CHAPTER IV. TOWNS IN FOREST-STEPPE UKRAINE OF THE EARLY 1860S (CLASSIFICATION AND TYPOLOGY)

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1. Sources, research history

The first city in Forest-Steppe Ukraine mentioned in written sources was Gelon (Herod., IV, 108, 123). It remains confidently correlated with Poltava province's Bilsk settlement of the 7th – 4th centuries BC (Shramko, 1986; Boiko, 2017, pp. 120–130).

In the early 1860s, in the six provinces of Forest-Steppe Ukraine, there were officially 94 urban settlements that had the status of provincial, district, or "unincorporated" towns[1] (Statisticheskiy vremennik Rossiyskoy imperii, 1866, pp. 87–88, 98, 119, 123, 134, 139).

The "Charter of Grant to the Cities" of Catherine II (1785) provided the main direction for the state and development of the towns of the Russian Empire from the last quarter of the 18th century to the 1870s. In it, the town was declared a legal entity consisting of several class communities, with the right to use or own urban property, income from it, and participation in town government (Dityatin, 1875, pp. 415–431; 1877, pp. 143–178).

The development of urban studies has drawn the attention of specialists to the lack of a unified definition of the category "gorod" ("town")[2]. In 1864, employees of the Ministry of Internal Affairs, preparing materials for the new Code on Towns, based on existing legal acts, concluded that the concept of "town" should include three elements: it is a special type of settlement, different in its livelihood (trade, crafts, science, and art instead of agriculture) from village, which has its public administration, and in which provincial or district government institutions are located (Dityatin, 1877, pp. 302–303). Other definitions of the town by researchers

[1] Problems sometimes arise related to the adequate translation of official terms and names from the times of the Russian Empire in English. If needed, it can be relied on the handwritten translations of the captions to Russian statistical tables of 1863, made by an unknown employee or user of the Public Library of the City of Boston in 1869: "Goroda gubernskie i uezdnyie" – "Governor and District Towns", "Mestechki" – "Large Villages", "Goroda bez'uezdnyie i zashtatnyie" – "Unincorporated Towns" (Statisticheskie tablitsyi Rossiyskoy imperii, 1863, p. 91) (fig. IV.1.1).

[2] In the context of the proposed study, preference is given to the word "town" rather than "city" to avoid unnecessary terminological confusion.

in the 19th and early 20th centuries revolved around these three qualitative features, taken together or separately (Bondarenko, 2020). As of now, the situation remains unchanged (Mironov, 1990, pp. 5, 15–19). Against this background, the trivial results of the typology (various repetitions of the obvious fact that "a town is not a village") or the classification of towns look similar. The latter came down to options for ranking them according to population size or other characteristics (Bondarenko, 2020, pp. 26–28; Shandra, 2019, pp. 16–18).

The gloomy situation is brightened up by the fact that already in the mid-19th century there appeared grounds for a new direction in domestic urbanism when the Central Statistical Committee of the Ministry of Internal Affairs created and published a database of statistics on urban settlements of the Russian Empire (Zaitsev, 2015, pp. 12–17; Karlina, 2023). This circumstance and the obvious futility of the functional-legal approach, demonstrated by both past and modern researchers, contributed to the fact that the author set himself the task of grouping, classifying, and typology of the towns of Forest-Steppe Ukraine according to mass statistical sources of the early 1860s when Eastern Europe ended with its feudal past and began a long period of fateful changes.

The methodology was based on the capabilities of multivariate statistical analysis, considering both the study's objectives and the source database's features. Grouping of objects was achieved using factor analysis (Hamed et al., 2014, pp. 375–382), and hierarchical classification was carried out using cluster analysis (Migliore, Rossi-Lamastra, 2023, pp. 95–98, 101–102). At the same time, the positive experience of using multivariate statistical analysis in studies of urban settlements, gained by foreign colleagues, was creatively comprehended (Lifeng, 2023, pp. 140–144). A comparative typological method was employed to interpret the final results.

The description of the objects under study was carried out taking into account the indexes adopted in official Russian statistics of the mid-19th century, reflecting the number and social composition of the population, its property wealth, types of activities, economic development of settlements (Ekonomicheskoe sostoyanie gorodov Evropeyskoy Rossii v 1861–62 g., 1863, XV, pp. 3–43; XVI, pp. 3–35; XXIX, pp. 3–47; XLII, pp. 3–48; Gorodskie poseleniya Rossiyskoy imperii, 1860, pp. 366–405; Ibid., 1861, pp. 132–200; Ibid., 1864, pp. 1–85: Ibid., 1865, I, pp. 304–418;

II, pp. 253–374; Statisticheskiy vremennik Rossiyskoy imperii, 1866, pp. 87–88, 98, 119, 123, 133–134, 139). The system of 17 features successfully passed the suitability test for factor analysis using KMO and Bartlett's test (tbl. IV.2.1, a).

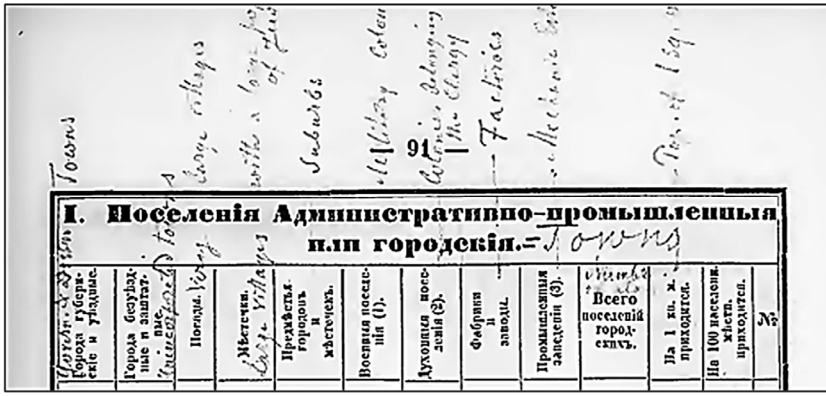


Figure IV.1.1. English translation of Russian names in a Statistical table of 1863 (1869)

2. Primary grouping and classification

The initial matrix is quite fully displayed in tbl. IV.2.3. It included statistical data on 94 settlements in six provinces (Kyiv, Podillia, Volyn, Poltava, Chernihiv, and Kharkiv) of the Ukrainian Forest-Steppe, which had the official status of towns during the period under review. Among them were 6 provincial centers, 71 district centers, and 17 unincorporated towns, which previously had administrative functions. As already noted, the grouping of objects was carried out using factor multivariate statistical analysis, the advantages of which are in identifying latent variables or factors that explain the structure of correlations within a set of observed variables. This allows someone to reduce the data dimensions, identify a few factors that explain most of the variance, and form hypotheses regarding the mechanisms of causal relationships (IBM. SPSS Statistics. Factor Analysis: Electronic resource).

The sample's explained variance was 97.13% (tbl. IV.2.1, b). Five factors (principal components) demonstrated high values for the following indexes: F1 –Population (2.54) and Townspeople (2.39), and Urban land (0.87) as additional; F2 –Trade turnover (3.83); F3 –Industrial income (3.78); F4 –Population (2.13) and Peasants (2.69); F5 – Urban revenue (3.83) (tbl. IV.2.1, b, c).

By rotating the principal components' matrix with Varimax using the Kaiser normalization method, factor groups of towns were obtained by assigning specific scores to each object (tbl. IV.2.2). Factor values in the range of 0.5 – 1.0 were accepted as significant for the group's interpretation; the rest were assigned an auxiliary role in comparing objects and groups.

Group f1. It included 32 (34.1%) urban settlements with a population of 221,708 (22.8% of all urban residents in Forest-Steppe), mainly in Podillia (15), Volyn (6), and Chernihiv (7) provinces. In Kyiv province, there were 3 such towns, in Poltava 1, and in Kharkiv, they were not known.

