

AN APPROACH TO CLUSTERING REGIONS OF UKRAINE BASED ON COMBINING VALUE ORIENTATION SURVEY DATA AND ELECTORAL STATISTICS ON THE POLITICAL CHOICE

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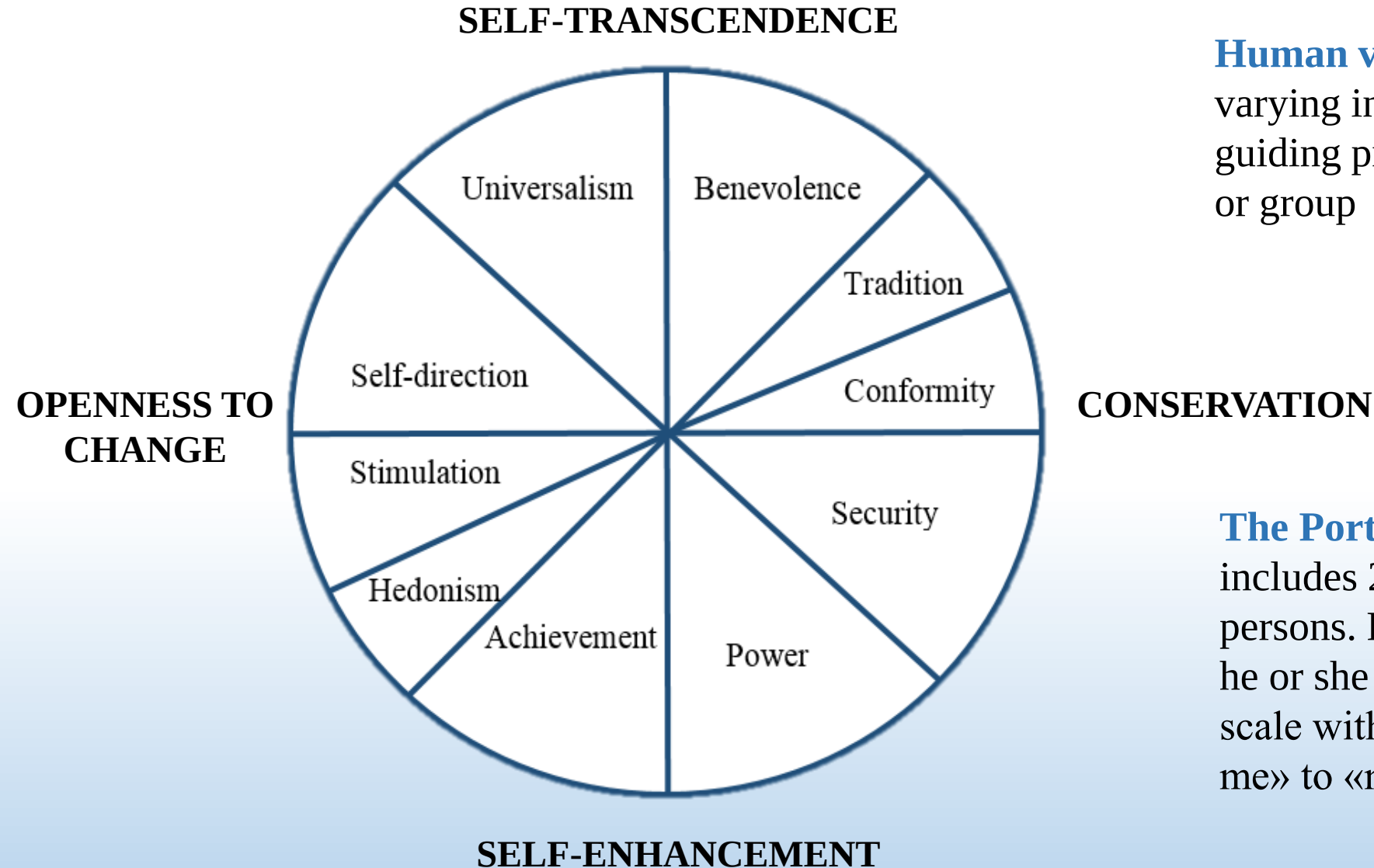
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Aim, research hypothesis, data

