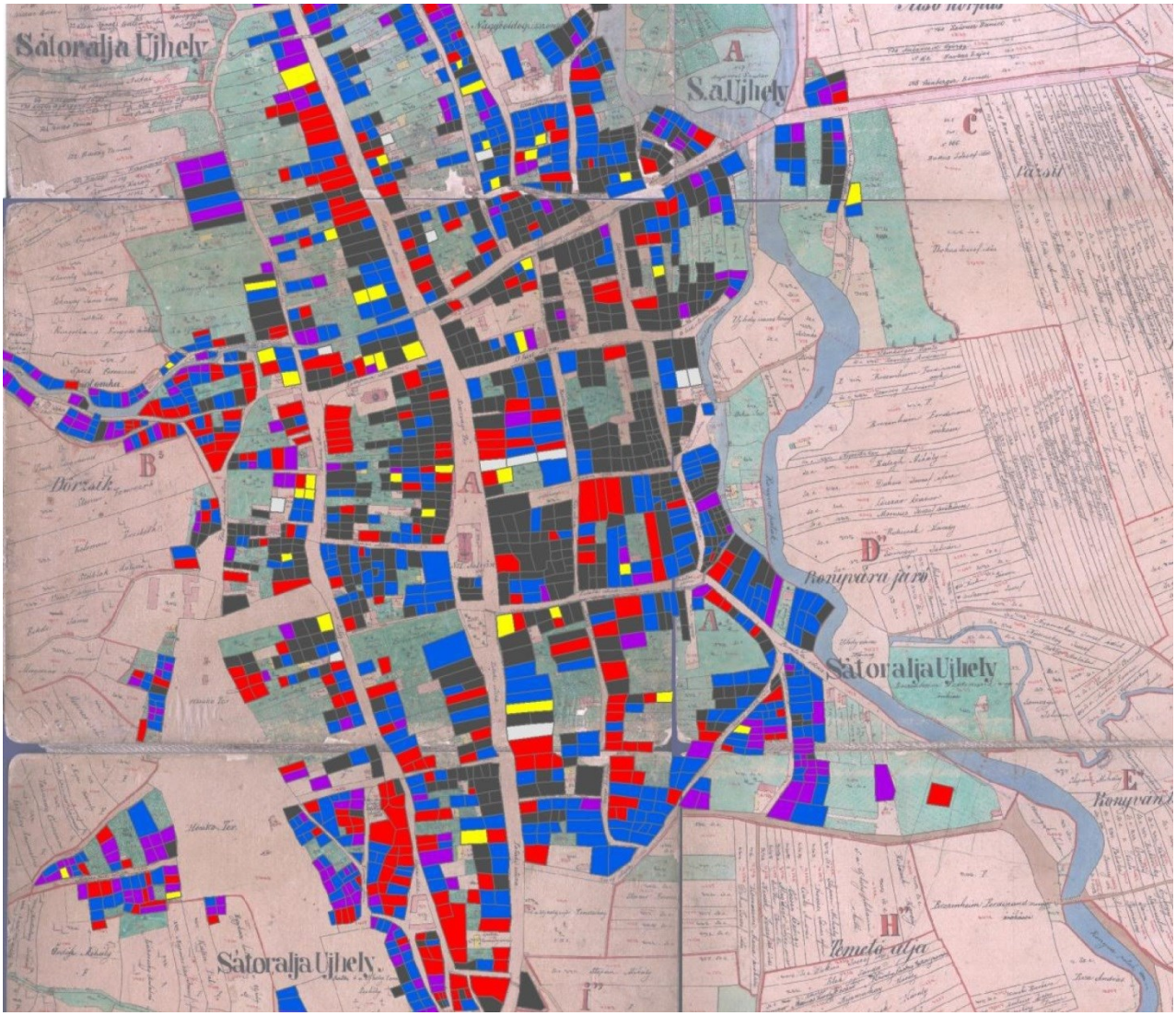
GIStorical Studies

Nr. 1.
(2018)

Historical GIS series of the HAS RCH Institute of History

DEMETER, Gábor – BAGDI, Róbert

Tracing the Transforming Urban Elite and Methods to Analyze Spatial Patterns, Social Composition and Wealth Based on Census Data (Northeast-Hungary, 1870)



I. Aims

This contribution attempts to (1) outline methods that can help identify the elite in urban societies, as well as (2) to analyze its spatial pattern and (3) social composition and welfare in the 19th c. Our research was based on the census data of 1870.

II. Data

The census of 1870 was a specific one in the sense that the original household-level data sheets (*figure 1*) survived in some of the towns and villages, making it possible to carry out a more detailed inquiry compared to the officially published material, which aggregated data at settlement-level. Furthermore, the forthcoming censuses used personal datasheets instead of household-level inquiries, making it more difficult to carry out similar investigations to those published in this study. The original census sheets in 1870 contained the name, age, address, birth place, occupation and religion of the head of family, repeating these data for the wife, children, co-workers, servants and housemaids. It also provided the number of rooms, kitchens, economic buildings (stores, stables, cellars) for each household. As the census did not contain income data, the mentioned variables had to be used as proxies of wealth in order to classify population into social layers and to identify the elite. Beyond wealth general socio-demographic phenomena – either with or without spatial pattern (like the average children number of different occupation groups, average children number of different religions, migration patterns, mixed marriages, territorial aspects of marriage patterns, territorial distribution of religions etc.) – were also possible to trace using the mentioned variables.[1] The data also offered possibility to create new variables beyond those given in the census, like population density (room/person), which was also used up as a proxy variable to measure welfare.

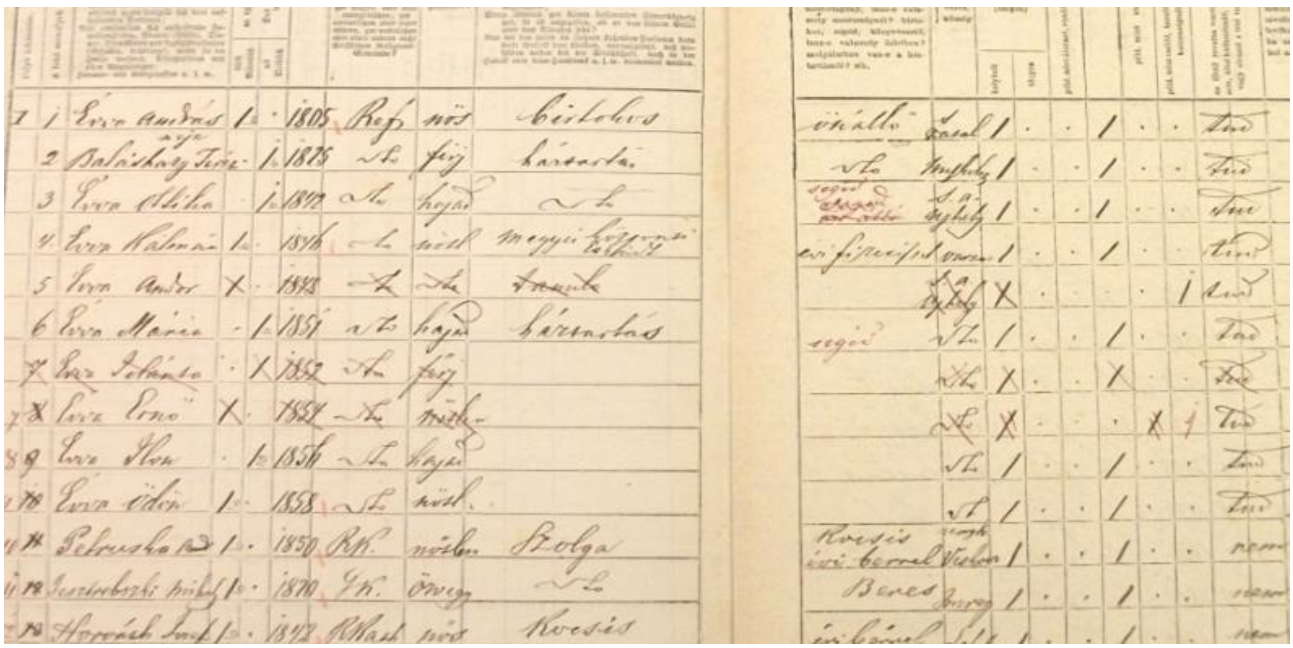


Figure 1. *Pages from the census, Nagy Piac str., nr. 9. Source:MNL-BAZML SFL XV. 83. box 77–79.*

[1] *Demeter, G.-Bagdi, R.:*A társadalom differenciáltságának és térbeli szerveződésének vizsgálata Sátoraljaújhelyen 1870-ben. (A GIS lehetőségei a történeti kutatásokban). Debrecen, 2016. (Investigating the Social Differentiation and Spatial Pattern of Society in Sátoraljaújhely, 1870. Applying GIS in Historical researches – in Hungarian).

The research was supported by the Hungarian Research Fund K 111 766.

III. The place

The selection of Sátoraljaújhely (the county seat of Zemplén County) as a sample area was ideal from several aspects. Not only the origial census sheets were available for 2150 households (10 000 inhabitants) offering substantial material for quantitative statistical analysis, but the timing itself was also fortunate.

The town was located along the market line, where the products of the plains and mountains were exchanged. The physical geographical conditions allowed a N-S migration from the peripheries of Zemplén County to the county seat, while in the southern part of the county an E-W migration route developed towards the capital. Although in 1775 the county seat was unable to extend its attraction zone even to its own administrativ district (*figure 2*), between 1810-1870 its population has tripled, and this increase was among the greatest regarding their neighboring towns (*table 1*). By 1900 50% of the inhabitants of the county seat were born in a different locality, confirming the great role of migration. The acceleration of urbanization processes made a melting pot from the town reflected in its religious diversity: 35% of the population was Jewish of origin, Roman catholics reached also 30%, Calvinist protestants 12-14%, Greek Catholics approximately 20%. As a basic step of industrialization the railway was opened in 1870, while guilds were dissolved in 1872, thus the parallel coexistence of traditional and modern social patterns and layers are also observable owing to the date of conscription.

Table 1. *Population increase referring to the rate of urbanization (1825–1900) in Sátoraljaújhely compared to the surrounding significant towns*

Town	Population increase	Population in 1000 (1825)	Population in 1000 (1900)
Eger	40 %	17.5	24.5
Kassa (Košice)	180 %	13	38
Miskolc	80 %	22	40
Sátoraljaújhely	200 %	4 (1784), 6.3 (1825)	10 (1870), 19.9 (1910)

Beluszky P.: Magyarország településföldrajza. Általános rész. Budapest – Pécs, 1999.