The factor characteristics of the group indicated the predominance of the townspeople among the population (tbl. IV.2.1, c). In some cases, the influence of factors characteristic of other groups is noticeable: Lityn and Hmilnyk – F3 Industrial income (0.68), Nizhyn, Yampol, Hradyzhsk, Pyriatyn – F4 Population and Peasants (0.56 – 0.65), Kaniv – F5 Urban revenue (0.64) (tbl. IV.2.2, c; fig. IV.2.2, a).

The internal structuring of this and other town groups based on the numerical characteristics of urban objects was achieved using hierarchical cluster analysis: “This procedure is intended to identify relatively homogeneous groups of observations (or variables) according to given characteristics using an algorithm that first considers each observation (variable) as a separate cluster, and then sequentially combines the clusters only one remains. You can analyze the original variables or use a set of standardizing transformations. Distances or similarity measures are formed using the Proximities procedure” (IBM. SPSS Statistics. Hierarchical Cluster Analysis: Electronic resource). Due to this classification (fig. IV.2.1, a; tbl. IV.2.3, group f1), 21 towns were assigned to a common taxon – subgroup f1.A, forming two microgroups, different in population size (f1.A.1 and f1.A.2). Another microgroup f1.A.3 was formed by the provincial town of Hradyzhsk, in which the number of townspeople and peasants was almost the same (3896 and 3727). Subgroup f1.B consisted

of Hmilnyk and Lityn, where income from industrial production exceeded the total town income, although it was relatively low. Subgroup f1.C (Tarashcha, Kaniv, Vinnytsia, Kremenets, Mohyliv, Starokostiantyniv, Starodub) stood out among others with a higher level of well-being on indexes of Urban revenue and Property tax. In Vinnytsia, Kremenets, and Starokostiantyniv, the number of military personnel, both active and retired, significantly exceeded the group average. The most populated in the group was Nizhyn (17,853). Ovruch, the district center of Volyn province, with a relatively small population (5,394), owned 17,105 desiatinas (18,644 ha) of land.

Comparison of group values of indexes for different factor groups of urban settlements cannot be considered correct in their sum or average form due to significant differences in the number of objects in each group (from 7 in group f5 to 33 in group f2). The problem was solved by calculating the proportion of the total value of indexes to the population in ‰ for each of the groups and the sample as a whole (tbl. IV.2.3). Table IV.2.4 displays the deviations between the group values normalized by the quantity of population in the group and the similar values for the total sample in %. For the f1 group, the deviation values of only two indexes were positive – Townspeople (+34.2%) and Urban Property (+70.7%). Otherwise, group f1 appeared to be one of the least representative, both socially and economically.

Group f2. It included 33 (35.1%) towns with a population of 461,076 (43.4%), mostly located in the Left-Bank part of the Forest-Stepp region: 8 in Poltava, 8 in Chernihiv, and 10 in Kharkiv provinces. On Right-Bank, there were 7 such towns: Volyn – 4, Podillia – 1, Kyiv province – 2. Four of the six provincial centers of the region belonged to this group – Kyiv, Zhytomyr, Kharkiv, and Poltava.

Trade turnover was the factor index for the group. For Kyiv, Starobilsk, Hadiach, and to a lesser extent, Berdychiv and Chuhuiv, the factor index F3 Industrial income was of additional importance (tbl. IV.2.2; fig. IV.2.2, e).

The group structure, according to the results of cluster analysis, had a four-part hierarchical organization (fig. IV.2.2, b; tbl. IV.2.3, group f2). The most extensive subgroup f2.A was composed of 27 towns, of which seventeen had annual trade turnovers of less than 100,000 silver rubles

(sr) and 10 more than 100,000. Romny (480,000), Balta (500,000), and Berdychiv (500,000) were prominent among them. Kyiv, the largest urban settlement in Forest-Steppe Ukraine, made up part of subgroup f2.B, with an annual trade turnover of 1,315,000 sr from the early 1860s. Subgroup f2.C was formed by the towns of Hluhiv (2,337,000 sr), Sumy (3,000,000 sr), Krolevets (2,492,000 sr), and finally, subgroup f2.D included two main trading centers of the Forest-Steppe region: Poltava (12,265,000 sr) and Kharkiv (20,165,483 sr). The value of Industrial enterprises and Industrial income indicated that industrial production was present in 22 towns in the group. The F3 factor played a crucial role in comprehending the traits of Kyiv, Starobilsk, and Hadiach, as previously mentioned. Using tbl. IV.2.3, we can clarify that they were united by the same ratio of the indexes Trade turnover and Industrial income (in sr): 30,000 and 25,000 Hadiach, 70,000 and 65,000 Starobilsk, 1,315,000 and 1,350,000 Kyiv. In other cases, Trade turnover noticeably exceeded Industrial income, for example, in Kharkiv by 12.5 times (20,165,483 versus 1,620,000 sr). In total, 99.9% of the annual commerce turnover was carried out in the towns of the group and 67.9% of the industrial income of all urban settlements in the region was concentrated here.

The group values of most indexes per 1000 population exceeded the same general sample ones (in %): Nobles (+38.1), Clergy (+18.2), Military (+20.2), Stone buildings (+40.0), Urban revenue (+42.2), Property tax (+37.3), Commercial establishments (+50.0), Trade turnover (+110.9), Industrial income (+43.5) (tbl. IV.2.4). In all main parameters, group f2 appears to be the opposite of group f1.

Group f3. It united 12 towns (at 12.8%), – 5 in Kyiv, 3 in Kharkiv, 2 in Volyn, 1 in Poltava, and 1 in Chernihiv provinces, where 128,931 or 13.2% of the region's urban population lived. The group factor index F3 Industrial income was supplemented in several cases by others: Kovel – F1 (0.50), Akhtyrka – F2 (0.49), and Vovchansk – F4 (0.54) (tbl. IV.2.2: fig. IV.2.2, d).

Structurally, the group consisted of three subgroups (fig. IV.2.1, c): f3.A (7 cities with industrial income ranging from 9,000 to 22,500 sr), f3.B (Novozybkiv, Akhtyrka, Sloviansk with industrial income 32,500 – 150,000 sr and trade turnover 10,000 – 20,000 sr), f3.C (Kremenchuk, Cherkasy with annual income from industrial production 620,600 and

820,500 sr) (tbl. IV.2.3, group f3). The group's unique characteristics were identified by the deviation of the group values of indexes recalculated per 1000 population as a percentage of similar values for the general sample. First of all, these are high positive values of Merchants (+30.9), Peasants (+22.0), Urban lands (+57.5), and Industrial income (+135.8) (tbl. IV.2.4).

Group f4. Left-Bank of the Ukrainian Forest-Steppe was the only location where there were all 10 group's towns (10.1%), with 4 in Poltava, 4 in Kharkiv, and 2 in Chernihiv provinces. The factor index of the group was F4 Population and Peasants due to the noticeable predominance of this social category in the number of town settlers. At the same time, for all objects of the group, the influence of factor F1 Population and Townspeople was significant, since the townspeople were the second largest social group of inhabitants of these settlements, and for the town of Lebedyn an additional factor was F3 Industrial income (tbl. IV.2.2; fig. IV.2.2, d). The group's noted characteristics can be seen in its hierarchical cluster structure (fig. IV.2.1, d; tbl. IV.2.3, group f4) and as the positive deviation of the values of some indexes per 1000 population from the general ones for the sample (in%): Peasants (+213.6), All buildings (+26.1), Property owners (+19.8) (tbl. IV.2.4). In general terms, this resembles the f1 group with the replacement of Townspeople with Peasants.

Group f5, to which 7 towns belonged (7.4%) with a population of 12,022 (1.2% of urban inhabitants in the region): 4 were located in Kyiv, 1 in Podillia (provincial center Kamianets-Podilskyi), 1 in Poltava, and 1 in Chernihiv (provincial center Chernihiv) provinces. The factor index of the group was F5 Urban revenue with a common additional factor F1 Population and Townspeople (tbl. IV.2.2, IV.2.3, group f5; fig. IV.2.1, e, IV.2.2, c). In the system of the sample statistical characteristics, the deviation of normalized values of the group indexes was as follows: Nobles + 33.3%, Merchants + 14.5%, Townspeople + 20.1%, Military + 25.3%, Stone buildings + 100.0%, Urban lands + 37.0%, Urban revenue + 33.9 %. In terms of the specifics of the social structure and general well-being, this small group of towns occupied an intermediate position between groups f2 and f3 (tbl. IV.2.4).