- The **aim** of this study is clustering of administrative-territorial units of Ukraine on the basis of value orientations and the electoral choice of the population of these units
- **Hypothesis:** there is a statistically significant correlation between the value orientations and the electoral choice of the population of Ukraine at the regional level. This correlation can be used as a base for grouping Ukrainian administrative-territorial units into clusters (macroregions)
- **Data:** electoral statistics from the Central Election Commission, European Social Survey

The European Social Survey (ESS) is a cross-national survey that has been conducted across Europe since its establishment in 2001. Every two years, face-to-face interviews are conducted with newly selected, cross-sectional samples.

Human values (according to S.Schwarz)



Human values – transsituational goals, varying in importance, that serve as guiding principles in the life of a person or group

The Portrait Values Questionnaire includes 21 value portraits of abstract persons. Respondent should decide how he or she is similar to this portraits using scale with 6 items: from «very much like me» to «not like me at all».

How are «values» calculated?

Indicators using for measuring the value «Security» in The Portrait Values Questionnaire

Value dimension	Value	Indicators in The Portrait Values Questionnaire
Conservation	Security	It is important to him/her to live in secure surroundings. He/she avoids anything that might endanger his/her safety.
		It is important to him/her that the government ensures his/her safety against all threats. He/she wants the state to be strong so it can defend its citizens.

- Compute scores for the 10 values by taking the means of the items that index it
- Compute each individual's mean score over all 21 value items
- Compute the centered scores of the 10 values by taking the mean of the items that index it
- Similarly, four value dimensions are formed

Electoral statistics: results of the Ukrainian parliamentary elections 2012

№ polling station	№ constituency	Address of the polling station	Boundaries of the polling station	The number of registered voters	Voters who cast a ballot in an election	Number of votes_"Homeland"	:	Number of votes_Communist Party of Ukraine
50130	11	street and house number of building for voting (administrative building, for example, school)	list of streets and numbers of houses that polling station is consists of	1687	973	432		98
50131	11			2150	1214	513		116
50132	11			1492	799	357		59
50133	11			2102	1259	647		73
50134	11			164	95	63		8

Combining results of the Ukrainian parliamentary elections 2012 and 2014

- According to boundaries of the polling station the type of territory (urban/rural) is coded for every observation (polling station)
- For urban territories observations are aggregated into cities or towns
- For rural territories observations are aggregated into rural districts (groups of villages)
- Results of elections 2012 and 2014 are combined in one data set (data set 1), where observations correspond to administrative-territorial units (ATUs) - cities, towns or rural districts
- ATUs are grouped by regions (Ukraine is divided into 27 regions: 24 oblasts, one autonomous republic, and two cities with special status)

Data set 1: results of the Ukrainian parliamentary elections 2012 and 2014

ATU	Type of ATU (urban/village)	Region	The number of registered voters_2014	The number of registered voters_2012	Voters who cast a ballot in an election_2014	Voters who cast a ballot in an election_2012	Voter turnout_2014	Voter turnout_2012	Number of votes_"Homeland"_2014	Number of votes_"Homeland"_2012	...	Number of votes_Communist Party of Ukraine_2014	Number of votes_Communist Party of Ukraine_2012	Share_"Homeland"_2014	Share_"Homeland"_2012	...	Share_Communist Party of Ukraine_2014	Share_Communist Party of Ukraine_2012
Bar	urban	Vinnytsia region	13577	13886	7431	7888	0,547	0,568	379	3955		82	488	0,051	0,501		0,011	0,062
Bershad	urban	Vinnytsia region	10557	10598	5214	6038	0,494	0,570	252	2659		79	441	0,048	0,440		0,015	0,073
Vinnytsia	urban	Vinnytsia region	284417	281426	164738	166943	0,579	0,593	8010	70700		3306	12992	0,049	0,423		0,020	0,078
Haisyn	urban	Vinnytsia region	19634	19687	9792	10873	0,499	0,552	626	5115		234	1027	0,064	0,470		0,024	0,094
Hnivan	urban	Vinnytsia region	9966	9980	5460	6011	0,548	0,602	424	3174		82	485	0,078	0,528		0,015	0,081