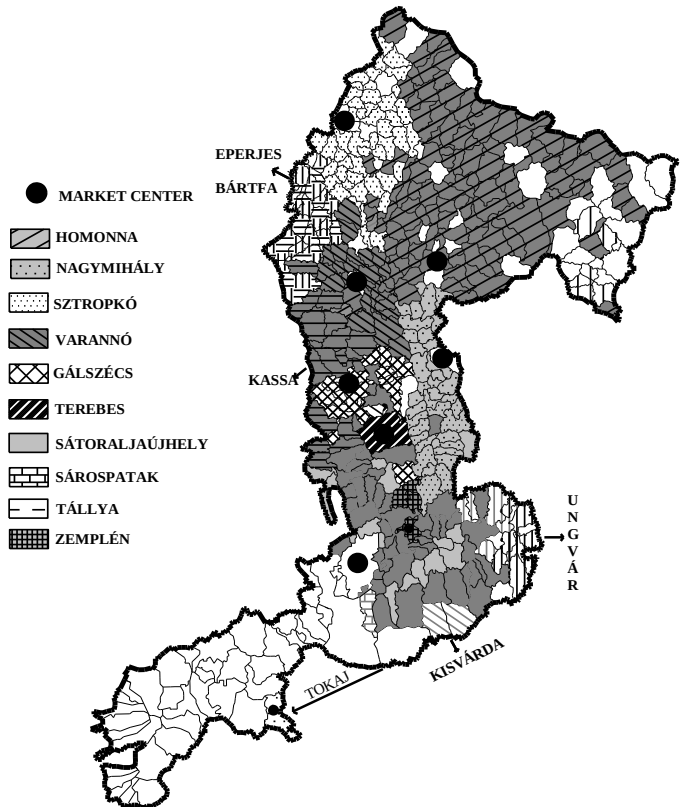


Figure 2. *Attraction zones based on market centers in Zemplén County in 1773.*

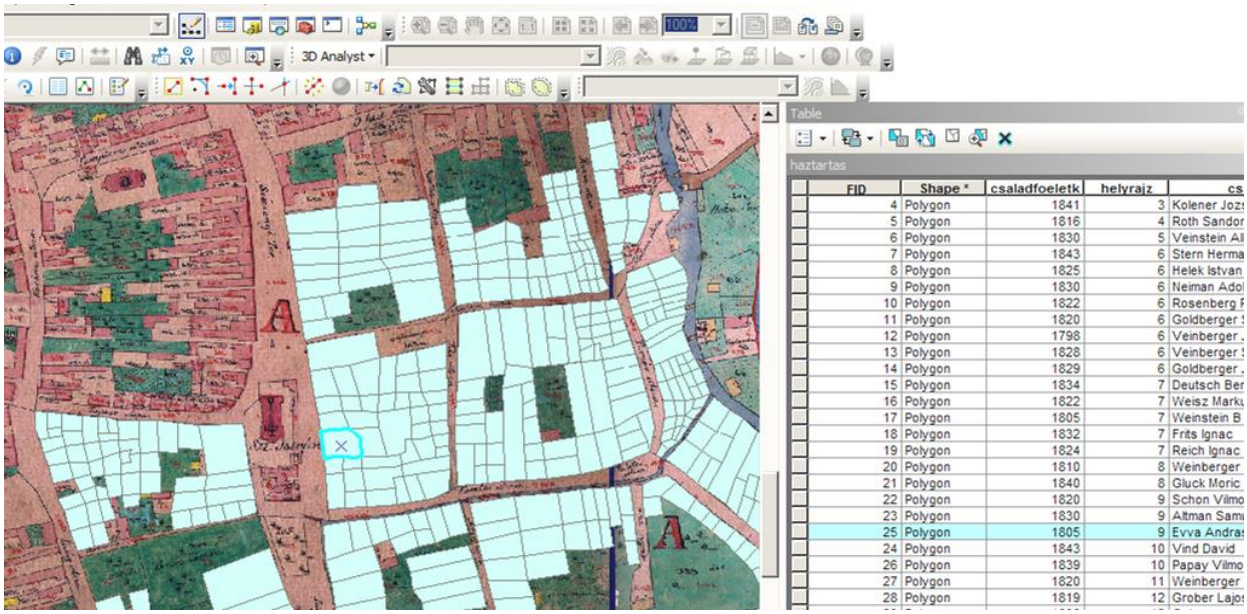


Figure 3. *The basemap, the database containing the digitized census data, and the households-entities organized in GIS: Nagy Piac str. nr. 9. Evva-household (nobleman)*

IV. Methods

In order to carry out the investigations, raw census data were organized into a database containing the above mentioned variables, where each household represented an entity. Phenomena with spatial pattern were analysed using GIS (ArcGIS 10.1),[2] while phenomena with no spatial relevance (within- and intergroup differences, like religious distribution within/between occupation groups, differences in welfare of religious groups and occupations, aging, differences in fertility rate, etc.) were evaluated using SPSS. The application of GIS required a map containing the same identifiers for households as the census data-sheets (topographical numbers), from the same era (1865) (*figure 3*).[3]

In case of *welfare* both spatial approach and the analysis of within and intergroup differences has relevance, thus both GIS and SPSS were utilized. The first step was to quantify welfare somehow. As social classifications are often not objective, we used 3 different methods to overcome social prejudices. Besides the traditional classification based on the the prestige of occupation multivariate statistics and SPSS were used for the other two classifications, both based on the quantified raw data of the census.

(1) In order to analyze patterns of traditional and modern layers of society we used Ferenc Erdei's model of 'accumulated society', when classifying the cases into different social layers. This means, that besides the traditional elite, middle and lower classes; paralelly capitalistic formations evolved in each layer, and these were slowly fusioning by the 1910s.

(2) The second method to classify the inhabitants was based on an *equation* containing the room numbers, number of economic buildings, number of co-workers, number of servants and housemaids, and the number of household members as input variables. Thus, this classification focused on the per capita welfare, while the third one represented a classification, where the economic power of the household as an entity was cumulated. The intervals were set according to natural breaks, thus the groups did not have equal members.

[2] A similar project led by *Mazsu, János*: OTKA 81488: The reconstruction of social and spatial pattern of Debrecen, 1870-72 was considered the predecessor of this, but remained mostly unevaluated.

[3] Source: MNL-BAZML SFL XV. 83. box. 77–79. Now www.hungaricana.hu and www.mapire.eu (containing settlement level cadastral maps) offers a new instrument to find detailed maps like this. The data sheets from Ung and Saros County are also left almost intact in county archives, thus there are plenty of options to repeat such investihgations

(3) The third method was based an automatic *cluster analysis* executed in SPSS containing the same variables except the number of family members. Classification results were checked by discriminance analysis. After numerous attempts the number of clusters was finally set to 6, as above this value the proportion of successfully reclassified data began to drop, and the forming new groups remained small. Neither this classification produced groups of similar size.

It is not surprising that the three classifications did not have identical results (although there was strong correlation measured between the 3 classifications - over r=0.7 - and there was also strong correlation between the wealth categories and room numbers; wealth and population density/room), which is confirmed by cross-tabulations, correspondance analysis (*table 2*).

Table 2. *Correspondence between complex wealth categories based on the equation and automatic clusterization*

Clusters	Complex wealth categories based on the equation												
	1	2	3	4	5	6	7	8	9	10	11	12	13
1	0	1	6	6	8	11	13	8	16	22	14	11	56
2	0	0	0	0	0	1	2	4	17	21	18	31	66
3	1	0	20	28	41	46	63	23	46	40	30	37	28
4	0	1	15	34	44	61	92	47	70	56	16	19	11
5	24	86	153	180	55	79	90	18	13	11	4	0	0
6	74	49	39	8	10	4	2	1	2	1	0	0	0
Total	99	137	233	256	158	202	262	101	164	151	82	98	161

Room numbers							
0	1	2	3	4	5	above 6	Total
0	59	57	19	20	10	7	172
0	1	9	74	40	19	17	160
10	222	131	32	6	2	0	403
3	146	289	25	3	0	0	466
60	656	0	0	0	0	0	716
97	93	0	0	0	0	0	190
170	1177	486	150	69	31	24	2107

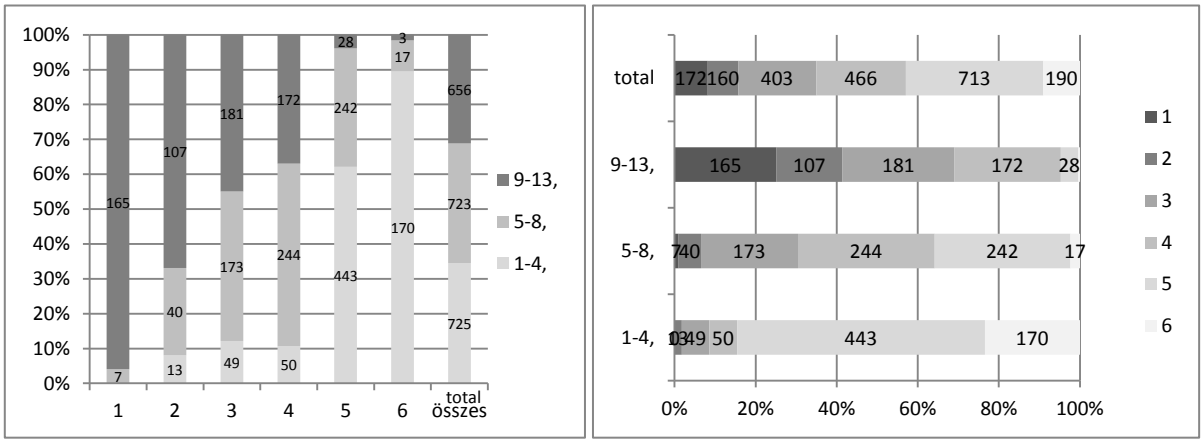


Figure 4. *Correspondence of the 2 statistical evaluation (6 clusters, 13 groups based on equation)*

The richest three groups (9-11) comprised 341 families (15%) in case of the 2nd method (equation referring to per capita economic power), while the richest 2 clusters comprised 332 family heads in the 3rd classification method, but only 192 were common of these (60%) (confirmed by *figure 4*).

V. Tracing the elite(s)

(1) Groups based on the traditional classification

The traditional (manual) classification based on the model of Erdei, Ferenc and Weber, Max resulted in more than 10 categories with uneven size (*table 3*). Free civil professions and clerks were underrepresented here compared to other towns with similar functions. The layer of merchants was quite strong possibly as the result of Jewish abundance and the geographical location. The proportion of craftsmen was high, but not remarkably – the same was measured in the larger Debrecen. Widows were separated as we have no information about their profession and incomes.

The elite was composed of the 'f', 'e' and 'p' categories, although as we will see, the wealth and economic power of the latter (civil professions) group was significantly weaker (teachers), than the other two according to data on room numbers, population density and the other two classification methods. Nevertheless, the categories do not strictly refer to welfare or social status: in category 'f' smallholders and large estate owners are also included. But since they tended to live in the centre of the town, while agrarian wage-labourers ('s') resided in the periphery, they were considered as part of the traditional (declining) elite.

The sectoral distribution of these categories is given in *table 4*. 35% of the family heads were involved in industry, but modern industrial branches were represented only by some 10% of the total family heads involved in industry – guilds still dominated referring to a transitional period. The private tertiary reached 30% reflecting the transformations (urbanization), while agriculture has already lost its dominant position (25%). Those, who did not own or rent separate flats (or were not family heads), were omitted from the analysis (they *ab ovo* cannot be considered as members of elite), thus this table did not contain data on 1100 workers and 700 servants.[4] In other words, only half of the wage-earners was included, thus percentage data on the elite below should be halved!

