QUANTIFICATION OF THE CHANCES AND RISKS OF IMPORTANT ASPECTS OF AN EMPIRICAL SURVEY IN THE COMMUNITIES OF VYSOČINA REGION[*]

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In 2007 an empirical survey took place in all communities of the Vysočina Region. Its results became basic data for statistical analyses. At the first stage of the solution, representativity of the sample was verified as concerns the community size and representation of districts. Important sections of community development were analyzed. By means of conjuncture research, aspects of public life were discovered, where deterioration was felt according to the meaning of citizens. Communities were grouped by population size. Using probabilistic procedures, chances and risks of the development were quantified by size groups. Sensibility of the procedures facilitated finding the optimal size of smallest communities within Vysočina Region, as concerns the sections assessed of the regional development.

regional development; empirical research; Vysočina Region; chance; risk; community

INTRODUCTION

Regional policies are targeted at a successful development of the communities. The impact of these can be assessed by the citizens through their representatives. Region Vysočina was deliminated to the NUTS 3 system in the year 2000 and there are five districts in its area: Havlíčkův Brod, Jihlava, Pelhřimov, Třebíč, and Žďár nad Sázavou. Actual number of communities in Vysočina Region is 704. The municipal offices got the questionnaire for description and evalution of conditions of inhabitant's life in the year 2007. Very important was excellent attitude of municipal representatives towards the research. They sent back 412 in total or particular filling questionnaires. The magistrates were expressive of community facilities, of public finance, of community possibilities in the economic development and also of the social and human capital, of the environment and chances for another development concrete village or town. The survey was interesting in historical background, roots and traditions. Survey results were compiled by unusual statistical techniques and with the help of probability aimed at negative trends of basic needs in civil life in the Vysočina communities.

MATERIAL AND METHODS

The paper aims at quantifying chances and risks of the future development and raising quality of living in Vysočina Region. Sources of data and information on the countryside problems are the researches that have a nature of qualitative surveys. Many authors (D i s m a n , 1993; M i š o v i č , 2001) define the qualitative research as a non-numerical survey and interpretation of the social reality aimed at discovering the importance of information responded. Principles of the empirical research and its problems are presented in papers of M a j e r o v á and M a j e r (2007).

The solution is based on the area questionnaire survey in all 704 communities of the Vysočina Region. The data collected substitute data missing in current surveys and central statistics. The survey was aimed at views and experience of the representatives from the communities in the domain of social, economic, ecological and human development. A part of the questionnaire has been dedicated to culture and tradition, too. The empirical research was subdivided in the following problem areas (P r á š i l o v á et al., 2007):

– community equipment as concerns life of its citizen,
– the infrastructure situation of community and transport accessibility,
– economic potential of the community,
– state and dynamics of social structure,
– conditions of social life, recuperation and culture,
– development of the conditions of living and its further stimuli.

Representativity of the sample was verified as concerns the community size and regional representation. To this end the one-sample test of hypothesis on the alternative distribution parameter was employed. Based on conjuncture research, the changes in citizens' approaches to basic aspects of civic life was assessed. Areas (compared with the past), were reported by the community representatives in employment chances, neighbourhood relations and transport offers. Therefore, relationships between the aspects selected and community size were looked for,

by means of construction and statistical assessment of two-dimensional contingency and association tables. For the statistically significant contingency relationships, detailed assessment was carried out by means of the sign test. The database was prepared in MS Excel and processed in STATISTICA 7.

The statistically significant relationships were also analyzed by means of the risk and chance measures. For selected relationships, a 2x2 table for two alternative variables was made (Table 1, Ř e z a n k o v á et al., 2007; H e n d l, 2006):

Table 1. Contingency table 2x2.