Table IV.2.1. KMO and Bartlett's test. Variance explained. Components and factor value

a) Kaiser-Meyer-Olkin (KMO) and Bartlett's test

Kaiser-Meyer-Olkin measure of sampling adequacy		0.86
Bartlett's test of sphericity	Approx. Chi-Square	2608.60
	free degree	136
	conspicuousness	0

b) Variance explained

Component	Initial eigenvalues			Rotation sums of squared loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	40.65	43.24	43.24	30.73	32.69	32.69
2	30.56	32.52	75.76	30.29	32.23	64.91
3	11.62	12.36	88.12	13.27	14.11	79.03
4	4.87	5.18	93.30	10.64	11.32	90.35
5	3.60	3.82	97.13	6.37	6.78	97.13

Extraction method: Principal component analysis.

c) Components and factor value

Index/Component/Factor value	F1	F2	F3	F4	F5
Population	2.54	0.22	0.32	2.13	-0.21
Nobles	-0.39	-0.34	-0.40	-0.31	-0.15
Clergy	-0.48	-0.36	-0.41	-0.29	-0.27
Merchants	-0.33	-0.34	-0.37	-0.33	-0.20
Townspeople	2.39	-0.11	0.25	-1.22	-0.32
Peasants	-0.93	-0.19	-0.21	**2.69**	-0.68
Military	-0.30	-0.31	-0.39	-0.16	-0.06
All buildings	-0.23	-0.29	-0.32	0.15	-0.35
Stone buildings	-0.49	-0.37	-0.42	-0.32	-0.28
Property owners	-0.24	-0.29	-0.31	-0.03	-0.28
Urban land	***0.87***	-0.33	-0.13	-1.35	-0.14
Urban revenue	-0.07	-0.06	0.03	0.30	**3.83**
Property tax	-0.21	-0.26	-0.31	-0.06	0.08
Commercial establishments	-0.45	-0.36	-0.40	-0.33	-0.26
Trade turnover	-0.39	**3.83**	-0.28	-0.33	-0.17
Industrial enterprises	-0.50	-0.37	-0.42	-0.32	-0.28
Industrial income	-0.79	-0.08	**3.78**	-0.24	-0.25

Table IV.2.2. Rotated component matrix

Town/Component/Factor score	F1	F2	F3	F4	F5
Stara Ushytsia	0.98				
Haisyn	0.97			0.19	0.12
Bratslav	0.97			0.19	0.15
Bar	0.97			0.21	
Volodymyr Vol.	0.96				0.22
Salnytsia	0.96				
Ushytsia	0.96				
Letychiv	0.96			0.18	0.15
Proskuriv	0.96			0.21	0.16
Vinnytsia	0.95			0.11	0.21
Olhopol	0.94				0.13
Verbovets	0.93		0.10	0.25	
Kremenets	0.92			0.17	0.34
Surazh	0.91			0.28	0.12
Novhorod Siv.	0.90			0.32	0.21
Mohyliv	0.90		0.20	0.25	0.20
Dubno	0.89			0.31	0.19
Nove Mesto	0.88			0.42	
Lutsk	0.86			0.38	0.28
Starodub	0.84			0.29	0.39
Tarashcha	0.84			0.20	0.50
Kozelets	0.84			0.44	0.27
Starokostiantyniv	0.84		0.24	0.43	
Oster	0.80			0.47	0.34
Nizhyn	0.78			0.56	0.21
Yampol	0.78			0.59	
Hradyzhsk	0.75			0.65	
Kaniv	0.73				0.64
Lityn	0.73		0.68		
Hmilnyk	0.73		0.68		
Pyriatyn	0.72			0.56	0.38
Ovruch	0.54			-0.23	
Zinkiv		1.00			
Rivne		1.00			
Konotop		1.00			
Horodnia		1.00			
Pryluky		1.00			

Bilopillia		0.99		0.10	
Zhytomyr		0.99			
Lubny		0.99			
Korop		0.99			
Mhlyn		0.99			
Khorol		0.99			
Romny		0.99			
Balta		0.99			
Hluhiv	-0.11	0.99			
Sumy	-0.10	0.99			
Kharkiv	-0.12	0.99			
Poltava		0.99			
Krolevets		0.99			
Novohrad Vol.		0.99			
Ostroh		0.99	0.14		
Kupiansk		0.98	0.16		
Pereiaslav		0.97	0.23		
Izium		0.97		0.18	0.12
Zolochiv		0.97		0.24	
Zmiiv		0.95	0.25	0.18	
Chuhuiv	-0.14	0.91	0.40		
Sosnytsia	0.33	0.89		0.31	
Berdychiv		0.89	0.44		
Borzna	0.35	0.89		0.28	
Pohar	0.57	0.81		0.10	
Hadiach		0.79	0.62		
Starobilsk	-0.14	0.77	0.62		
Kyiv	-0.20	0.70	0.68		
Kremenchuk	-0.17		0.98		
Cherkasy	-0.18		0.98		
Sloviansk	-0.16	0.12	0.98		
Novozybkiv		0.22	0.97		
Zaslav	0.22		0.95	0.16	
Radomyshl	0.34		0.91		0.22
Zolotonosha	0.30		0.87	0.33	0.17
Vasylkiv	0.34		0.86		0.23
Lypovets	0.38		0.86	0.30	0.11
Akhtyrka		0.49	0.80	0.33	
Vovchansk	0.24		0.78	0.54	0.18

Kovel	0.50		0.69	-0.28	
Myrhorod	0.46			0.87	0.15
Kobeliaky	0.51			0.84	0.13
Bohodukhiv	0.50	0.15		0.82	0.18
Valky	0.49			0.82	0.20
Krasnokutsk	0.58			0.80	
Berezna	0.51		0.43	0.73	-0.11
Hlynsk	0.52			0.72	0.44
Nedryhailiv	0.34		0.25	0.72	
Lokhvytsia	0.62			0.70	0.34
Lebedyn	0.36		0.57	0.69	0.23
Uman	0.56			0.23	0.78
Chyhyryn	0.61			0.13	0.78
Kamianets Pod.	0.60			0.26	0.75
Skvyra	0.60		0.23	0.13	0.74
Zvenyhorodka	0.52		0.40	0.11	0.74
Chernihiv	0.57			0.33	0.74
Kostiantynohrad	0.63			0.33	0.68

Extraction method: Principal component analysis. Rotation method: Varimax with Kaiser normalization. Rotation converged in 5 iterations.

Table IV.2.3. The statistical description of towns and factor groups

Subgroup/ microgroup	Town/Group	Population	Nobles	Clergy	Merchants	Townspeople	Peasants	Military	Buildings	
									all	stone
	Group f1									
A.1	Letychiv	4284	82	56	142	2827	14	262	480	21
	Ushytsia	3654	243	38	197	2661	5	508	586	32
	Bratslav	5024	280	46	265	3863	61	319	468	4
	Olhopol	4983	180	41	80	3843	31	545	565	2
	Kozelets	4802	184	54	145	2884	887	576	548	1
	Pyriatyn	4412	161	38	370	1961	1247	369	509	5
	Oster	4663	173	35	108	2210	1359	641	542	2
	Verbovets	4714	14	32	53	3725	0	30	244	4
	Surazh	3784	187	32	158	3020	183	204	214	3
	S. Ushytsia	3158	137	22	508	2492	0	54	311	5
	Salnytsia	2084	8	13	50	1765	0	0	276	0
	N. Mesto	2121	23	10	0	1068	176	37	191	0
	Yampol	3493	239	29	287	1389	891	515	610	50