Table 3. *Social groups according to the model of 'accumulated' society (method 1; prs and %)*

e	town and county elite	lawyers, chief clerks (state servants)	*47*	*2.2%*
f	landowners	mainly middle estate owners	*116*	*5.4%*
p	*free civil professions*	*teachers, doctors, railway engineers, photographers, clockmaker*	*91*	*4.2*
h	*clerks*	*state (lower class compared to 'e') and private (in banking and finances)*	*108*	*5%*
g	*agrarian experts*	*not independent, but skilled agrarian wage-earners*	*34*	*1.6%*
n		*policemen*	*29*	*1.5%*
kk	*merchants*	*mason owners, railway entrepreneurs, merchants*	*216*	*10.1%*
k, ka		*lower officials: postmen, poor merchants*	*151*	*7.0%*
m	*craftsmen*	*guild members: tailors, potters etc.*	*677*	*31.5%*
q	*lower tertiary*	*transportation: cartsmen, waiters*	*60*	*2.8%*
s	*poor*	*daily wage earners in agriculture, beggars, bakers (women), washerwomen, peripatetic, scrap-iron collector*	*508*	*23.7%*
ö	*widows*		*101*	*4.7 %*

Table 4. *Hypothetic-preconceptional social stratification based on the prestige of occupation (family heads; %)*

Group	**Agrarian**	**Industrial**		**Tertiary**	**Private tertiary**	**Altogether**	**%**
Upper	f (116)			e (47)	p (91)	kb. 250	12%* (7%)
Middle	g (34)	m (677)	kk (30)	h (108)	kk (190), h	kb. 550	25% (25%)
Lower middle				n (30)	k (132)	kb. 500	23% (25%)
Lower	s (343)				s (160), q (60)	570 + some craftsmen = 800	38% (43%)
Total	cca. 500	cca. 700		cca. 200	cca. 600	cca. 2100	*+101 widow households*
%	25%	35%		10%	30%	100%	

*Servants or co-workers not conscripted as family heads were omitted. See corrected values including these layers in brackets.

(2)Groups based on the welfare-equation

The family heads were classified into 13 groups based on the natural breaks in welfare values calculated by the equation. Groups 9-13 were definitely richer than the average. The richest 15% of

[4] There were altogether more than 4000 persons conscripted with occupation, but only 2150 was family head.

families owned only 20% of the economic potential (it could reach 40% in Ottoman towns during the 18th c.).[5] The next 20% owned 25% (*figure 5*), thus there were not significant differences within the elite. The poorest 20% owned only 13%. In other words the richer 50% of the population was 3 times richer, than the poorer half owning 25% of the economic potential. This inequality is not great measured to other regions. [6]

Based on *figure 5* the aggregation of wealth categories 11-13 (comprising 15% of households) may be reasonable. This is followed by group 9-10 including another 15% of the cases. (The reason of the small differences between these two groups might be, that members of the real elite had larger households, which decreased per capita economic potential. It is also true that within the 300 households there is a layer comprising 100 households with extremely high values).

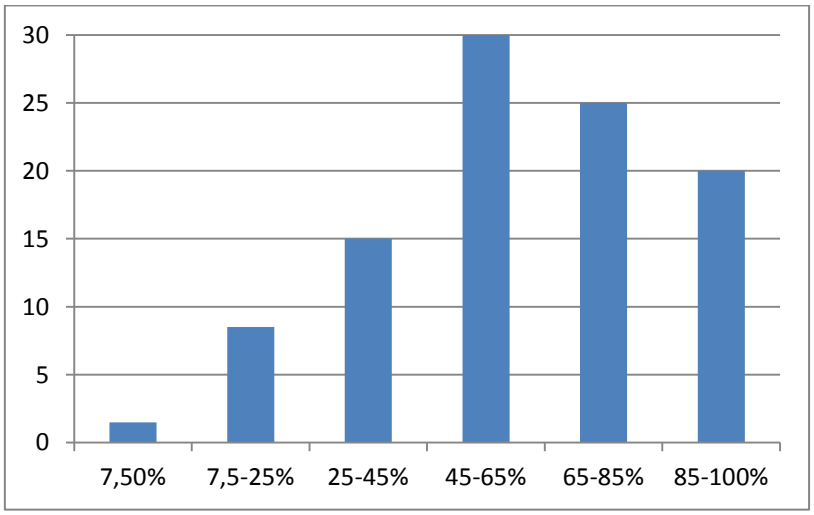


Figure 5. *The distribution of economic potencial (vertical axis) between groups of families (horizontal axis in %)*

The classification results confirm, that categories (based on the prestige of occupation) 'e', 'f', 'kk', 'h' are considered to be the richest, followed by 'p', thus our preconception was not flawed (*figure 6*). The minor differences between the cluster-based and equation based classification (*table 7*) is due to the fact, that the latter measures total wealth of a family regardless of family size. Thus group 'f' is considered poorer is per capita wealth is calculated as agriculture was labour-force intensive sector traditionally characterized by larger family size.

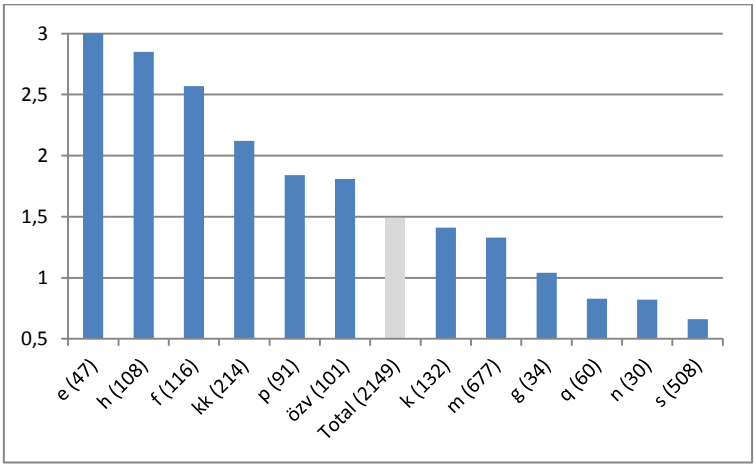


Figure 6. *Differences in per capita economic potential between social groups based on prestige and occupation*

[5]*Canbakal, H.– Filiztekin, A.*: Wealth and Inequality in Ott oman Lands in the Early Modern Period.Working Paper.

[6] The richest 2% owned 25% in China, in New-Spain in 1790, the richest 10% owned 55% of the wealth, in Bihar (India) in 1804 the richest 20% owned 50%, and in Naples in 1811 it was 10 and 33% percent respectively. *Milanovic, B–Lindert, P. H.–Williamson, J. G.*:Measuring Ancient Inequality. Working Paper 13550. NBER. Cambridge, MA, 2007. http://www.nber.org/papers/w13550.

Surpisingly the average room number/family was not higher than in rural areas (although the average household size – 4.66 prs – was bit smaller), the 1.5 room/family is not greater value than measured in Belgrade after 1900.[7] Multistorey buildings were abundant only in the town centre, but even houses only with ground floor were usually divided between families (often not relatives). Only 12% of the households (not houses!) had more than 2 rooms – this can be the real elite as there was a strong correlation between room numbers and the calculated wealth based on the equation (*table 5*). Further 22% had 2 rooms. Population density – calculated from room number and household size – is also an index of welfare (*table 6*). In 25% of households there were 4 or more than 4 inhabitants per room, while only 10% of families were characterized by density smaller than 1.5 person/room.

Table 5. *Distribution of households based on room numbers in 1870 (prs and %)*

No data	**0.5 room and under**	**1**	**2**	**3**	**4**	**5 rooms and above**	**Total**
40	170	1175	488	150	69	55	2147 (average: 1.5)
1.9	7.9	54.7	22.7	7.0	3.3	2.6	100 %

Table 6. *Population density (prs/room) in Sátoraljaújhely in 1870 (prs and %)*

under 1	**1**	**1–1,5**	**1,6–2**	**2–2,5**	**2,5–3**	**3–4**	**above 4**	**Total**
47	167	125	375	120	352	391	529	2147 (average: 2.85)
2.2	7.8	5.8	17.5	5.6	16.4	18.2	24.6	100 %

Table 7. *The rankings of the pre-defined layers based on prestige of occupation using the two different statistical classification (cluster-based; equation-based)*

	e (47)	**h (108)**	**f (116)**	**kk (214)**	**p (91)**	**ö (101)**	***Total (2149)***	**k (132)**	**m (677)**	**g (34)**	**q (60)**	**n (30)**	**s (508)**
average cluster membership	2.45	2.8	3.2	3.06	3.71	3.85	*3.93*	3.91	3.97	4.21	4.49	4.48	4.75
ranking	1	2	4	3	5	6	*8*	7	9	10	12	11	13
average equation-based wealth	4.52	2.85	2.57	2.12	1.84	1.81	*1.49*	1.41	1.33	1.04	0.83	0.82	0,66
ranking	1	2	3	4	5	6	*7*	8	9	10	11	12	13

Table 8. *Socio-demographic characteristics of the layers defined by the equation (the average represents intergroup differences, standard deviation represents within-group differences)*

Social group based on equation		**Average children number**	**Average number of servants**	**Household size**	**Proportion of earners**	**Average room number**	**Average inhabitants per room**
1 (127, 6%)	Mean	**2.09**	0.01	4.07	0.29	0.51	**7.84**
	St. Dev.	1.60	0.09	1.73	0.20	0.39	3.61
2 (140, 6.5%)	Mean	**2.24**	0.01	4.32	0.28	0.81	**5.31**
	St. Dev.	1.75	0.12	1.90	0.19	0.30	1.63
3 (233, 11%)	Mean	**2.26**	0.03	4.37	0.24	0.99	**4.70**
	St. Dev.	1.50	0.20	1.60	0.10	0.29	2.43
4 (258, 12%)	Mean	1.65	0.04	3.81	0.33	1.06	**3.60**
	St. Dev.	1.62	0.20	1.91	0.19	0.37	1.51

(Continues on the next page)

[7] In Belgrade in 1907 60% of the *houses* had only one room (as in the *households* of Sátoraljaújhely), but the density was 3.5 prs/house, while in the Hungarian town it was 9 prs (2 households/house). *Vuksanović-Anić, D.:* Urbanistički razvitak Beograda u periodu izmedu dva svetska rata (1919–1941). In: Istorija XX. veka. Zbornik radova IX. Beograd, 1968. 458–465. In 1926 an offcial or merchant family in Belgrade had 2.5 rooms, artisans had 1.9, workers had 1.5. The former values are similar to the Hungarian, while the latter are higher. *Calic, M-J.:* Sozialgeschichte Serbiens 1815–1941. Der aufhaltsame Fortschritt während der Industrialisierung. München, 1994. 323-325.

(Continues from the previous page)

Social group based on equation		Average children number	Average number of servants	Household size	Proportion of earners	Average room number	Average inhabitants per room
5 (158, 7.5%)	Mean	**2.36**	0.11	**4.63**	0.28	1.20	**4.10**
	St. Dev.	1.77	0.32	1.92	0.16	0.49	1.65
6 (203, 9.5%)	Mean	1.87	0.11	4.17	0.33	1.22	3.52
	St. Dev.	1.89	0.33	2.19	0.15	0.49	1.62
7 (264, 12%)	Mean	1.43	0.18	3.64	**0.45**	1.36	2.75
	St. Dev.	1.73	0.40	2.24	0.30	0.58	1.64
8 (104, 5%)	Mean	**1.94**	0.36	**4.55**	0.35	**1.60**	2.91
	St. Dev.	2.00	0.59	2.55	0.20	0.77	1.50
9 (164, 7.5%)	Mean	1.63	0.37	4.37	**0.39**	**1.78**	2.64
	St. Dev.	1.62	0.59	2.42	0.25	0.83	1.58
10 (151, 7%)	Mean	1.28	**0.49**	3.90	**0.43**	**1.95**	2.10
	St. Dev.	1.61	0.70	2.33	0.27	0.77	1.39
11 (83, 4%)	Mean	1.51	**0.70**	**5.01**	**0.42**	**2.17**	2.52
	St. Dev.	1.69	0.79	2.95	0.30	1.07	1.65
12 (99, 4.5%)	Mean	1.60	**0.88**	**5.14**	**0.41**	**2.59**	2.18
	St. Dev.	1.70	0.97	2.99	0.29	1.28	1.45
13 (162, 7.5%)	Mean	1.69	**1.87**	**6.57**	0.37	**3.73**	2.04
	St. Dev.	1.89	1.62	3.87	0.26	1.66	1.64
Total (2149)	Mean	*1.81*	*0.34*	*4.39*	*0.35*	*1.53*	*3.50*
	St. Dev.	*1.74*	*0.80*	*2.45*	*0.23*	*1.09*	*2.28*

The narrow elite (group 11-13) was characterized by low children number, but with large family owing to the auxiliary workforce (*table 8*). The proportion of earners was higher than the city average, room number was over 2, as in group 9-10. The average population density was similar to that of group 9-10, because of the high number of servants (group 9-10 was characterized by smaller household sizes). Since the room number of the real elite was also similar to that of the middle class, it was the available auxiliary workforce that made real difference between them.