Selection of observation for data set 1

For a valid comparison of the results in 2012 and 2014, temporarily occupied and uncontrolled territories should be excluded from the analysis because of changing of socio-demographic structure of voters who took part in the elections in 2014.

Cluster analysis (k-means) with cluster centers according 2 variables (the difference in the number of voters and the difference in the turnout between 2012 and 2014)

ATU are divided into 5 clusters:

- Number of voters / turnout decreased by more than 20% compared to 2014
- Number of voters / turnout decreased by 11%-20%
- Number of voters / turnout decreased by 1%-10%
- Number of voters / turnout increased by 0%-9%
- Number of voters / turnout increased by more than 9%

Cluster number	Final cluster centers		Frequency	Percent
	number of voters	number of voters		
1	56,7	15,1	5	0,3
2	54,2	100,3	105	7,3
3	82,6	99,2	630	44,1
4	98,6	99,5	688	48,1
5	101,3	746,2	2	0,1

Data set 2: European Social Survey

(Ukraine, 6th wave, 2012)

Respondent's identification number	Region	Security	Conformity	Tradition	Benevolence	Universalism	Self-Direction	Stimulation	Hedonism	Achievement	Power	Conservation	Self-Enhancement	Self-Transcendence	Openness to Change
1	Vinnytsia region	2,81	-1,19	0,81	-0,19	-0,52	0,31	0,31	-0,69	-1,19	-0,19	0,78	-0,72	-0,38	-0,05
2	Vinnytsia region	0,95	-0,05	-0,55	-0,55	0,29	0,45	-1,55	-0,55	0,95	0,45	0,13	0,72	-0,12	-0,53
3	Vinnytsia region	2,12	1,12	1,62	0,12	0,95	-0,38	-2,38	-1,38	-1,38	-0,88	1,67	-1,08	0,58	-1,33
4	Vinnytsia region	1,55	-1,45	-1,45	-0,45	-0,62	-0,45	0,05	2,05	0,55	0,55	-0,48	0,52	-0,57	0,52
5	Vinnytsia region	2,29	1,79	1,29	-0,71	0,62	-0,21	-2,21	-2,71	-0,21	-0,21	1,82	-0,18	-0,02	-1,68

Attaching data set 2 to data set 1

- Working with statistical data we usually don't have information on individual level, just aggregated data.
- In the electoral statistics used in this study, polling station, which, depending on size, can represent the results of voting from ten voters to almost three thousand, is the unit of analysis.
- On the other hand, in a sample survey there is data on individual level, but, in the same time, there are limited opportunities to identify the domicile of the respondents.
- Using data set of the European Social Survey we can identify only region and type of settlement (urban or rural).
- The data set of the European Social Survey is aggregated at the region level, and the arithmetic mean for four value dimensions is calculated.