A.2	Novhorod Siv.	6715	143	131	426	4755	541	440	816	21
	Lutsk	7135	824	72	325	4301	906	665	407	37
	Dubno	8365	443	88	466	6053	303	689	710	31
	Proskuriv	6844	110	57	287	5232	219	690	900	99
	Volodymy Vol.	6305	222	68	151	6117	72	620	406	31
	Bar	7965	133	56	384	5627	65	855	700	19
	Haisyn	8953	155	47	445	6919	0	777	691	8
A.3	Hradyzhsk	7970	31	16	29	3896	3727	230	1058	0
B	Hmilnyk	7081	74	54	208	6460	11	128	845	16
	Lityn	6580	123	35	247	5710	0	298	659	5
C	Tarashcha	8377	645	26	197	6530	39	574	868	2
	Kaniv	6844	272	50	506	4955	4	837	742	3
	Vinnytsia	10120	160	96	1204	7550	19	1304	1384	30
	Kremenets	12585	1021	71	428	9048	19	1950	588	49
	Mohyliv	10696	226	80	1590	7502	11	479	1380	45
	Starokostiantyniv	12376	388	67	556	7707	2199	1457	781	95
	Starodub	12474	284	193	352	10161	1040	444	955	5
D	Nizhyn	17853	230	221	778	9677	5634	684	2203	65
E	Ovruch	5394	842	40	226	3707	104	409	76	5
	∑ f1	*221808*	*8237*	*1914*	*11168*	*155615*	*19767*	*17590*	*21713*	*695*
Per 1000 population f1		–	*37*	*9*	*50*	*702*	*89*	*79*	*98*	*3*
	Group f2									
A	Sosnytsia	5864	237	38	107	2565	2620	180	734	3
	Borzna	5933	172	68	119	2712	2238	454	1565	1
	Pohar	4121	79	33	178	3288	338	97	515	0
	Zolochiv	5379	4	48	16	76	4861	362	773	0
	Zmiiv	4105	344	31	88	249	2708	660	638	7
	Kupiansk	5594	213	150	100	1456	2824	1551	624	3
	Izium	11401	277	122	341	2224	6797	1192	1210	24
	Hadiach	7401	54	50	724	4312	1651	478	900	3
	Konotop	9939	179	83	362	4695	3164	1425	1102	2
	Horodnia	3903	307	31	110	2610	355	490	321	3
	Bilopillia	11746	62	133	166	3092	7922	426	1706	10
	Zinkiv	9494	246	130	296	3245	4871	653	1750	6
	Rivne	6402	1163	15	246	3614	721	548	527	49
	Ostroh	9409	285	34	500	7908	102	622	511	44
	Pereiaslav	9786	193	140	577	5543	2292	876	1396	9
	Chuhuiv	8176	318	45	267	138	2431	2611	2457	206
	Starobilsk	8164	210	83	740	3532	3242	357	595	12
	Korop	5034	23	41	98	3381	1328	156	820	5
	Khorol	3152	148	95	310	1448	599	546	594	5
	Lubny	3419	73	46	426	1930	564	371	652	12
	Pryluky	10481	176	84	570	7043	1768	645	1011	6

	Novohrad_Vol.	8813	1030	43	353	6715	43	489	587	22
	Zhytomyr	40564	16393	197	3433	15914	206	3710	1936	207
	Mhlyn	8668	263	102	948	5176	1908	281	619	2
	Romny	5642	170	22	613	2887	1203	486	772	27
	Balta	15143	271	87	673	7044	45	1661	1530	18
	Berdychiv	53524	463	291	6647	42886	406	1552	1486	200
B	Kyiv	70590	6538	2089	1619	28395	7919	21491	20861	702
	Hluhiv	10162	315	149	564	6521	1872	677	1201	22
	Sumy	11277	301	143	477	3822	5791	575	1591	96
	Krolevets	7273	301	82	206	4073	2232	410	1131	3
C	Kharkiv	52016	4325	1089	2825	12787	19081	4075	5679	1169
	Poltava	28501	4897	261	1009	9917	6958	4640	3351	322
	∑ f2	*461076*	*40030*	*6055*	*25708*	*211198*	*101060*	*54747*	*61145*	*3200*
Per 1000 population f2		–	*87*	*13*	*56*	*458*	*219*	*119*	*133*	*7*
	Group f3									
A	Zolotonosha	6719	274	51	485	3151	2188	412	862	2
	Lypovets	6290	290	54	92	3958	1859	429	806	4
	Radomyshl	5070	458	30	354	3862	46	355	620	3
	Vovchansk	7901	261	65	150	2093	5355	934	1011	6
	Zaslav	8034	392	53	672	5025	1640	484	707	32
	Kovel	3892	357	22	294	2875	25	347	387	6
	Vasylkiv	11656	271	44	413	7332	2571	956	1470	4
B	Novozybkiv	7493	97	11	720	6372	13	279	1086	9
	Akhtyrka	17315	230	306	248	4159	11618	857	2064	10
	Sloviansk	10225	138	88	1179	3070	4431	695	1455	10
C	Kremenchuk	23956	1010	109	2530	13344	3863	2656	2202	198
	Cherkasy	20380	233	52	2195	17313	32	433	1691	6
	∑ f3	*128931*	*4011*	*885*	*9332*	*72554*	*33641*	*8837*	*14361*	*290*
Per 1000 population f3		–	*31*	*7*	*72*	*563*	*261*	*69*	*111*	*2*
	Group f4									
A	Myrhorod	8598	275	61	160	1270	6068	699	1139	5
	Kobeliaky	9424	239	170	480	1826	6017	761	972	8
	Bohodukhiv	9461	181	72	102	1829	6559	684	1272	4
	Lokhvytsia	7508	263	77	395	2733	3665	399	1018	4
	Berezna	8279	194	119	265	2523	4991	189	1593	0
	Valky	5942	158	111	116	673	4019	802	771	3
	Krasnokutsk	6427	35	62	114	1646	4394	176	934	0
	Nedryhailiv	5167	18	54	89	396	5160	450	901	2
	Hlynsk	3149	54	22	49	1003	1937	77	536	0
B	Lebedyn	13747	125	155	106	3401	9303	657	2544	11
	∑ f4	*77702*	*1542*	*903*	*1876*	*17300*	*52113*	*4894*	*11680*	*37*
Per 1000 population f4		–	*20*	*12*	*24*	*223*	*671*	*63*	*150*	*0*

	Group f5									
A	Chyhyryn	9340	284	132	515	7599	114	460	340	3
	Skvyra	8248	251	55	1149	5531	22	632	775	11
	Uman	13725	544	59	1296	9566	81	1342	1631	73
	Chernihiv	14612	686	186	471	6686	930	3844	1105	51
	Zvenyhorodka	11775	345	93	283	9284	78	1121	752	8
C	Kamianets Pod.	22771	4763	298	1169	12140	299	2588	2071	687
B	Kostiantynohrad	3686	189	84	421	2056	166	486	532	7
	∑ *f5*	*84157*	*7062*	*907*	*5304*	*52862*	*1690*	*10473*	*7206*	*840*
	Per 1000 population f5	–	*84*	*11*	*63*	*628*	*20*	*124*	*86*	*10*
	Total ∑	**973674**	**60882**	**10664**	**53388**	**509529**	**208271**	**96541**	**116105**	**5062**
	Total per 1000 popul.	**–**	**63**	**11**	**55**	**523**	**214**	**99**	**119**	**5**

Table IV.2.3. (Ending)