(3) Groups based on clusterization

Though the 3rd method to identify social strata was based on automathic classification, thus it lacked any preconception, unlike method 1 (prestige of occupation), the classification resulted in well-defined social characteristics (*table 10*), although the boundaries of some of the groups created were unconsolidated (group 2-3) as the discriminance analysis proved (*table 9*). Better classification results could not be achieved even when using less or more clusters.

Table 9. *Discriminance analysis: successfully reclassed cases measured to total*

Original cluster	Reclassed into						Total case number
	1	2	3	4	5	6	
1	**123**	8	0	40	1	0	172
2	21	**10**	30	53	34	12	160
3	0	11	**270**	17	94	11	403
4	1	1	16	**353**	95	1	467
5	0	0	0	0	**716**	0	716
6	0	0	2	6	71	**111**	190

Table 10. *Socio-demographic characteristics of groups created by automatic clusterization*

Cluster 6:	the poor, high children ratio, low proportion of earners, room number under 1
Cluster 5:	the poor, no servants, small household size (3 prs!), room number around 1
Cluster 1:	the rich, servant number over 2, low proportion of earners (0.2 – contrary to groups defined by the previous method, where it was over 0.4 – revealing that the two methods of defining the elite are not equivalent!), room number around 4
Cluster 2–3–4:	average values, unconsolidated boundaries, fuzzy
Cluster 2:	the proportion of Jews within the group is over 50%: 'par excellence Jewish middle-class'

The classification based on cluster membership was also appropriate to define groups based on their wealth as revealed by its combination with the classification based on the equation (*figure 7*), although the relation is not one-to-one. The average cluster membership of cases classified into equation-based groups 11-13 was under 3, while in the case of equation-based groups 1-6 it was above 5.

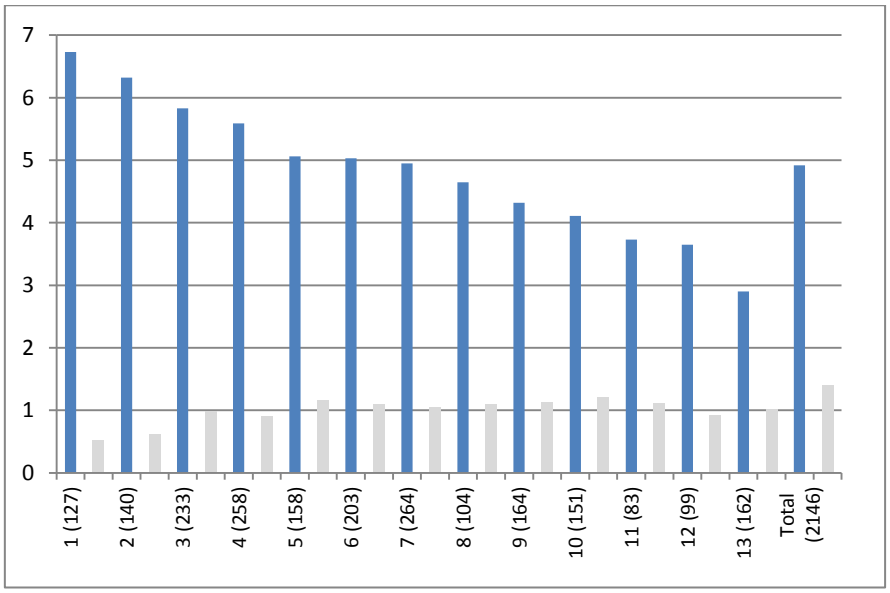


Figure 7. *The average cluster membership of classes based on the equation*

V.1. Socio-demographic features of the elite

The 170 households of the elite was characterized by high children number (over 2) contrary to the previous classification (with great standard deviation), but similarly to the high-middle class (cluster 2, 160 households) (*table 8 and 11*). The average number of servants was also around 2, while in cluster 2 it was under 1. The average household size exceeded 6.5 (with great standard deviation), which was remarkably higher than in cluster 2 or cluster 3-5, but similar to in group 13. The proportion of earners was lower than in any other clusters, except cluster 6 (0.2 with low standard deviation), and lower, than in group 13. Room number was 4, while it was only 2 in cluster 2 and 1 in cluster 5. Rich were averagely 5 years older (over 42 yrs), than measured in other clusters. Population density was below 2 prs/room with low deviation (like in group 13), while it was over 3 in cluster 2 and over 7 in cluster 6. The average group membership in cluster 1 was above 11, while households classified into cluster 2 had a value over 9. Clusters 3-4 had average wealth based on the equation, while in the two categories comprising the poor the average group membership was only 4 and 2.

Table 11. *Socio-demographic features based on automatic clusterization (average represents inter-group differences, standard deviation reveals within group differences)*

Cluster (Ward-method)		Number of children	Number of servants	Household size	Proportion of earners	Average room number	Aging	Prs/room	Group membership based on the equation
Elite (172)	Mean	**2.30**	**1.97**	**6.61**	0.22	**3.97**	**1828**	1.79	11.62
	St. Dev.	2.07	1.48	3.33	0.15	1.46	12.62	0.97	1.64
2 (160)	Mean	**2.34**	**0.71**	**5.74**	0.35	**2.11**	1832	3.29	9.54
	St. Dev.	2.02	0.96	2.73	0.25	1.17	10.77	2.16	3.11
3 (403)	Mean	**2.26**	0.21	**5.51**	**0.43**	1.54	**1828.5**	**4.03**	8.02
	St. Dev.	1.70	0.46	2.39	0.22	0.76	11.21	1.82	2.90
4 (467)	Mean	1.90	0.31	4.28	0.31	**1.75**	**1829.6**	2.71	7.58
	St. Dev.	1.89	0.50	2.16	0.21	0.59	11.74	1.53	2.38
5 (716)	Mean	1.06	0.00	2.91	0.38	0.96	1833	3.07	4.44
	St. Dev.	1.07	0.00	1.21	0.24	0.14	12.00	1.19	2.04
6 (190)	Mean	**2.77**	0.22	**5.05**	0.23	0.70	1833	**7.84**	2.34
	St. Dev.	1.79	0.49	2.02	0.14	0.30	10.27	3.23	1.67
Total (2108)	Mean	*1.83*	*0.34*	*4.42*	*0.35*	*1.55*	*1831*	*3.51*	*6.61*
	St. Dev.	*1.74*	*0.80*	*2.45*	*0.23*	*1.08*	*11.77*	*2.28*	*3.46*

As for the categories based on traditional classification (the weberian prestige of occupation), group 'e' was characterized by more than 3 rooms, in case of group 'f', 'h' and 'kk' it exceeded 2. (Either owned or rented, room number represents economic power, *figure 8*).

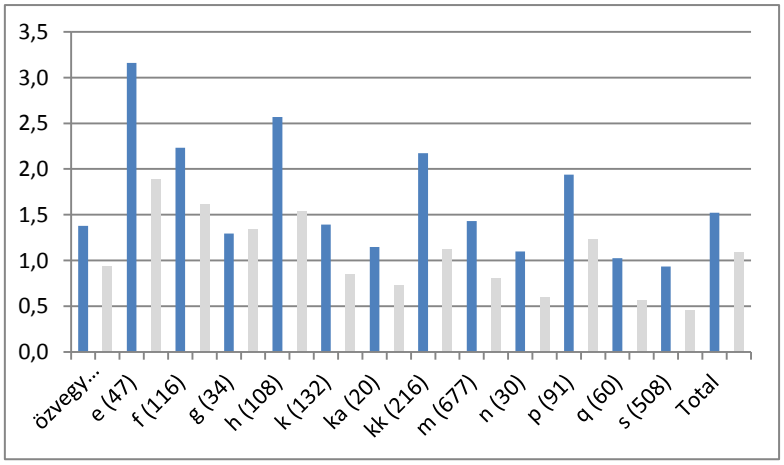


Figure 8. *Average room numbers per groups based on prestige of occupation*

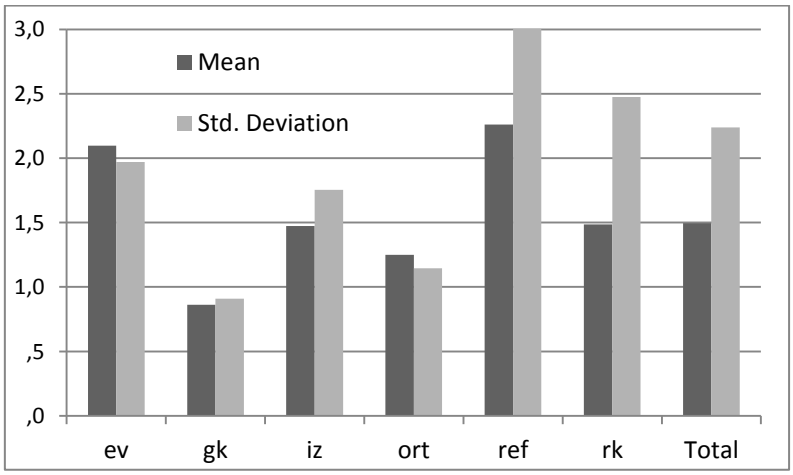


Figure 9. *The connection between economic potential (based on the equation) and religion*

As for religious differences it was the Protestants (both Calvinists and Lutherans), whose economic potential proved to be the greatest followed by Jews (*figure 9*). Greek Catholics were poorer than the average. Although Calvinists constituted only 12% of the population they held traditionally most of the leading offices. Differentiation within religious groups progressed by 1870: standard deviation was high (there were poor artisans among Protestants, and beggars, scrap-metal collectors among Jews).

Internal differentiation

After analyzing the *inter-group differences* it is time to take a closer look on *within-group differences* earlier depicted by standard deviation values. Cluster 1 comprising the elite was dominated by group 'e', 'kk', 'h' and 'f' ('h' and 'f' constituted 20-20% of this group respectively referring to the predominance of old bureaucratic-agrarian classes, the new layer of merchants also reached 20% within cluster 1, but their proportion was still over 40% in the middle-class, cluster 2). As these traditional categories based on the prestige of occupation can be found in other clusters as well, this confirms, that the 2 methods are not equivalent (*figure 10*). Only 50% of members in group 'e' was classified into cluster 1, the chance to be the part of the elite was also 50% among 'h' (officials), but only 15-15% in group 'kk' and 'p', while in group 'f' 30% belonged to the elite. Almost 30% of group 'kk' was classified into cluster 2 (representing merchant burgeoisie). Thus it was category 'e' and 'h' that is considered dominantly the elite (these were officials referring to the fact that capitalist transformation was one-sided as new layers were not yet members of the high society here in 1870).