Clustering regions of Ukraine

- Cluster analysis using the k-means method
- Coordinates for cluster centers are based on the correlation between the level of support for political parties and the expressiveness of value orientations, divided in four dimensions: «Conservation», «Self-transcendence», «Openness to change» and «Self-enhancement»

Initial cluster centers based on Ukrainians value orientations and the results of the 2012 Parliamentary elections

	cluster №1	cluster №2	cluster №3
Level of support of the Party of Regions	max		
Level of support of the Communist Party of Ukraine	max		
Level of support of the Party of N. Korolevskaya «Ukraine - Forward!»	max		
Level of support of the «Homeland»		max	
Level of support of the «Our Ukraine»		max	
Level of support of the «Freedom»			max
Level of support of the «UDAR»		max	
Level of support of the Radical Party of O. Lyashko		max	
Self-enhancement values	min	max	
Self-transcendence values	max	min	
Openness to change values			min
Conservation values			max

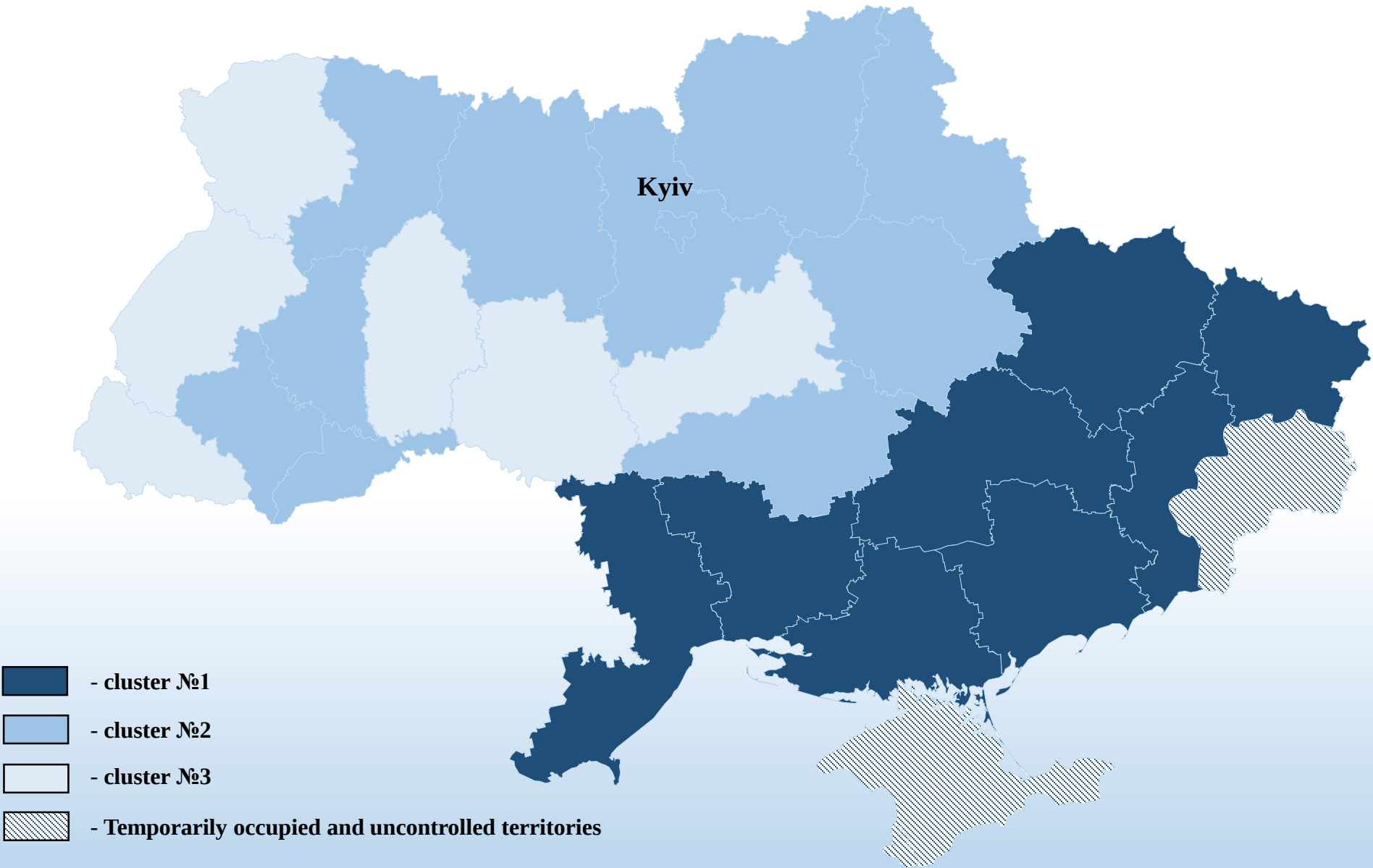
Final cluster centers based on Ukrainians value orientations and the results of the 2012 Parliamentary elections