Subgroup/ microgroup	Town/Group	Property owners	Urban land*	Urban revenue**	Property tax	Commercial establishments	Trade turnover**	Industrial enterprises	Industrial income**
	Group f1								
A.1	Letychiv	415	1917	1379	249	103	0	2	0
	Ushytsia	441	2434	722	175	38	0	0	0
	Bratslav	247	1486	1657	479	44	0	0	0
	Olhopol	456	3773	1740	120	49	0	0	0
	Kozelets	397	248	2208	900	106	0	4	0
	Pyriatyn	527	37	2667	814	49	0	0	0
	Oster	505	1440	2651	660	63	0	1	0
	Verbovets	0	0	67	30	0	0	0	0
	Surazh	0	0	1087	500	0	0	0	0
	S. Ushytsia	304	1808	271	225	0	0	0	0
	Salnytsia	266	1514	128	90	0	0	0	0
	N. Mesto	190	66	280	280	0	0	0	0
	Yampol	0	0	602	277	47	0	25	0
A.2	Novhorod Siv.	561	700	2642	1500	124	0	7	0
	Lutsk	487	738	3290	1300	204	0	4	0
	Dubno	791	0	3043	1815	258	0	4	0
	Proskuriv	712	2023	2431	450	110	0	4	0
	Volodymy Vol.	780	2793	2973	400	210	0	10	0
	Bar	1528	2267	1844	650	162	0	15	0
	Haisyn	525	2551	2629	571	107	0	0	0
A.3	Hradyzhsk	936	355	1122	389	41	0	0	0
B	Hmilnyk	1039	2215	1586	160	88	0	9	6500

	Lityn	654	2447	2074	461	146	0	6	6000
C	Tarashcha	888	2325	7018	1000	64	0	2	0
	Kaniv	1180	4944	8401	1000	61	0	0	0
	Vinnytsia	0	5836	4342	2080	137	0	4	0
	Kremenets	1045	5184	7195	1980	219	0	9	0
	Mohyliv	1478	1620	4227	2444	407	0	15	1800
	Starokostiantyn.	1147	0	3133	2000	233	0	5	2500
	Starodub	0	549	8377	1820	180	0	38	0
D	Nizhyn	2260	61	7352	3000	200	0	10	0
E	Ovruch	527	17105	2771	450	101	0	4	0
	$\sum f1$	*20286*	*68436*	*91909*	*28269*	*3551*	*0*	*178*	*16800*
Per 1000 population f1		*91*	*309*	*414*	*127*	*16*	*0*	*1*	*76*
	Group f2								
A	Sosnytsia	713	254	1665	880	41	10000	0	0
	Borzna	1248	720	1715	1300	70	10000	0	0
	Pohar	745	840	1316	700	50	6000	20	0
	Zolochiv	732	132	3000	594	20	20000	0	0
	Zmiiv	388	0	3391	420	17	15000	8	5000
	Kupiansk	527	1503	4565	46	28	30000	2	7000
	Izium	1096	1247	8791	3965	77	40000	11	0
	Hadiach	613	47	2938	824	51	30000	6	25000
	Konotop	1431	0	2853	1300	94	50000	1	1000
	Horodnia	0	1500	1565	550	73	50000	0	0
	Bilopillia	1751	100	3282	1153	70	60000	13	3200
	Zinkiv	1243	111	3014	726	58	75000	2	5000
	Rivne	551	0	1550	1580	264	70000	8	2600
	Ostroh	791	0	1481	1800	255	60000	35	12000
	Pereiaslav	2793	116	7085	1195	142	64000	8	19400
	Chuhuiv	1465	612	4240	1490	108	70000	1	36000
	Starobilsk	309	2589	7657	1369	44	70000	7	60500
	Korop	829	23	795	900	91	114000	11	12000
	Khorol	610	1	2386	918	6	120000	1	1500
	Lubny	717	59	4124	1408	46	100000	6	0
	Pryluky	1589	88	4698	1435	39	200000	4	1600
	Novohrad Vol.	602	6633	7173	1000	216	200000	10	32000
	Zhytomyr	1668	5591	26935	16300	785	260000	34	0
	Mhlyn	659	38	1771	800	74	250000	5	2100
	Romny	677	55	13048	3230	546	400000	9	0
	Balta	1679	4621	11794	2799	610	500000	27	60000
	Berdychiv	1425	0	30835	16000	769	500000	29	280000
B	Kyiv	4603	8190	203052	29980	12015	1315000	55	1350000
	Hluhiv	1150	661	8504	1820	245	2337000	51	150000
	Sumy	733	1074	2411	4226	100	3000000	16	70500

	Krolevets	885	0	7948	1440	61	2492000	6	0
C	Kharkiv	4019	4548	185199	36270	791	20165483	127	1620000
	Poltava	1889	159	141980	14353	201	12265000	11	0
	∑ f2	*40130*	*41513*	*712761*	*152771*	*18057*	*44948483*	*524*	*3756400*
Per 1000 population f2		*87*	*90*	*1546*	*331*	*39*	*97486*	*1*	*8147*
	Group f3								
A	Zolotonosha	1204	44	3904	639	43	0	2	10000
	Lypovets	451	0	2945	1000	121	0	4	9000
	Radomyshl	539	2481	3977	1032	172	0	9	10200
	Vovchansk	1111	1012	4689	1245	64	0	2	10000
	Zaslav	567	0	1465	850	243	0	6	17600
	Kovel	353	4732	3216	600	135	0	10	18000
	Vasylkiv	1459	10871	9765	2800	104	0	13	22200
B	Novozybkiv	783	3039	3325	1600	163	10000	25	40000
	Akhtyrka	2325	1794	7123	1807	63	20000	4	32500
	Sloviansk	1210	3089	6377	2864	73	17000	38	115000
C	Kremenchuk	1765	269	31183	10525	308	0	41	620660
	Cherkasy	1624	9366	20095	4200	90	0	6	820500
	∑ f3	*13391*	*36697*	*98064*	*29162*	*1579*	*47000*	*160*	*1725660*
Per 1000 population f3		*104*	*285*	*761*	*226*	*12*	*365*	*1*	*13384*
	Group f4								
A	Myrhorod	1103	87	3424	378	44	0	0	0
	Kobeliaky	0	151	3299	817	84	0	1	800
	Bohodukhiv	1058	1121	4142	1353	41	2000	3	0
	Lokhvytsia	633	92	4417	1598	85	0	4	0
	Berezna	1194	507	1082	1000	32	0	2	4000
	Valky	593	1217	2643	457	16	0	0	0
	Krasnokutsk	717	1002	1382	622	12	0	0	0
	Nedryhailiv	932	3278	2348	127	14	0	3	2000
	Hlynsk	438	63	2485	212	5	0	0	0
B	Lebedyn	1826	1310	7917	1522	60	0	7	10300
	∑ f4	*8494*	*8828*	*33139*	*8086*	*393*	*2000*	*20*	*17100*
Per 1000 population f4		*109*	*114*	*426*	*104*	*5*	*26*	*0*	*220*
	Group f5								
A	Chyhyryn	754	4560	16017	1080	59	0	0	0
	Skvyra	1041	4656	12331	1800	207	0	6	3000
	Uman	1172	925	21596	4500	297	0	10	0
	Chernihiv	827	1170	18659	1530	100	0	12	0
	Zvenyhorodka	907	5668	19934	2200	89	0	10	8500
C	Kamianets Pod.	1498	3910	29830	4385	426	0	18	0
B	Kostiantynohrad	278	0	4206	557	83	0	7	0
	∑ f5	*6477*	*20889*	*122573*	*16052*	*1261*	*0*	*63*	*11500*
Per 1000 population f5		*77*	*248*	*1456*	*191*	*15*	*0*	*1*	*137*
	Total ∑	**88778**	**176363**	**1058446**	**234340**	**24841**	**44997483**	**945**	**5527460**
Total Per 1000 popul.		**91**	**181**	**1087**	**241**	**26**	**46214**	**1**	**5677**