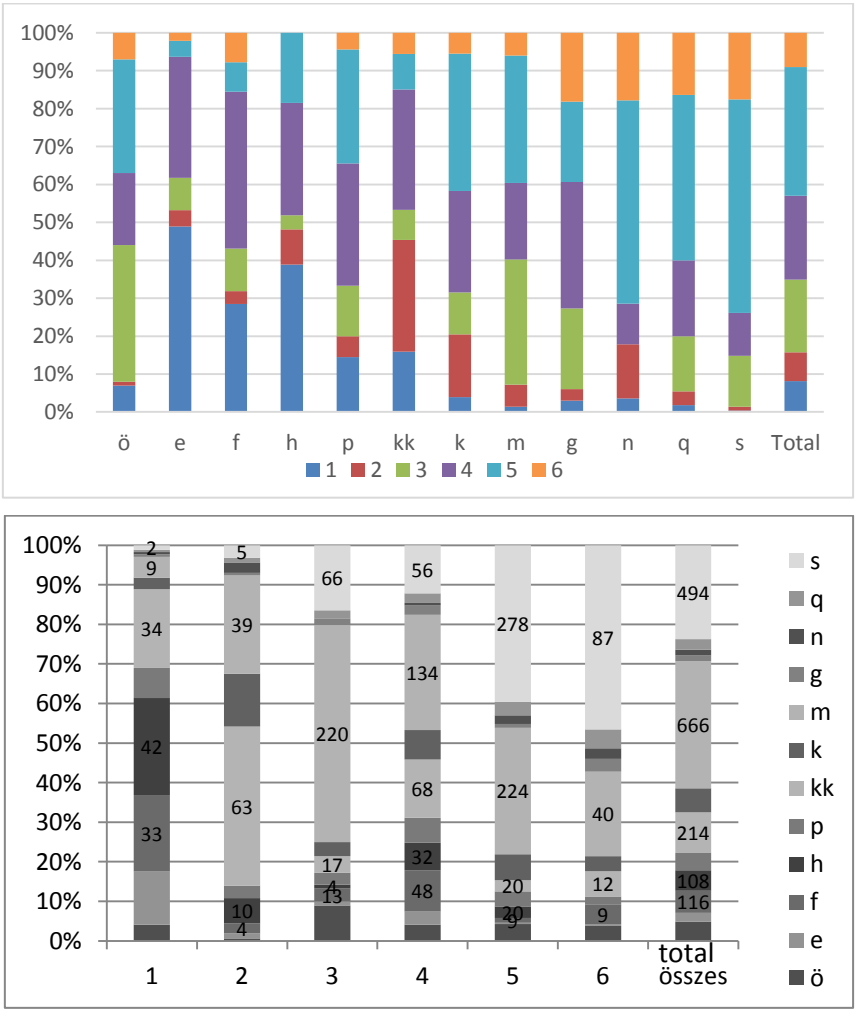


Figure 10. *The classification of traditional groups into clusters: within-group differences*

Surprisingly category 'p' cannot be unequivocally considered as the component of the elite (only 10% of the elite stemmed from this category, though it is still higher, than their proportion from the total households, which is 5%; and only 15% of group 'p' was classified as 'elite' into cluster 1). This also refers to defects in modernization process of towns compared to the western models.

The above mentioned are also true if we use the equation-determined categories instead of automatic clusterization (*figure* 11). The proportion of cases classified into group 9-13 was over 70% in case of group 'e' and 'h', 50% in case of 'kk' and 'f', while 40% in group 'p' (the agrarian elite was weakening, but the merchant elite was not yet strong to take over the positions of the bureaucrats – the agrarian elite transformed their power into political). As group 9-13 is a broader interval composed of more than 600 hundred families, while cluster 1 represented only 7.5% of the households (and cluster 2 gave further 7.5%), it is not surprising that artisans were also included into these aggregated groups.

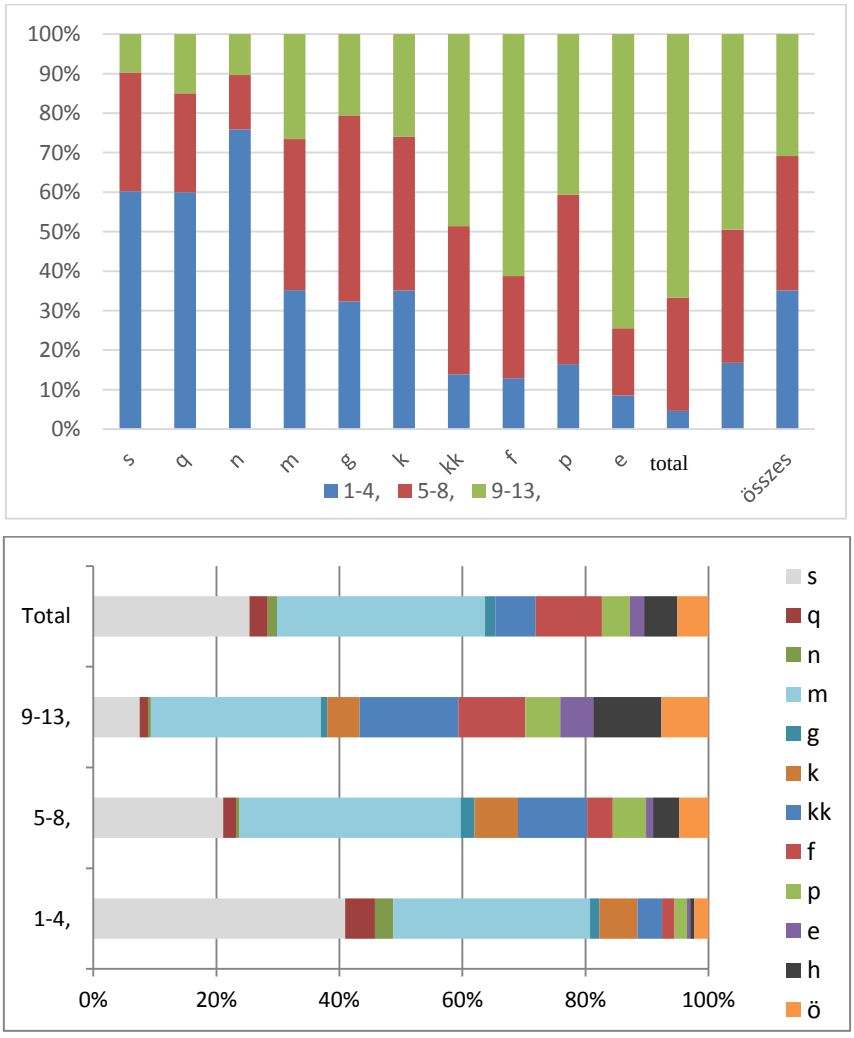


Figure 11. *Internal differentiation (based on economic potential) within traditional occupation groups*

As for the religious distribution within the categories of theelitewe may conclude, that protestants were overrepresented within category 'h' and Jews among members of group 'kk' (both constituting the part of the elite), but within group 'e' or group 'f' no similar trends could be observed (*figure 12*); the share of different religions in the latter categories was similar to that of the total sample. The same phenomena can be observed if using the other two classifications.

Every family had 2 or more than 2 rooms (90% had more than 3) in cluster 1, while it was only 60% in cluster 2. 90% of family heads had 2 or more than 2 rooms in group 'e', 60% in group 'f', 70% in group 'kk' and 'h', while it was only 40% among households classified into category 'p' (*figure 13*).

Going down into a deeper level we also tried to identify the proper occupations of the elite, within the pre-defined categories. Lawyers, doctors, engineers, landowners determined this group either we used averege room number, the equation to determine wealth or cluster analyis (*table 12*).

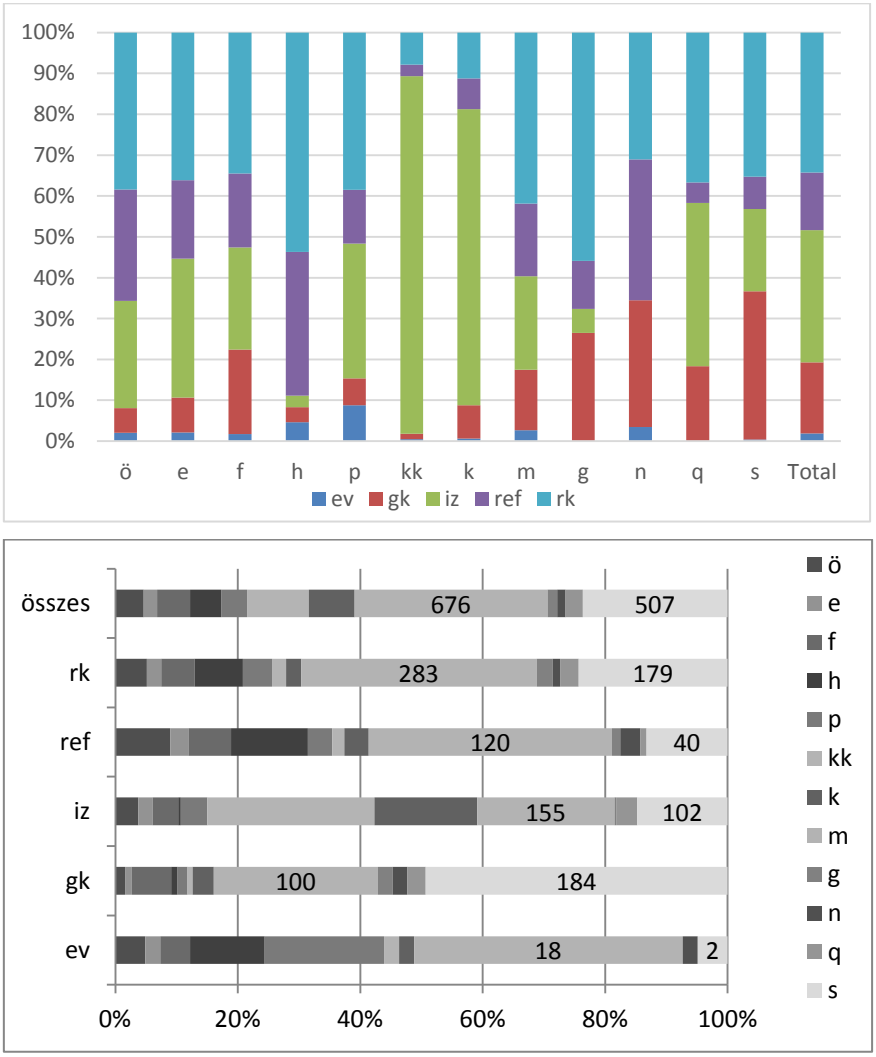


Figure 12. *The frequency of different denominations among and within social groups based on prestige of occupation*