	cluster №1	cluster №2	cluster №3	arithmetic mean for whole data set
Level of support of the Party of Regions	0,447	0,181	0,145	0,271
Level of support of the Communist Party of Ukraine	0,217	0,095	0,065	0,133
Level of support of the Party of N. Korolevskaya «Ukraine - Forward!»	0,017	0,014	0,012	0,014
Level of support of the «Homeland»	0,146	0,352	0,398	0,287
Level of support of the «Our Ukraine»	0,005	0,017	0,017	0,013
Level of support of the «Freedom»	0,027	0,123	0,175	0,100
Level of support of the «UDAR»	0,103	0,156	0,152	0,135
Level of support of the Radical Party of O. Lyashko	0,008	0,025	0,010	0,015
Self-enhancement values	-0,246	-0,013	-0,319	-0,174
Self-transcendence values	0,447	0,226	0,501	0,375
Openness to change values	-0,438	-0,293	-0,600	-0,422
Conservation values	0,227	0,111	0,398	0,224

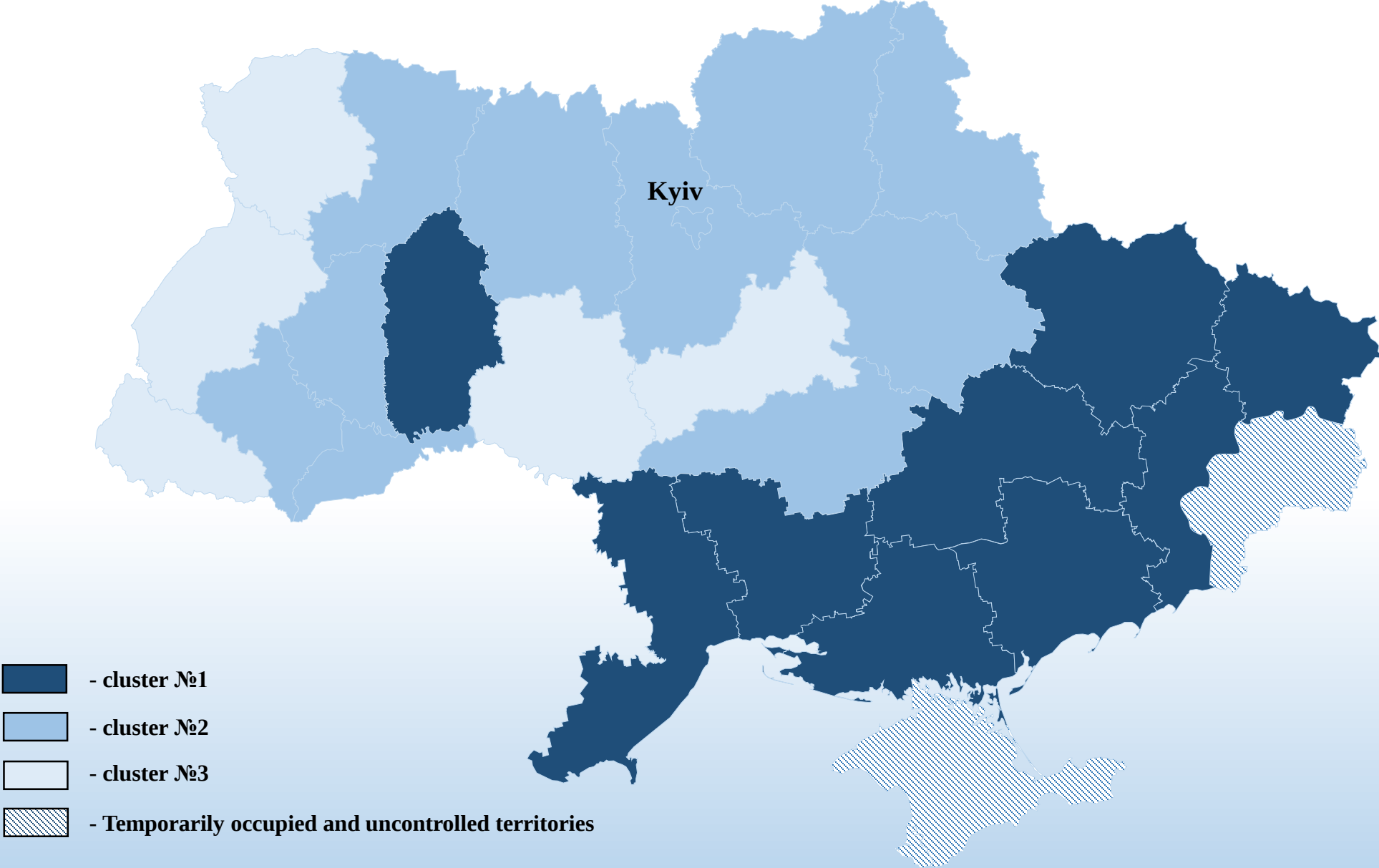
Final cluster centers based on Ukrainians value orientations and the results of the 2012 Parliamentary elections