** Desiatinas; ** Silver rubles.*

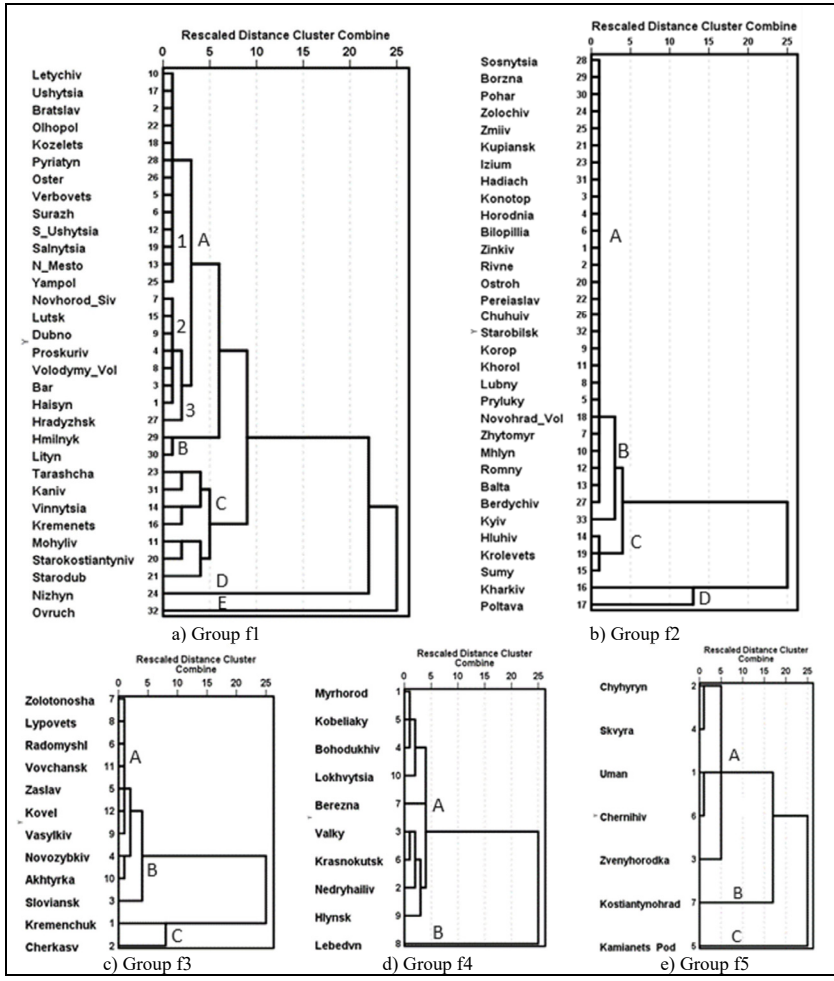


Figure IV.2.2. Internal structuring of the towns factor groups (see tbl. IV.2.3)

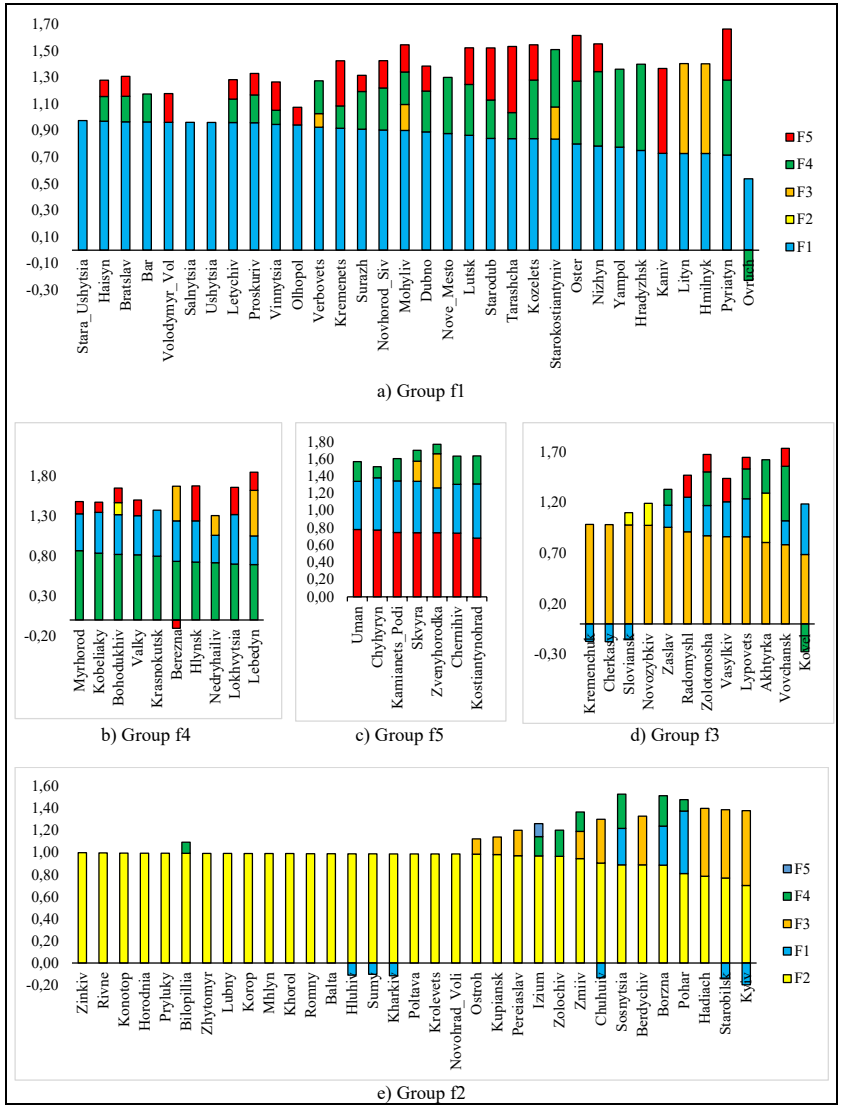


Figure IV.2.2. Factor groups and factor scores (diagrams, see tbl. IV.2.2)

Table IV.2.4. Deviation of the factor groups' statistical characteristics from general sample values (per 1000 population in%)

Index/Factor groups	f1	f2	f3	f4	f5
Nobles	-41.3	38.1	-50.8	-68.3	33.3
Clergy	-18.2	18.2	-36.4	9.1	0.0
Merchants	-9.1	1.8	30.9	-56.4	14.5
Townspeople	34.2	-12.4	7.6	-57.4	20.1
Peasants	-58.4	2.3	22.0	213.6	-90.7
Military	-20.2	20.2	-30.3	-36.4	25.3
All buildings	-17.6	11.8	-6.7	26.1	-27.7
Stone buildings	-40.0	40.0	-60.0	-100.0	100.0
Property owners	0.0	-4.4	14.3	19.8	-15.4
Urban land	70.7	-50.3	57.5	-37.0	37.0
Urban revenue	-61.9	42.2	-30.0	-60.8	33.9
Property tax	-47.3	37.3	-6.2	-56.8	-20.7
Commercial establishments	-38.5	50.0	-53.8	-80.8	-42.3
Trade turnover	-100.0	110.9	-99.2	-99.9	-100.0
Industrial enterprises	0.0	0.0	0.0	-100.0	0.0
Industrial income	-98.7	43.5	135.8	-96.1	-97.6

Source: calculated by the author according to the tbl. IV.2. 3.

3. Secondary classification and typology. Conclusion

The presented results were important, but still did not allow us to proceed directly to the final stage of the study – the construction of a typology of urban settlements in the Ukrainian Forest-Steppe of the early 1860s. To do this, it was necessary to identify groups with their internal structures and the strength and direction of connections between them. Secondary factor grouping and cluster classification helped with this, but now not of the primary objects-towns, but of the factor groups themselves using the values of group indicators recalculated per 1000 population of each group separately (tbl. IV.2.3).

Three principal components made explaining 82.6% of the sample variance possible, which is considered a completely acceptable result (tbl. IV.3.1, a). Three new factor indexes acquired the following values: F1 – Townspeople (2.00) and Urban revenue (2.69), additional Peasants (0.54); F2 – Industrial income (3.59) and additional Peasants (0.78); F3 –Trade turnover (3.59) (tbl. IV.3.1, b). The rotated component matrix

showed us three new factor groups, consisting of different combinations of primary ones: F1 (0.89f1+0.66f4+0.91f5); F2 (0.96f3); F3 (0.99f2) (tbl. IV.3.1, c).

As we see, ultimately and as a consequence of the methodology we proposed, an amorphous set of 94 towns in Forest-Steppe Ukraine in the early 1860s took the form of a three-part system with five elements, differently connected between themselves and the system as a whole (fig. IV.3.1, IV.3.2). The study's ultimate and most crucial stage begins with a meaningful interpretation of the results, which is always subject to debate.