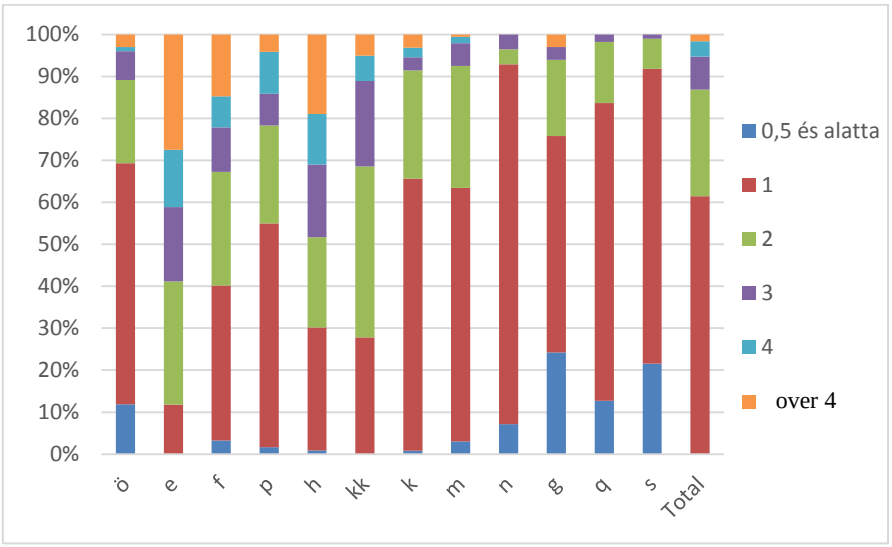


Figure 13. The connection between room number and occupation

Table 12. *Rankings of different occupations based on their economic potential*

Occupation of the family head	Average (category) based on equation (14)	Ranking	Cluster (6)	Ranking	Average room number	Ranking
Lawyers and doctors (33)	11.24	1	2.03	1	3.64	1
mason owners (60)	8.70	5	2.69	2	2.32	3
skinner-weaver (10)	9.40	2	3.10	3	2.9	2
landowners (106)	9.08	3	3.17	4	2.3	4
wheat, flour merchants (21)	*6.76*	*14*	*3.33*	*5*	*1.81*	*9*
engineers (18)	8.83	4	3.35	6		
other merchants (38)	7.61	8	3.46	7	1.87	7
grocers (11)	6.82	12	3.55	8	1.55	12
joiner (35)	7.66	7	3.65	9	1.84	8
entrepreneurs, railway entrepreneurs (13)	7.31	9	3.69	10	2.08	5
butchers (27)	6.89	11	3.74	11	1.56	11
small merchants (10)	*6.10*	*18*	*3.78*	*12*	*1.00*	*26*
textile merchants (15)	*8.40*	*6*	*3.87*	*13*	*2.0*	*6*
tanner-skinner (37)	6.57	15	3.89	14	1.27	18
woolen coat maker (aba) (46)	*6.04*	*21*	*3.91*	*15*	*1.34*	*15*
bootmakers (144)	6.11	17	3.92	16	1.33	16
total sample (2144)	6.53	16	3.93	17	1.52	13
shopkeekers (27)	*5.52*	*23*	*3.96*	*18*	*1.19*	*21*
shoemakers (16)	6.00	22	4.00	19	1.13	22
teachers (15)	*6.80*	*13*	*4.07*	*20*	*1.77*	*10*
tailors (103)	6.10	19	4.23	21	1.33	17
washers, sewers, bakers (37)	*7.27*	*10*[8]	*4.24*	*23*	*1.20*	*20*
cartsmen (52)	4.83	25	4.55	24	1.00	24
carpenter (33)	4.61	26	4.73	25	1.11	23
personal servants (55)	5.00	24	4.73	26	1.00	25
agrarian daily wage earners (343)	3.89	27	4.88	27	0.87	27
policemen (15)[9]	3.73	28	5.00	28	0.86	28

V.2. Reproducing the elite

It is evident, that in urban environment natural reproduction was subordinated compared to migration as source of reproducing the elite. Even in the introverted Eger 75% of the measured population increase was the result of migration processes, as the net reproduction rate until 1873 was low (high mortality besides the high birth rate). The demographic transition in Hungary began only after the last cholera epidemics (1873).

External sources

As we mentioned, by 1900 55% of the urban dwellers in Sátoraljaújhely was born outside the administrative area of the town, which functioned as a 'sink'. The social distribution of the immigrant and indigenous society showed remarkable differences. High-class and upper classes were overrepresented among migrants compared to indigenous or total population, while the middle class was overrepresented in case of the indigenous population. Lower classes were also overrepresented among newcomers, especially regarding industrial-tertiary occupations, which clearly shows the changing workforce-demand of the transforming economy (*table 13*).

[8] The differences in rankings using different classification method are due to the fact, that the equation calculates per capita potential contrary to the other two indices, thus a poor, but small family shows better performance when the equation is used as classification method.

[9] Only heads of families included.

Table 13. *Differences in social status of immigrant and indigenous society in Sátoraljaújhely (based on family heads)*

Layers	**Total number**	**%**	**Indigenous**	**%**	**Immigrant %**	***Immigrants from the layer %***	**Examples**
High class	50	2	13	*1.5*	2.1	*74*	priests, lawyers, doctors, engineers
High and upper class	*90*	*3.4*	*22*	*2.5*	3.8	*75*	*teachers, tax-collectors, railway engineers, local and county high-officials*
Middle class	*1080*	*41*	*435*	*50*	36	*60*	*merchants, craftsmen, mason owners*
Lower middle class	*96*	*3.5*	*36*	*4.1*	3.3	*62*	*low-commission officers, grocers, tailors, waiters*
Lower classes	*1390*	*52.5*	*341*	*39*	58	*75*	*nurses, servants, scrap-metal and textile collectors*
Agrarian from lower classes	558	21	183	*21*	21	*67*	peasants, daily labourers
Industrial-tertiary from lower classes	735	28	124	*14*	34	*83*	bricklayers, servants, cartsmen, cooks
Altogether	2656	100	873	*100*	100	*67*	

A *regional comparison* can also be useful to identify common and specific patterns. We analyzed the small Varannó oppid (Vranov, SK), a district center in the same county with only 2000 inhabitants, and the tradional, but introverted center, Eger (over 20 000), the county seat of Heves County (*table 14*). Not surprisingly the elite was mainly recruited from newcomers even in the small Varannó, as it had no school to educate its own elite. In the case of Eger, with its Lyceum, not only the elite was stronger regarding its percentage value compared to the other two settlements (20% vs. 3.5-7%) (although we used a different source type, the birth and marriage registers from 1883 containing only 870 persons and not the census data), but the local elite was also stronger compared to the immigrant elite society (22 vs. 12%). In Eger the middle class was thinner.

Table 14. *A comparison of social stratification of immigrant and indigenous societies in urban and semi-urban environment*

Layer	**Varannó total (%)**	**S.újhely, total (%)**	**Eger,* total (%)**	**Varannó migrant (%)**	**S.újhely migrant (%)**	**Eger,* migrant (%)**	**Varannó, indigenous (%)**	**S.ujhely, indigenous (%)**	**Eger,* indigenous (%)**
Elite	7.1	3.4	20.0	8.1	3.8	12.0	5.8	2.5	22.0
Middle	48.3	41.0	33.0	40.8	36.0	49.0	58.2	50.0	25.0
Lower middle	6.1	3.5	24.0	8.6	3.3	12.0	2.9	5.0	28.0
Lower	38.5	52.0	22.0	42.5	58.0	25.0	33.1	39.0	20.0
Total prs	720	2656	x	409 (57%)	1783 (67%)		311 (43%)	873 (33%)	

*Eger is based on birth registers from 1883, while the other two were based on census data from 1870.

Internal sources

In order to analyze the chances of passing down or inheriting social positions, we used a sample of 100 persons (cca. 1% of the total population) between 1896 and 1906 collected from the birth registers of Sátoraljaújhely (narrow time interval was needed to identify father-son relations). In case of the elite both upward migration and the inheritance of social position was observable, but the sample was statistically irrelevant (*table 15*). The sum of cases predicts, that upward

movements were a bit more characteristic for this urbanising community than declassation (12 vs. 5 cases in 1896 out of 43; and 8 vs. 5 cases out of 40 in 1906, however stability characterized more than 50% of cases). As at least the sons were considered indigenous, thus the general improvement in their social status reveals the *role of towns in ameliorating livelihood*, while it is also evident, that in *the society of (especially rural) immigrants lower classes dominated*.

Table 15. *Investigating social mobility in Sátoraljaújhely between 1896-1906 (father-son relations)*

1896	**cases investigated**	**inherited position**	**%**	**upward movement**	**%**	**declassation**	**%**
Upper classes	2	1	50%	1	50%	0	0%
Middle class	34	17	50%	11	33%	3	9%
Lower classes	7	5	71%	0	0%	2	28%
1906	**cases investigated**	**inherited position**	**%**	**upward movement**	**%**	**declassation**	**%**
Upper classes	0	0	0%	0	0%	0	0%
Middle class	23	11	48%	8	34%	2	9%
Lower classes	17	9	53%	0	0%	3	18%

MNL-BAZML SFL, XXXIII-2. marriage registers from 1896, birth registers from 1906

V.3. Spatial pattern of the elite in different dimensions

After visualizing our data on maps, where each household was represented by an entity, we managed to locate the elite, which was characterized by a center-periphery accommodation pattern (Chart 1-5). Wealthy people were located along the main road in N-S direction (also representing the general route of migration), then in the city center, and the road leading towards the River Ronyva, perpendicular to the main road. The members of the elite often rented their houses in the city center to Jewish merchants, who there claimed the majority by 1870. As we used a *multidimensional approach* it is evident that the category of 'elite' does not coincide in many cases after overlying the maps (wealth based on equation, clusterization, traditional classification, room numbers, density of dwellers).[10]

[10] Contact with authors: Gábor Demeter (HAS, RCH, Institute of History), demetergg@gmail.com; Róbert Bagdi (Pallas Athena University), bagdir@szolf.hu