Category of variable 1	Category of variable 2	
	v_{1s}	v_{2s}
v_{r1}	a	B
v_{r2}	c	D

The indicators applied to risk and chance assessment in this paper are as follows (H e b á k et al., 2005; H e n d l, 2006; Ř e z a n k o v á et al., 2007):

Relative risk

$$RR_1 = \frac{\dfrac{a}{a+b}}{\dfrac{c}{c+d}} = \frac{a(c+d)}{c(a+b)} \tag{1}$$

The numerator for RR_1 $a/(a + b)$ shows, what probability corresponds to the category v_{r1} appearing in the v_{1s} variates (field "a"). The complement to 1 of this probability can be obtained expressing the ratio $b/(a + b)$. If the category of the 2nd variable is not contingent upon the category of the 1st variable, is the value of $RR_1 = 1$. Values higher than 1 signal that a higher proportion of the total v_{r1} frequency will appear in the "a" field than in the "b" field. At the same time, a higher proportion of the total frequency of the v_{r2} variable will appear in the "d" field than in the "c" field. If the RR_1 value is less than 1, then for the v_{r1} variable a higher proportion of the total number for this variable will be in the "b" field and for the v_{r2} variable a higher proportion will be in the "c" field. The relative risk can be found also as concerns the v_{2s} category in the 1st variable (RR_2):

$$RR_2 = \frac{\dfrac{b}{a+b}}{\dfrac{d}{c+d}} = \frac{b(c+d)}{d(a+b)} \tag{2}$$

Odds ratio

$$OR = \frac{RR_1}{RR_2} = \frac{ad}{bc} \tag{3}$$

By the ratio of two varieties of the relative risk outcome (i.e. RR_1 and RR_2) the ratio of chances can be found.

It is situated within $(0; \infty)$, in the case of independence of the variables it attains the value 1. Values close to zero signal a strong contingence.

Attributive risk

$$AR = \frac{a}{a+b} - \frac{c}{c+d} \tag{4}$$

Attributive risk expresses the difference of probabilities of v_{1s} category appearance in both the 1st variable categories – v_{r1} and v_{r2}. It attains values within $\langle -1; 1 \rangle$

Relative attributive risk

$$RAR = \frac{\dfrac{a}{a+b} - \dfrac{c}{c+d}}{\dfrac{a}{a+b}} \cdot 100 \tag{5}$$

Relative attributive risk starts from the attributive risk and it expresses the percentage of probability change of the v_{1s} category appearance in both the categories of the 1st variable – v_{r1} and v_{r2}. The basis of all considerations and evaluations is the ratio of appearance of the frequencies in th "a" field at the marginal frequency of v_{r1} category [i.e. the $a/(a + b)$ ratio]. Relative attributive risk is based on attributive risk and it is percentage change of probability of incidence v_{1s} for both categories – v_{r1} a v_{r2}. Basis for computing is the share of frequency incidence in the cell „a" in relation to marginal frequency of category v_{r1} (share $a/(a + b)$).

RESULTS AND DISCUSSION

As a whole, there were 704 villages in the Vysočina region on November 30, 2006, to whom the questionnaire had been addressed by the beginning of 2007. The questionnaire was sent back by 412 representatives, i.e., the rate of return was 58.52%. In three cases the village size and the name of district were not given, hence, size of the sample was reduced in the double-degree grouping operation.

Verification of representativity

In spite of the high number of responses, representativity of the sample had to be verified. Representativity was verified by village size groups by the number of inhabitants and also according to representation of villages in separate districts of the region. Tables 2 and 3 show the results of testing.

Except the villages over 10 thousand of inhabitants, of which there are 1.14% only in the entire list of communities, structure of the sample corresponds to the structure of the total population ($\alpha = 0.01$). Similar conclusion can be expressed as concerns the distribution of villages by districts.

Table 2. Representation of respondents by the village groups by size

Size of village (number of the population)	Database	Relative frequency (%)	Selective data set	Selective relative frequency (%)	Test criterion	"p" value
To 199	336	47.73	167	40.83	−1.7852	0.14
200–499	212	30.11	140	34.23	1.0627	0.42
500–999	90	12.78	61	14.91	0.4458	0.70
1000–1999	35	4.97	24	5.87	0.2029	0.88
2000–4999	13	1.85	9	2.20	0.0779	0.95
5000–9999	10	1.42	6	1.47	0.0103	0.99
10 000– 19 999	4	0.57	1	0.24	−4.3835	0.00
20 000 and more	4	0.57	1	0.24	−4.3835	0.00
Uninitiated	x	x	3	x	x	x
Total	704	100.00	412	100.00	–	–