This statement is consistent with our assumption that the three secondary factor groups and the three levels of hierarchical organization of the primary factor groups should be considered as three global types of urban settlements in the southwest of Eastern Europe mid-19th century. These types were implemented in the Ukrainian Forest-Steppe using local variants, which are represented by the primary groups (tbl. IV.3.2; fig. IV.3.3).

Type I (52.1% of all urban settlements and 39.4% of their population) was the archetypal for the others. It had a full set of isomorphic typological characteristics, except Trade turnover and Industrial income allomorphic for types II and III. It's classic version was the f1 – a large group of urban settlements, populated mainly by representatives of the social group Townspeople of small and medium income. Its local variety was the Left-Bank variant f4 on the east of Poltava and northeast of Kharkiv provinces, both sides of the Pale of Settlement (Jewish Encyclopedia, 1910, pp. 590–594). State peasants mostly populated these towns. The Malorossian Cossacks traditionally lived in urban settlements of Poltava, Chernihiv, and the northern part of Kharkiv provinces as a separate socio-legal group. They did not mix with other groups of townspeople to not lose their privileges, but in statistical reports, they were listed as “free rural inhabitants” or “state peasants”. The third variant of the I-st type of towns was the f5 group of 7 settlements, among which the provincial centers of Kamianets-Podilskyi, Chernihiv, and Uman as the center of Kyiv-Podillia military settlement, stood out. The concentration of nobles, merchants, artisans, real military, urban revenues, and property tax income was higher there. In economic terms, this local variant was not different from two others of this type. The average distance between type I factor groups (variants) in the Euclidean space of the cluster classification was 1051 (fig. IV.3.1, b).

Type II (12.8% of towns and 13.2% of their population). It included group f3 with the factor index F3 Industrial income. Notably, despite the normal distribution of towns in this group along Right-Bank and Left-Bank, none was noted in Podillia province (fig. IV.3.3).

The social group Townspeople predominated among the population, but in the towns of Akhtyrka and Sloviansk in Kharkiv province, many state peasants continued to engage in agriculture. At the same time, group f3 was characterized by an increased concentration of merchants (tbl. IV.3.2), some of them owned industrial enterprises or were engaged in the sale of their products. The most profitable was the sugar refinery in Cherkasy (tbl. IV.2.3, group f3). The products of the enterprises of Kremenchuk, Cherkasy, and Novozybkiv were sold to Odesa, Vilna, Riga, St.-Peterburg, Warsaw, and Mogilev provinces, but in most other towns, they provided only local needs. In Novozybkiv, Akhtyrka, Sloviansk, industrial production was combined with fair trade (Ekonomicheskoe sostoyanie gorodov, 1863, VII, pp. 13, 15; XV, pp. 18, 26, 29, 40; XXX, pp. 18, 23; XLII, pp. 10, 17, 44; XLIV, pp. 25–26).

This type of town, with a certain convention, can be called "industrial" or even "proto-industrial," taking into account the low general level of industrial development in the Forest-Steppe region in the early 1860s. According to the results of cluster classification, type II had its closest similarity to type I (average distance 13261) (fig. IV.3.1, b; IV.3.2).

Type III was represented by a local variant of group f2 (35.1% of the region's towns and 47.4% of its urban residents). The factor index of the type and group was F2 Trade turnover. Towns of the third type were included in the fair-trade[3] system that covered the Russian Empire before the formation of the national market (Ekonomicheskoe sostoyanie gorodov, 1863, VIII, pp. 4, 23, 28, 31; XV, pp. 5–7, 13–14; XXIX, p. 8; XXX, pp. 4–5, 8, 14, 29, 34, 40, 43, 46; XLII, pp. 5–6, 19, 22, 24, 29, 32, 35, 38, 47; 16, 18, 21, 34, 42, 46). Statistical data from 1863 indicates that 1635 fairs were held in Forest-Steppe Ukraine (265 urban and 1370 rural). Of these, 22.4% were recorded on the Right-Bank and 77.6% on the Left-Bank subregions. In terms of the total number of fairs per year, Kharkiv province (602) took first, and Poltava province (451) the second place in the empire

[3] Fair – a large event where companies show and sell their products and try to increase their business (https://dictionary.cambridge.org/ru/trade-fair).

(Statisticheskiy vremennik, 1866, II, pp. 158–161; Aksakov, 1858, pp. 5–57). In many cases, such fairs had a small turnover – from 10,000 to several hundred thousand silver rubles (sr). In the Ukrainian Forest-Steppe, they were known in 27 towns. The largest trade turnover in the mid-19th century occurred in Romny, Balta, and Berdychiv (400,000 – 500,000 sr) (tbl. IV.2.3, group f3, subgroup f2.A). Some economists assumed the shadow turnover of the Berdychiv fair to be about 20,000,000 sr and considered it one of the largest in the Russian Empire, but there were no official confirmations of this (Boiko, 2020, pp. 160–162).

Kyiv Contracts occupied the position between local and regional fairs, with the highest turnover on Right-Bank with about 1,315,000 sr (subgroup f2.B). It is noteworthy that the industrial income of the town of Kyiv was almost the same (1,350,000 sr). The turnovers at Left-Bank fairs like Hluhiv (2,337,000 sr), Krolevets (2,492,000 sr), and Sumy (3,000,000) were slightly higher (tbl. IV.2.3, group f3, subgroup f2.B). A giant of an imperial scale was a series of fairs in Kharkiv with a total turnover of about 20,166,000 sr. The Illinska Fair in Poltava (12,265,000 sr) was no less well-known, having been administrated here in 1852 from Romny to support the economic condition of the provincial town (tbl. IV.2.3, group f3, subgroup f2.C). In most cases, notable fairs regularly took place at the intersection of interregional trade routes, both on land and by rivers. Such towns became important logistics centers: Zhytomyr, Balta, Berdychiv, and Kyiv on Right-Bank, Hluhiv, Krolevets, Romny, Sumy, and Kharkiv on Left-Bank of the Dnipro (Voenno-statisticheskiy sbornik, 1871, pp. 641–645).

The question is not simple, for is it possible to call all towns classified as type III, the commercial, using this term without “quotes”? It's probable that not, as they were only meant for fairs, with sporadic exceptions, and outside-fair trade was not well-developed here. Their difference from towns of the first and second types was so significant (average distance 97674) that it allows us to say that the factor type forming index F2 Trade turnover at the time in question belonged to a different, non-urban, systemic space, associated with fair-trade only (fig. IV.3.1, IV.3.2) (Mironov, 1981, pp. 214–229). This assumption is also supported by the fact that with the deepening of the fair's crisis after 1881, in the process of forming a common imperial market (Tugan-Baranovskiy, 1898, p. 5), many “fair towns”, including Berdychiv and Poltava, returned to their original (archetypal)

state, immanently preserved during the fairs' heyday (tbl. IV.3.2; fig. IV.2.2, e)[4]. The minority, where an advantageous logistics location was combined with industrial development, gradually turned into a new type of modern commercial and industrial centers, not towns but cities, the best examples of which were Kharkiv and Kyiv in Forest-Steppe Ukraine.