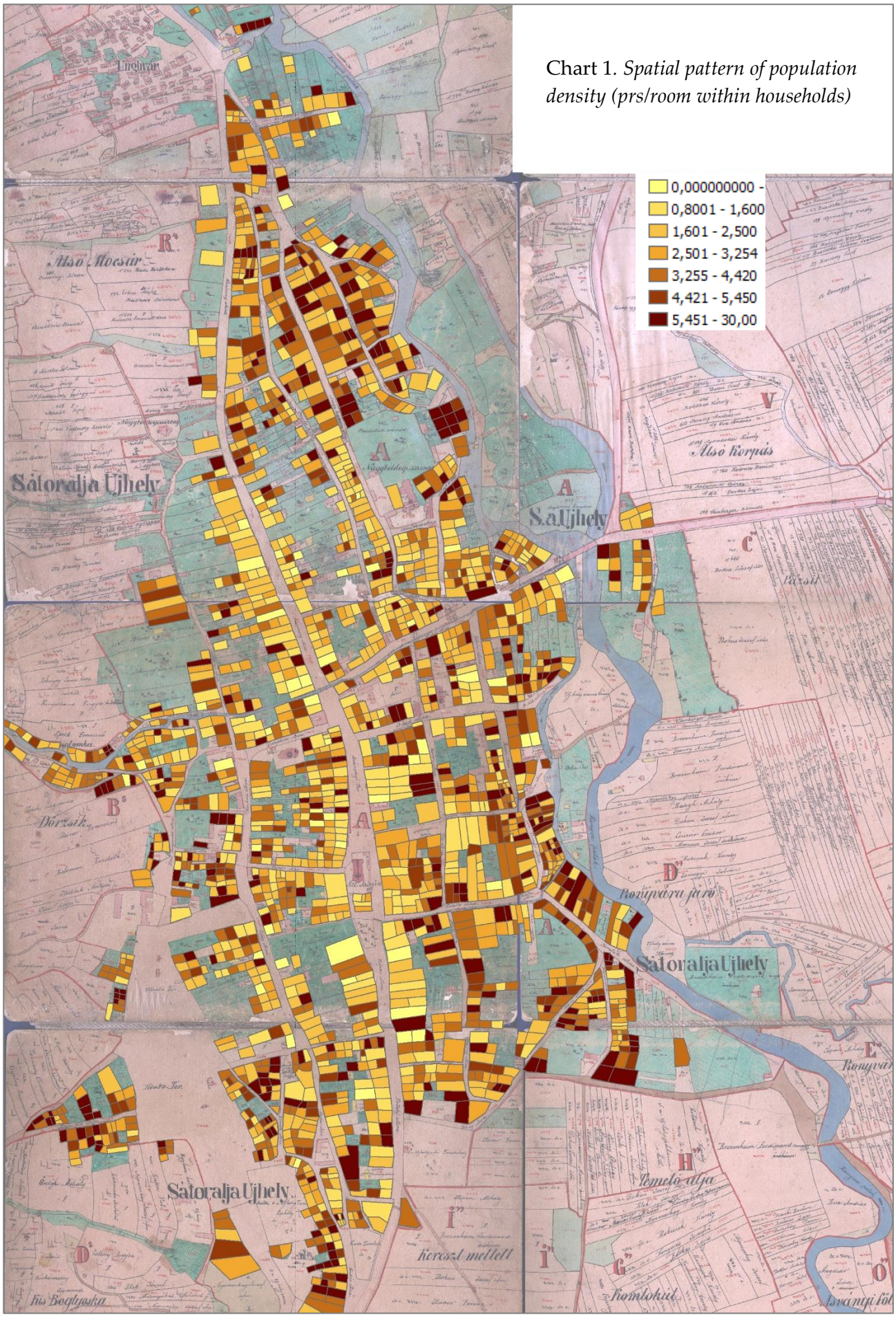


Chart 1. *Spatial pattern of population density (prs/room within households)*

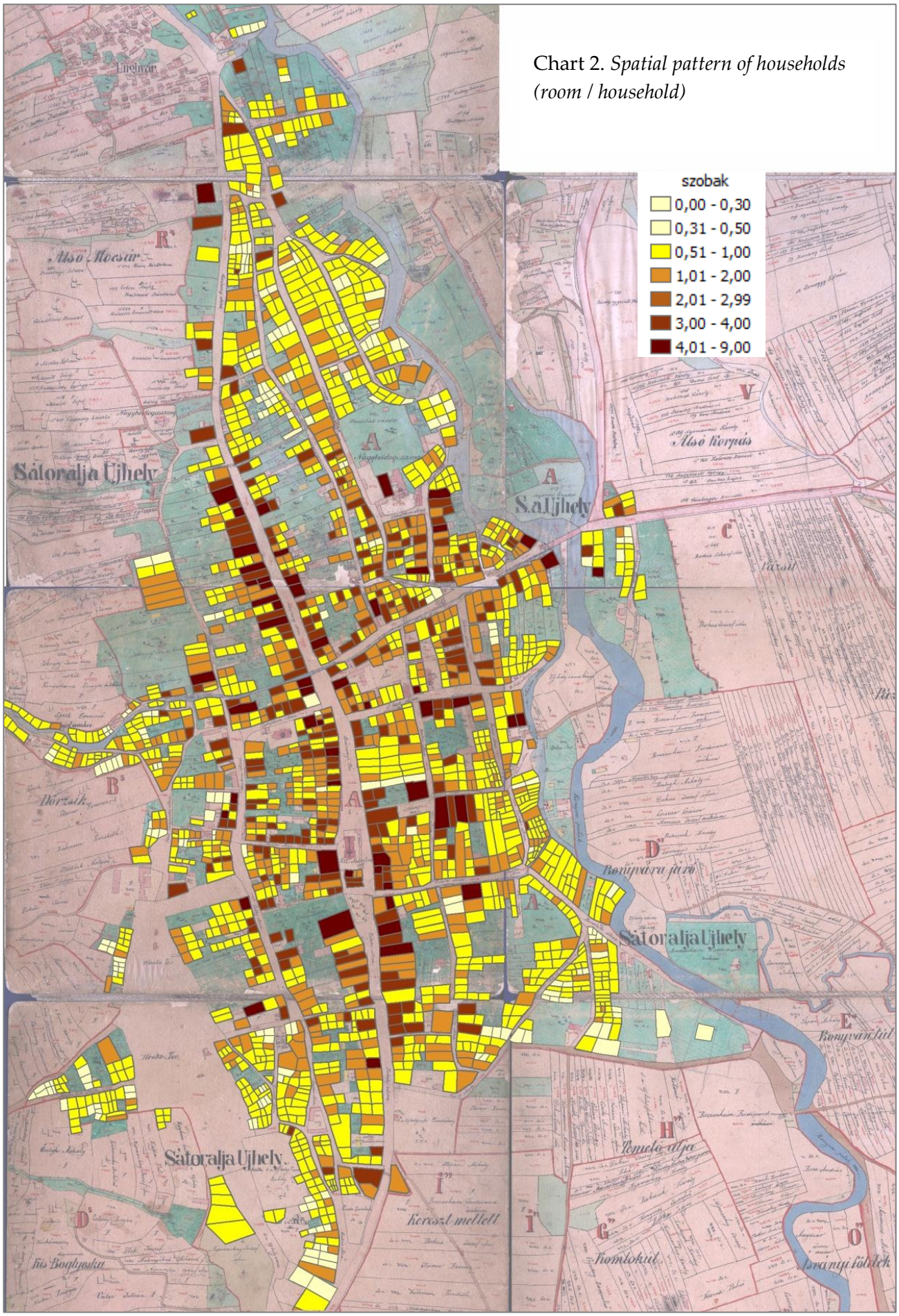
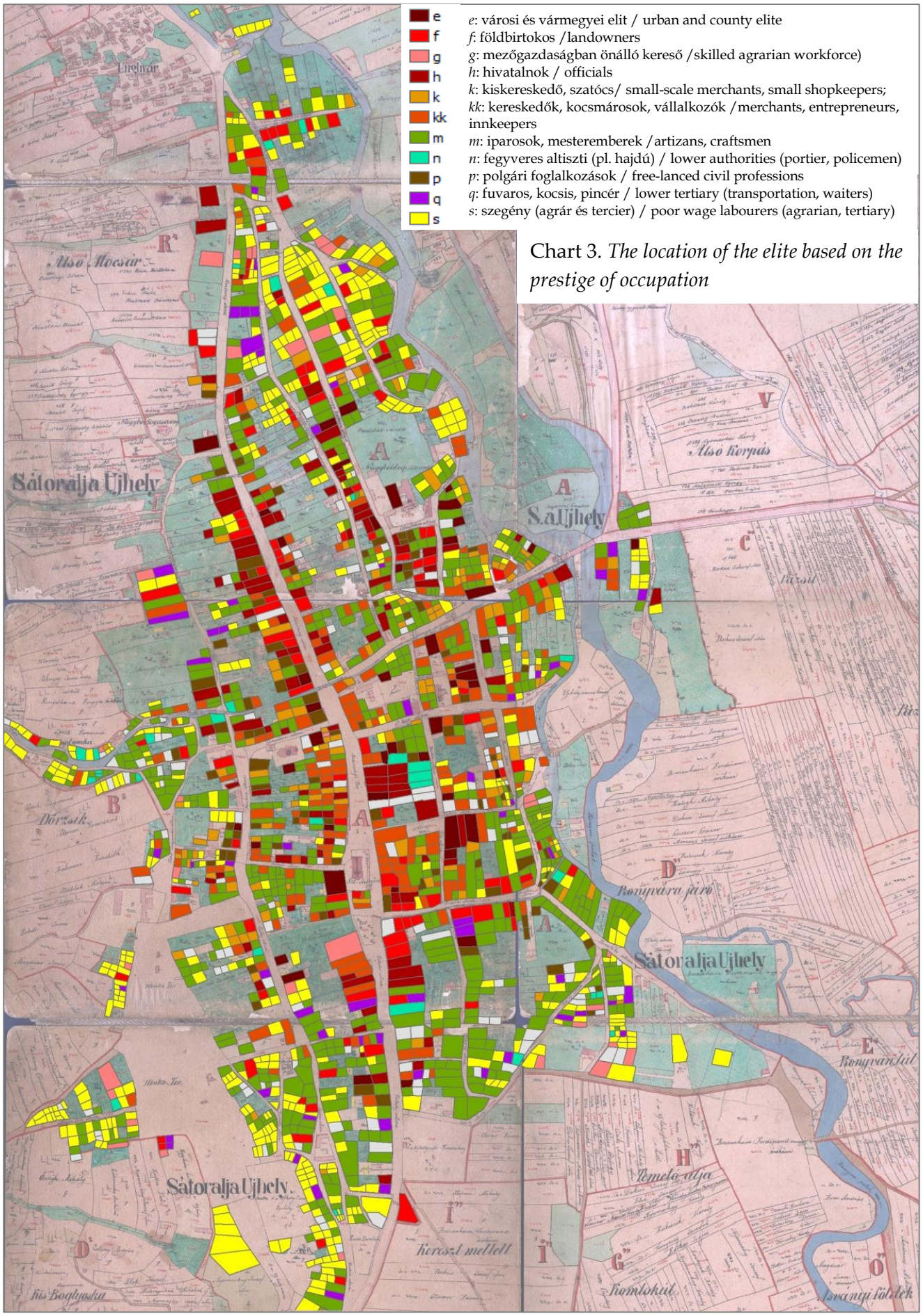


Chart 2. *Spatial pattern of households (room / household)*



e: városi és vármegyei elit / urban and county elite
f: földbirtokos /landowners
g: mezőgazdaságban önálló kereső /skilled agrarian workforce)
h: hivatalnok / officials
k: kiskereskedő, szatócs/ small-scale merchants, small shopkeepers;
kk: kereskedők, kocsmárosok, vállalkozók /merchants, entrepreneurs, innkeepers
m: iparosok, mesteremberek /artizans, craftsmen
n: fegyveres altiszti (pl. hajdú) / lower authorities (portier, policemen)
p: polgári foglalkozások / free-lanced civil professions
q: fuvaros, kocsis, pincér / lower tertiary (transportation, waiters)
s: szegény (agrár és tercier) / poor wage labourers (agrarian, tertiary)

Chart 3. *The location of the elite based on the prestige of occupation*

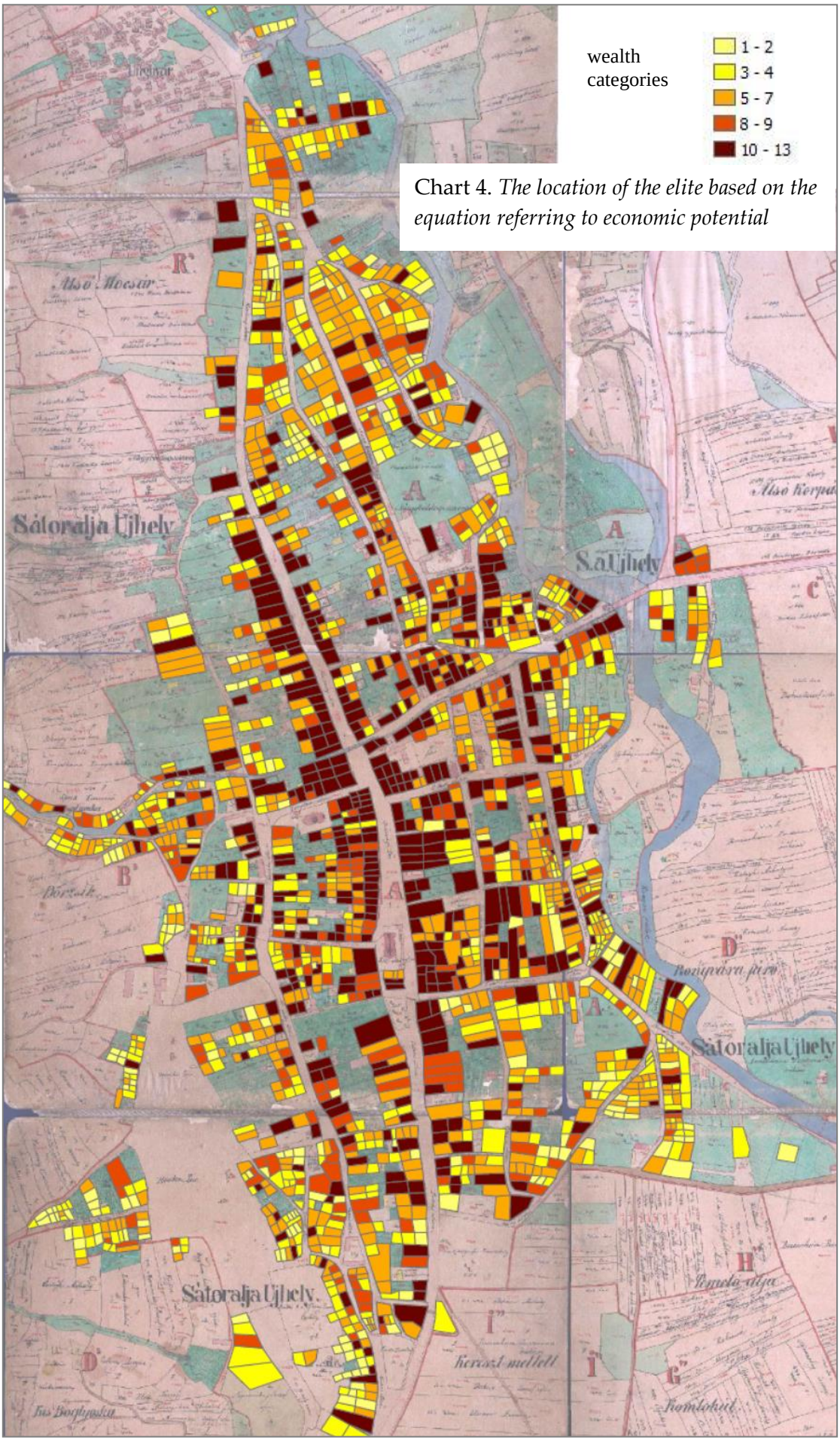


Chart 4. *The location of the elite based on the equation referring to economic potential*