Table 3. Representation of villages by county

Rural region	Database	Relative frequency (%)	Selective data set	Selective relative frequency (%)	Test criterion	"p" value
Havlíčkův Brod	120	17.05	70	17.11	0.0133	0.99
Jihlava	121	17.19	69	16.87	−0.0705	0.96
Pelhřimov	120	17.05	66	16.14	−0.1966	0.87
Třebíč	172	24.43	104	25.43	0.2373	0.85
Žďár n. Sázavou	171	24.29	100	24.45	0.0373	0.97
Uninitiated	x	x	3	x	x	x
Total	704	100.00	412	100.00	–	–

Assessment of village infrastructures

Within most of the Vysočina region villages (> 60%) many elements of the basic civic infrastructures and services are missing: elementary school, hairdresser's, dry cleaning shop, medical practitioner, gym, pharmacy, post-office, police station, dentist, gas filling station, bank branch or the "hole in the wall", cinema hall, theatre and sports events. It is encouraging that in 42% of communities a kindergarten has been supported, however, an elementary school in 35% only. In most villages there is a grocery shop, a restaurant and a sports court. A community library can be visited in most communities. Divine service can be attended in 60% of all communities, religious pilgrimages are attended as well as traditional feasts.

Bus is the most important public means of transport. In 95% of communities a prevailing number of economically active population has to travel to work. Most households in the region use heating by coal and wood, however, about a quarter have gas heating. A problem is felt as concerns sewage cleaning and bad state of the surface of roads. The service sector is at insufficient level, except repair services. Social services are missing. The proportion of industrial production is lower as compared with other regions, some more importance can be assigned to wood processing and construction. Farm production is at the sub-mountain level, cereals and potatoes are grown and cattle is bred.

The villages are dependent upon state coffers and upon the taxes collected. Improvement of environment and of the level of living has been noted, transport accessibility has deteriorated as well as chances of employment. The representatives see a certain chance for the development of the villages in improving the living conditions for young families and improving the services.

Civic life in the region

Conjuncture research has been arranged in order to assess changes in the approaches of people to basic aspects of civic life (Table 4).

The village representatives appreciate positively the improvement in levels of living, in the environment, and sports and recreational activities. Negatively they assess the insufficient employment opportunities and the transport problems. The survey discovered deterioration of neighbourhood relationships within the villages. The "open" questionnaire questions completed the survey results by further explanations. Important reasons for people's remaining to live in the Vysočina villages are given by improvement and facilitation of life for the young families. Care for the elderly is insufficient. Three variables have been selected from the civic life problems, where a higher proportion of unsatisfied citizens has been recorded: employment opportunities, neighbourhood relations and transport problems. A detailed analysis has been carried out of the impact of the tendencies recorded upon

Table 4. Structure of survey respondents in communities

Aspect	Part of answers (%)		
	Improvement	The same level	Upset
Labour chances	17.3	31.3	51.4
Neighbour's relationships	4.3	59.9	35.8
Recreational chances	37.7	55.8	6.5
Transportation chances	16.8	31.8	51.4
Cultural chances	24.1	58.0	17.8
Sports chances	44.4	48.2	7.3
Environment	50.9	42.9	6.3
Safety of inhabitants	8.8	62.6	28.5
Level of living	51.1	36.0	12.8
Criminality	5.1	64.8	30.1

the most threatened communities group, i.e. the smallest villages up to 200 and to 500 inhabitants.

Risks and chances of changes in the perception of communities development aspects

The most important indicator felt as the decisive one for maintenance and improvement of the inhabitants' levels of living and stability of the communities is that of employment opportunities. The Vysočina region is one of the regions having the above – average share of farming on the region's GDP. In spite of the downfall of numbers of those employed in farming and forestry in the nineties, Vysočina belongs to the regions with the highest employment in these primary sectors. The problem of employment opportunities is given very high attention in Vysočina. The sign test signalled a significant feeling of worsened chances of employment especially in the smallest villages up to 200 inhabitants but in those up to 500 as well. Table 5 quantifies the facts recorded by means of probabili-

ties. The probability for a citizen from a small village to assess real chances of his/her employment as worsened ones as against the previous period, is 1.257 times (men), or 1.316 times (women) higher than for larger communities. The chance for the smaller villages citizens to assess the situation of employment opportunities as better one is 0.378 times (0.396 times) lower, while the chance that people from the smallest villages will express themselves negatively to the employment opportunities is 2.645 times (2.527 times) higher. The probability of a negative assessment of current situation in employment opportunities is by 0.1727 higher as against the communities above 200 head, i.e. by 20.47%. Since, in the smallest villages up to 200 head a large proportion of the elderly live, this difference is much higher than in the villages up to 499 head. The difference between the probabilities of deterioration in the group up to 499 head and the group over 500 head makes it 0.1904, i.e. 144.69%.

