,4 ==> CBS < 0,6;

26 < 2 > FA < 0,6 FBM < 0,6 ==> CL < 0,4;
 27 < 2 > CL < 0,4 FBM < 0,6 ==> FA < 0,6;
 28 < 2 > FFE < 0,8 FI < 0,8 CBS < 0,6 CL < 0,8 FBM < 0,6 ==> FA < 0,8;
 29 < 1 > FI < 0,6 ==> FFE < 0,8 FA < 0,6 CBS < 0,6 CL < 0,4 FBM < 0,6 DI < 0,6;
 30 < 1 > CBS < 0,8 ==> FFE ≤ 1,0 FI < 0,8 FA ≤ 1,0 CL < 0,8 FBM < 0,6 DI < 0,8;
 31 < 1 > CL < 0,6 ==> FFE < 0,6 FI < 0,4 FA < 0,6 CBS < 0,6 FBM < 0,4 DI < 0,6;
 32 < 1 > FI < 0,4 FBM < 0,6 ==> FFE < 0,6 FA < 0,6 CBS < 0,4 CL < 0,4 DI < 0,4;
 33 < 1 > FFE < 0,8 FA < 0,6 CBS < 0,6 CL < 0,4 FBM < 0,6 ==> FI < 0,6 DI < 0,6;
 34 < 1 > FI < 0,8 CL < 0,8 FBM < 0,6 DI < 0,4 ==> FFE < 0,8 FA < 0,8 CBS < 0,6;
 35 < 1 > FFE < 0,8 CBS < 0,6 FBM < 0,6 DI < 0,4 ==> FI < 0,8 FA < 0,8 CL < 0,8;
 36 < 1 > FFE < 0,6 FI < 0,4 FA < 0,6 CBS < 0,4 CL < 0,4 DI < 0,4 ==> FBM < 0,6;
 37 < 1 > FA < 0,6 CBS < 0,6 CL < 0,4 DI < 0,6 ==> FFE < 0,8 FI < 0,6 FBM < 0,6;
 38 < 1 > FFE < 0,6 FI < 0,4 FA < 0,6 CBS < 0,6 FBM < 0,4 DI < 0,6 ==> CL < 0,6;
 39 < 1 > FFE ≤ 1,0 FI < 0,8 FA ≤ 1,0 CL < 0,8 FBM < 0,6 DI < 0,8 ==> CBS < 0,8.