	cluster №1	cluster №2	cluster №3	arithmetic mean for whole data set
Level of support of the Opposition block (Party of Regions)	0,187	0,031	0,016	0,082
Level of support of the Radical Party of O.Lyashko	0,091	0,106	0,074	0,093
Level of support of the «Freedom»	0,024	0,050	0,049	0,041
Level of support of the «Homeland»	0,054	0,072	0,062	0,063
Level of support of the Communist Party of Ukraine	0,078	0,023	0,011	0,040
Level of support of the «People's Front»	0,131	0,279	0,309	0,235
Level of support of the Block of P.Poroshenko	0,202	0,226	0,250	0,223
Level of support of the «Samopomich»	0,055	0,090	0,112	0,083
Level of support of the «Strong Ukraine»	0,058	0,019	0,012	0,031
Level of support of the «RIGHT SECTOR»	0,011	0,014	0,016	0,014
Level of support of the «Civic position»	0,022	0,027	0,032	0,027
Level of support of the «ZASTUP»	0,044	0,035	0,033	0,037
Self-enhancement values	-0,243	-0,012	-0,337	-0,167
Self-transcendence values	0,473	0,227	0,483	0,372
Openness to change values	-0,436	-0,297	-0,620	-0,420
Conservation values	0,200	0,113	0,447	0,220

Clustering of the administrative-territorial units of Ukraine on the basic of value orientations and electoral choice (2012) of the population in these territories



Clustering of the administrative-territorial units of Ukraine on the basis of value orientations and electoral choice (2014) of the population in these territories



Conclusions and limitations

- The combination of values and results of voting enables to evaluate the received cluster structure in dynamics, combining the results of national and local elections in different years with the value orientations of Ukrainians.
- In consequence of merges value orientations and voting results, space for clustering becomes two-dimensional. This enables not only to discover similar administrative-territorial units, but also, for example, to identify groups of parties whose supporters share similar values.
- Values reflect the cultural and historical features of the region, which increases the validity of such clustering.
- Limitations: since the value orientations were calculated at the level of the regions, the interpretation of results can be made only at the aggregated level and does not apply to the level of individuals.
- One of the perspectives for further research is to increase the accuracy of aggregation of data from two sources, for example, by taking into account not only the region but also the type of settlement.