The condition sine qua non of high quality village life is a regular public transport facility. The sign test results

Table 5. Risks and chances of labour chances by village size

Size of village (number of the population)	Labour chances are		Chances and risk indicators			
	worse	better	RR_1	OR	AR	RAR
Up to 199	97	18	1.257	2.645	0.1727	20.47%
200 and more	108	53				
Size of village (number of the population)	Labour chances are		Chances and risk indicators			
	better	worse	RR_1	OR	AR	RAR
Up to 199	18	97	0.475	0.378	−0.1727	−110.32%
200 and more	53	108				
Size of village (number of the population)	Labour chances are		Chances and risk indicators			
	worse	better	RR_1	OR	AR	RAR
Up to 499	161	42	1.316	2.527	0.1904	144.69%
500 and more	44	29				
Size of village (number of the population)	Labour chances are		Chances and risk indicators			
	better	worse	RR_1	OR	AR	RAR
Up to 499	42	161	0.521	0.396	−0.1904	−92.03%
500 and more	29	44				

show a common tendency with the employment opportunities variable. The feeling of deterioration is recorded by the smallest villages up to 199 head, and improvement of transport facilities has been stated by the respondents from communities over 500 head. The probability of transport deterioration (Table 6) towards the smallest villages below 200 head as against larger communities is 1.143 times higher, while in the villages up to 499 head is the probability of negative assessment 0.552 times lower. This fact shows some further problems of the smallest villages. The difference of the probability of deterioration in the villages up to 199 head as against the larger ones is positive and it makes 12.51%, while the transport situation in the villages up to 499 head got improved according to the respondents, and the chance that these citizens would be able to use the transport towards their village as an improved one is 2.292 times higher than the opposite opinion.

Solid neighbourhood relations are typical for the countryside. Historically, mutual collaboration was necessary, strengthened moreover by kinship connections.

Nowadays, the neighbourhood relations got loosened, but the survey has shown that they are perceived as important. In spite of the growing level of living and independence upon the help of the others it shows that neighbourhood links are maintained by the inhabitants of the smallest villages up to 199 head; it is understood that the nature of the links has not been changed. Research has shown favourable findings in the population of villages up to 499 head, where an improvement has been recorded.

Table 6. Risks and chances of transportation chances by village size

Size of village (number of the population)	Transportation chances are		Chances and risk indicators			
	worse	better	RR1	OR	AR	RAR
Up to 199	94	22	1.143	1.754	0.1014	12.51%
200 and more	112	46				
Size of village (number of the population)	Transportation chances are		Chances and risk indicators			
	better	worse	RR1	OR	AR	RAR
Up to 199	22	94	0.657	0.57	–0.1014	–53.45%
200 and more	46	112				
Size of village (number of the population)	Transportation chances are		Chances and risk indicators			
	worse	better	RR1	OR	AR	RAR
Up to 499	41	160	0.552	0.437	–0.1659	–81.22%
500 and more	27	46				
Size of village (number of the population)	Transportation chances are		Chances and risk indicators			
	better	worse	RR1	OR	AR	RAR
Up to 499	160	41	1.263	2.291	0.1659	20.84%
500 and more	46	27				