As a result, the author once again ***concluded*** that statistical materials of the 19th century become most informative only if they are processed and analyzed using modern methods of multivariate statistical analysis. The sample size of towns allowed for the successful application of its factor and cluster varieties. The 5 factor groups of towns with their typological characteristics were identified, and their internal structure was established. A feature of the methodology developed by the author was the secondary grouping and classification of primary groups, which made it possible to move on to the creation of a typological model of the urban space of Forest-Steppe Ukraine in the early 1860s (tbl. IV.3.1, IV.3.2; fig. IV.3.1, IV.3.2, IV.3.3). The first type, initial or archetypal, with three local variants, included towns that most closely corresponded to the format of the "Charter of Grant to the Cities" of Catherine II (1785). Its formation was rooted in the late Middle Ages in the south and southwest of Eastern Europe. Its further development was type II, which united the towns of the Ukrainian Forest-Steppe, in the economy of which there was a tendency towards an increasing role of industrial income. The term "proto-industrial" was given to this type because the actual industrial sector in the economy of the towns of the Ukrainian Forest-Steppe was still in its infancy. The third type, which was representative of the number of towns and had the leading factor of Trade turnover, turned out to be the most distant from the two previous ones in the space of the cluster classification of groups. These towns cannot be classified as "trade" or "commerce" in their modern definition, as regular trade operations with the involvement of townspeople were insignificant. Like many large villages, "fair towns" served only as venues for fairs, sometimes quite significant ones, leaving in their revenue a small percentage of the trade turnover of the fair itself as payment for the use of some elements of the town infrastructure (tbl. IV.2.3, group f3; IV.3.2). The formation of a common imperial market in Russia in the last quarter

[4] At the beginning of the 20th century, the turnover of the Poltava Fair decreased by 6 times (Goroda Rossii v 1904 godu, 1906, p. 360).

of the 19th century was accompanied by the decline of fair trade and the return of many "fair towns" to their original state within the first or second types of urban settlements. Only a few of them, for example, Kyiv-city and Kharkiv-city, due to their location in the largest logistics hubs in the south of Eastern Europe, became the leading commercial and industrial centers of Forest-Steppe Ukraine in the late 19th and early 20th centuries.

Table IV.3.1. Secondary classification of the towns' factor groups

a) Variance explained

Component	Initial eigenvalues			Rotation sums of squared loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	2.13	42.68	42.68	2.05	41.09	41.09
2	1.07	21.30	63.98	1.07	21.31	62.40
3	0.93	18.63	82.61	1.01	20.21	82.61

Extraction method: Principal component analysis.

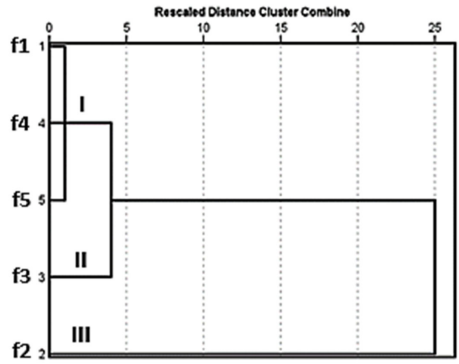
b) Components and factor value

Index/Component/ Factor value	F1	F2	F3
Nobles	-0.56	-0.37	-0.30
Clergy	-0.73	-0.35	-0.33
Merchants	-0.55	-0.36	-0.31
Townspeople	**2.00**	-0.50	-0.06
Peasants	***0.54***	***0.78***	-0.47
Military	-0.34	-0.33	-0.29
All buildings	-0.20	-0.17	-0.32
Stone buildings	-0.76	-0.37	-0.33
Property owners	-0.30	-0.24	-0.32
Urban land	0.43	-0.38	-0.23
Urban revenue	**2.69**	-0.06	0.12
Property tax	-0.08	-0.27	-0.26
Commercial establishments	-0.72	-0.37	-0.32
Trade turnover	-0.39	-0.23	**3.71**
Industrial enterprises	-0.78	-0.37	-0.33
Industrial income	-0.26	**3.59**	0.03

c) Rotated component matrix

Group/Component/Factor Scores	F1	F2	F3
f1	0.89	-0.10	-0.09
f2	-0.10	0.02	0.99
f3	-0.01	0.96	0.03
f4	0.66	0.37	-0.13
f5	0.91	-0.03	-0.02

Extraction method: Principal component analysis. Rotation method: Varimax with Kaiser normalization. Rotation converged in 4 iterations.



Proximity matrix

Case	f1	f2	f3	f4	f5
f1	0	97827	13320	795	1055
f2	97827	0	97266	97790	97815
f3	13320	97266	0	13185	13273
f4	795	97790	13185	0	1302
f5	1055	97815	13273	1302	0

Figure IV.3.1. Factor groups proximity (Hierarchical cluster classify)

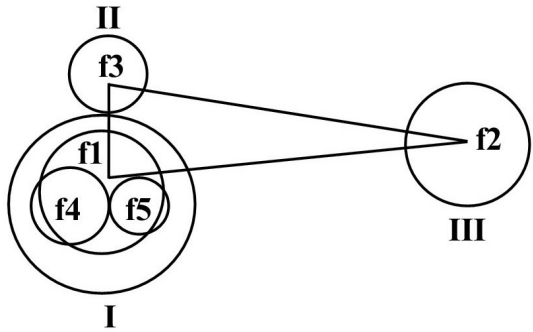


Figure IV.3.2. Typology of factor groups of the urban settlements in Forest-Steppe Ukraine (early 1860s)

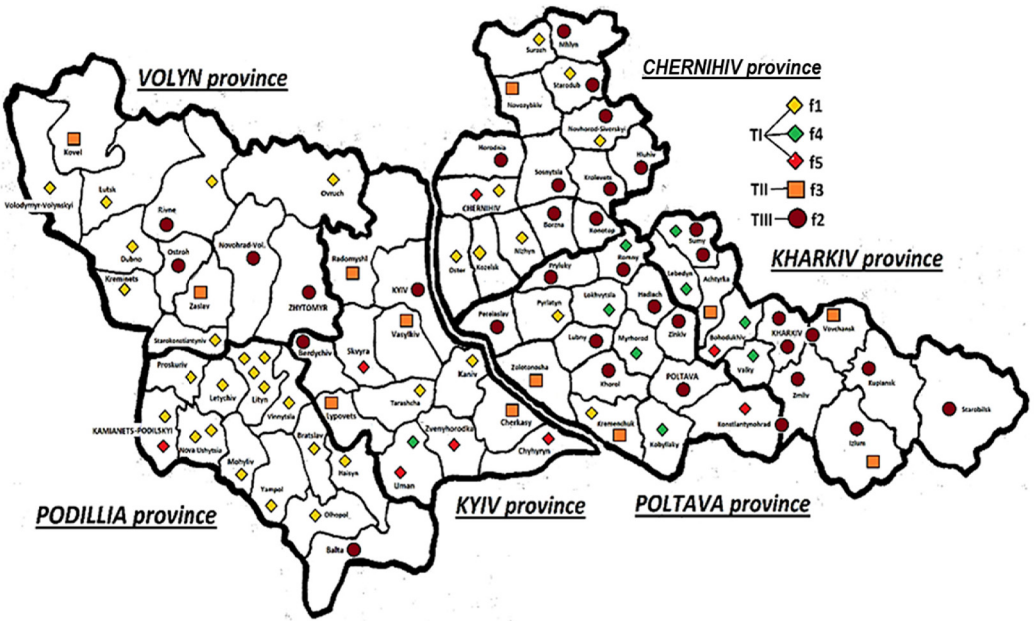


Figure IV.3.3. Spatial distribution of types and variants of urban settlements in Forest-Steppe Ukraine (early 1860s)

Table IV.3.2. Advanced statistical description of types and local variants of urban settlements in Forest-Steppe Ukraine (early 1860s)

Type		I				II	III
Variant/Index		**f1**	**f4**	**f5**	**Total I**	**f3**	**f2**
	*Population	221,808	77,702	84,157	383,667	128,931	461,076
Nobles	Hereditary	9	7	26	13	8	40
	Personal	28	13	58	31	23	47
	Merchants	50	24	63	48	72	56
Townspeople	Burghers	612	149	526	499	633	387
	Guild artisans	90	74	102	89	85	71
Peasants	State	73	614	4	168	218	169
	Obligated	11	40	3	15	32	31
Military with families	Real	45	31	86	51	36	69
	Reserves and retired	34	32	39	35	32	50
Buildings	All	14	19	7	14	11	9
	Stone	0	0	1	0	0	0
	Property owners	91	109	77	92	104	87
	Urban land	309	114	248	256	285	90
	Urban revenue	414	426	1,456	645	761	1,546
	Property tax	127	104	191	137	226	331
Commercial establishments		16	5	15	14	12	39
	Trade turnover	0	26	0	5	365	97,486
Industrial enterprises		1	0	1	1	1	1
Industrial income		76	220	137	118	13,384	8,147

** Population is presented as a numerical total. The values of all other indexes are indicated in ‰.*