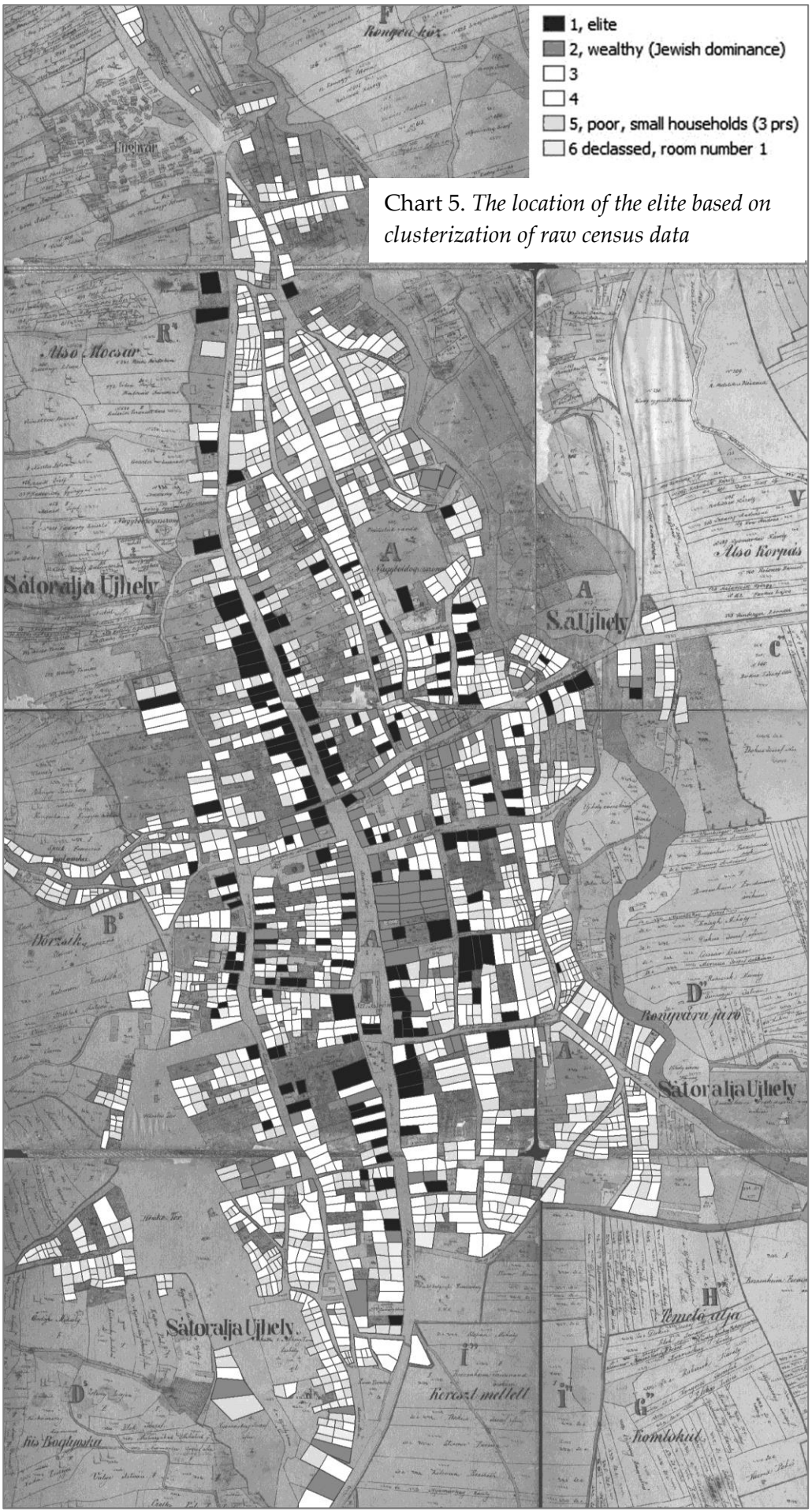


Chart 5. *The location of the elite based on clusterization of raw census data*

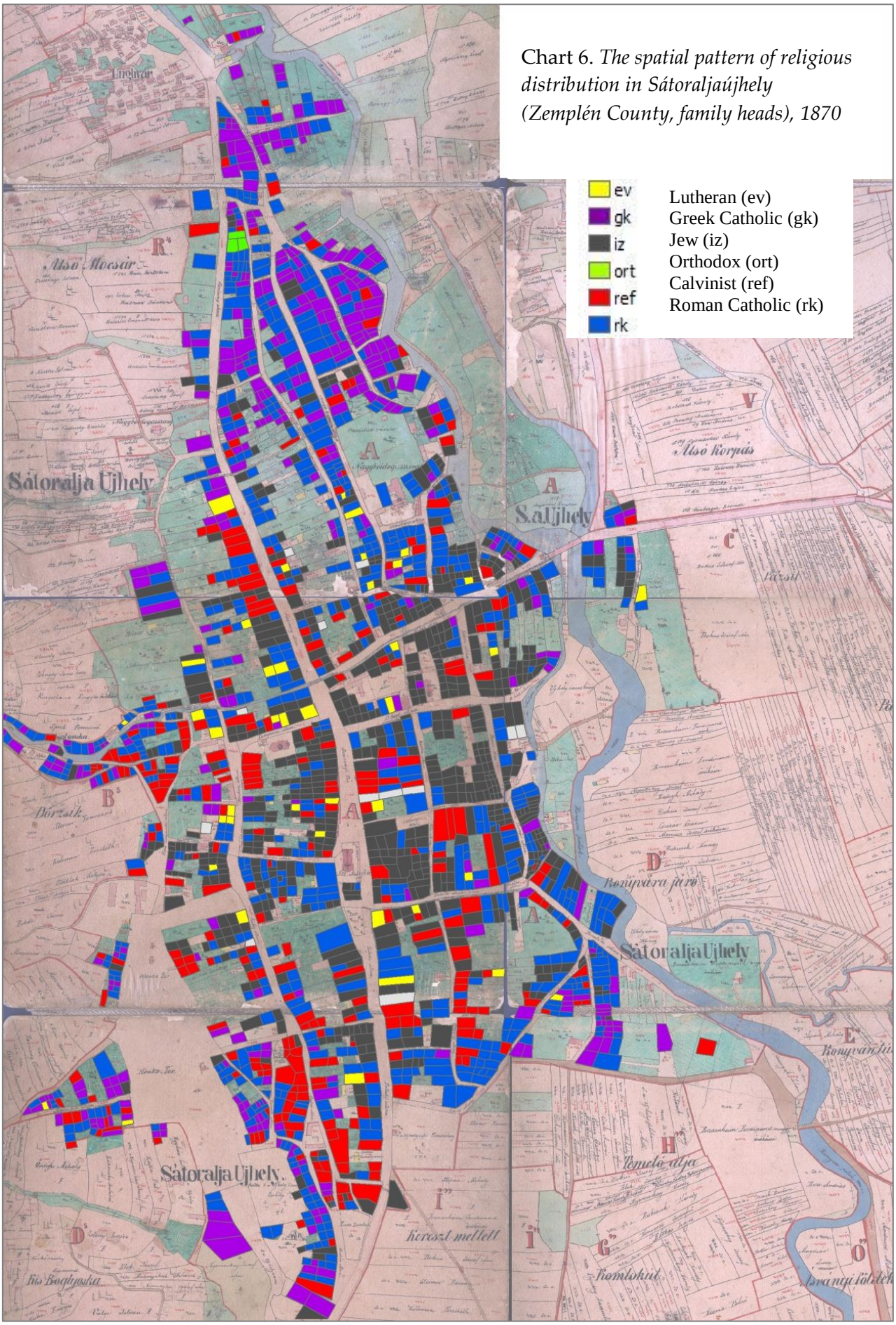


Chart 6. *The spatial pattern of religious distribution in Sátoraljaújhely (Zemplén County, family heads), 1870*

GISta Hungarorum

The Institute of History, Research Centre for the Humanities, Hungarian Academy of Sciences together with the cooperation of the researchers at Pécs University, Debrecen University and Eötvös Loránd University (Budapest) with the support of the Hungarian Research Fund have elaborated a Geographical Information System (including numerous databases and base maps as well) that enables researchers to carry out spatial analyses of socio-demographic phenomena for Austria-Hungary between the 1850s and the 1910s. The goal was to create a transparent, expandable and open system that can be operated under QGIS to promote the work of geographers, historians, ethnographers and other researchers from the neighboring countries in order to ask new questions or to find new answers to old questions from different perspectives. This R&D was named ***GISta Hungarorum*** (referring to the name of the Hungarian chronicles, Gesta Hungarorum) and the datafiles and shape files of maps are available at: http://www.gistory.hu/g/en/gistory/otka free of charge.

GIStorical Studies

Historical GIS series of the Institute of History, Research Centre for the Humanities, Hungarian Academy of Sciences

In order to make GIS applications for historians more popular, as well as to advertise the perspectives of historical geography we also launched a new peer-reviewed series named ***GIStorical Studies*** in which we invite researchers who use GIS to conduct historical geographical research (in a broad sense, including landuse, urban history, social history, economic history, regional analysis, demography, migration, climate, cliometrics etc.) and publish their studies both online and in print either based on the released database or on other data sources from Hungary and Central-Europe. We welcome interdisciplinary and multidisciplinary, as well as methodological researches focusing on the region using GIS methods.

Editoral board: DEMETER, Gábor – SZULOVSZKY, János
Responsible for issuing: FODOR, Pál Director General • Hungarian Academy of Sciences Research Centre for the Humanities Institute of History • H-1097 Budapest, 4 Tóth Kálmán Str.

Redaction: H-1097 Budapest, 4 Tóth Kálmán Street, Room 5.25. , Hungary
Postal address: GIStorical Studies, c/o MTA BTK TTI • H-1453 Budapest, p.o.b. 33. Hungary
E-mail: demetergg@gmail.com

ISSN 2560-2101
ISBN 978-963-416-097-7
Prepress preparation and printed in the HAS Research Centre for the Humanities, Institute of History