Table 7. Risks and chances of neighbour relationships by village size

Size of village (number of the population)	Neighbour's relationships are		Chances and risk indicators			
	better	worse	RR1	OR	AR	RAR
Up to 199	10	49	2.494	2.799	0.1015	59.88%
200 and more	7	96				
Size of village (number of the population)	Neighbour's relationships are		Chances and risk indicators			
	worse	better	RR1	OR	AR	RAR
Up to 199	49	10	0.891	0.357	–0.1015	–12.22%
200 and more	96	7				
Size of village (number of the population)	Neighbour's relationships are		Chances and risk indicators			
	better	worse	RR1	OR	AR	RAR
Up to 499	16	100	6.355	7.211	0.1162	84.26%
500 and more	1	45				
Size of village (number of the population)	Neighbour's relationships are		Chances and risk indicators			
	worse	better	RR1	OR	AR	RAR
Up to 499	100	16	0.881	0.139	–0.1162	–13.48%
500 and more	45	1				

On the contrary, an expected improvement of neighbourhood relations has not materialized in the villages over 500 head. The evaluation of chances and risks (Table 7) shows a favourable situation in the smallest villages up to 199 head and especially, the ratio of chances of the proportion of inhabitants in the village up to 500 head with positive feeling of neighbourhood atmosphere as against the large communities is an encouraging finding for the village representatives' work, too.

CONCLUSION

Maintenance and favourable development of small villages is a fundamental task of the state policies. Inhabitants of the small villages naturally wish to live a life of the same quality as the town people. In 2007 an extensive questionnaire survey was finished in all the communities of the Vysočina region, having a high 58.5% return rate. The database formed supplied a large volume of data not obtainable by the standard periodic and non-periodic statistical surveys. After the verification of representativity of the sample as concerns the village size and the regional representation, deeper analyses became possible. Besides the multi-degree grouping exercise the procedure was intentionally aimed at conjunctural questions, the responses on which signalled unfavourable tendencies. These concerned problems of employment opportunities, of public transport availability, of neighbourhood relations. Contingency tables showed the links between responses and the village size. It is just the village size that in the Vysočina region presents an important factor since Vysočina reports the largest proportion of the smallest villages. The solution offered distinguishes villages up to 199 head and up to 499 head within the "smallest villages" category.

By means of the risks and chances analysis it has been discovered that the subdivision of the smallest villages into two groups is useful. The villages up to 199 head stand in the most complex situation within the regional development. Deterioration of employment opportunities happens there and bad problems of transport are felt. The ratio of further deterioration chances is high and the probability of improvement is low. If the availability of transport for the villages up to 199 head does not improve, depopulation will likely follow in Vysočina. The villages of size 200–499 head represent perhaps the optimal size of the "smallest" villages, where most of the civic life aspects studied have improved. These villages have reported high values of the ratio of chances for further improvement in transport availability as well as in neighbourhood relations.

The analysis carried out demonstrated further chances of application of statistical methods in the assessment of results of empirical research and offered ways of their possible use.

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Kvantifikace šancí a rizik významných aspektů empirického šetření v obcích kraje Vysočina.

Revitalizace venkovského prostředí přináší pozitivní změny do života obyvatel obcí. Je výslednicí působení ekonomických, sociálních a environmentálních faktorů a projevuje se jako zkušenost v každodenním životě. Při hodnocení změn má celý proces charakter konjunkturního výzkumu. V roce 2007 proběhlo ve všech obcích kraje Vysočina empirické šetření. Jeho výsledky se staly podkladovými údaji pro následné statistické analýzy. Návratnost byla 58,52 %. V první etapě řešení byla ověřena reprezentativnost výběrového souboru z hlediska velikosti obcí a z hlediska zastoupení jednotlivých okresů v souboru. Byly analyzovány významné oblasti rozvoje obcí v kraji Vysočina. V konjunkturním výzkumu byly odhaleny aspekty veřejného života, kde podle obyvatel došlo ke zhoršení. Obce byly rozděleny podle počtu obyvatel. Pravděpodobnostními postupy byly kvantifikovány šance a rizika rozvoje obce s ohledem na

velikostní skupiny. Citlivost postupů umožnila nalézt optimální velikost nejmenších obcí v prostředí kraje Vysočina vzhledem k hodnoceným oblastem regionálního rozvoje. Nejohroženější skupinou kraje jsou obce do 199 obyvatel, příznivé šance na další rozvoj vykazují obce velikostní skupiny 200–499 obyvatel.

regionální rozvoj; empirický výzkum; kraj Vysočina; šance; riziko; obec

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