Labour implementation and efficiency of the foodstuffs wholesales

Pracovná vybavenosť a výkonnosť potravinárskych veľkoobchodov

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Abstract: The analysis is made in the set of the selected foodstuffs wholesales in the Slovak Republic and shows their differences from the viewpoint of the size (sale place 15 m²–1 300 m², storage space 106 m²–6 500 m²), number of workers (1–81) and yearly turnover (219 thousand SKK–2 748 thousand SKK). The main part of wholesales is operated by owners (83%) and a small part (17%) is on lease. From the viewpoint of location, the wholesales are situated in the centre of town (50%) and village (27%). The rest is located in the habitations and suburbs of town. The competitive wholesales (43%) are situated in the distance from 11 to 500 m. The highest labour productivity was obtained at the wholesale with location in the suburbs of town and the distance from competitive firms is about 500–1 000 m. Suitable results were achieved in the wholesales on lease with location in the suburbs of towns. The efficiency of wholesales was affected by the main factors, including the number of workers, size of sale place and storage space which determined up to the 92% of the volume of yearly turnover.

Key words: foodstuffs wholesales, sale place, storage space, yearly turnover, labour productivity

Abstrakt: Analýza uskutočnená v súbore vybraných potravinárskych veľkoobchodov v Slovenskej republike poukazuje na ich značnú diferenciáciu z hľadiska veľkosti (predajná plocha 15 m² až 1 300 m², skladovacia plocha 106 m² až 6 500 m²), počtu pracovníkov (1 až 81) i dosahovaného ročného obratu (219 tis. Sk až 2 748 tis. Sk). Podstatnú časť veľkoobchodov súboru prevádzkujú vlastníci (83 %) a len malá časť (17 %) je prenajatá. Z hľadiska umiestnenia dominujú veľkoobchody v centre mesta (50 %) a na dedine (27 %). Zbytok tvoria veľkoobchody na sídlisku a na predmestí. Sledovala sa tiež vzdialenosť konkurenčnej firmy, pričom najviac veľkoobchodov (43 %) sa nachádza vo vzdialenosti od 11 do 500 m. Najvyššiu úroveň produktivity práce dosahujú veľkoobchody umiestnené na predmestí so vzdialenosťou konkurenčnej firmy 501 až 1 000 m a prevádzkované vlastníkmi. V plošnej výkonnosti (ročný obrat na 1 m² predajnej plochy) sa zistili priaznivejšie výsledky v prenajatých veľkoobchodoch umiestnených na predmestí a so vzdialenosťou konkurenčnej firmy väčšou ako 2 km. Pri posudzovaní vplyvu vybraných činiteľov na výkonnosť veľkoobchodov sa javia ako rozhodujúce počet pracovníkov a veľkosť predajnej a skladovacej plochy, ktoré až na 92 % determinujú objem ročného obratu.

Kľúčové slová: potravinársky veľkoobchod, predajná plocha, skladovacia plocha, ročný obrat, produktivita práce

INTRODUCTION

The wholesales create the main part of sale channels at the sale of products. From the viewpoint of the characteristics of these products, they need suitable conditions for storage and transport. Authors such as (Kotler, Armstrong 1992; Majoro 1996; Kretter et al. 1997) devoted the attention to the information about the importance, single forms as well as activities of wholesale organisations. Tršťanská (1993) and Šimo (2000) deal with the position of wholesales in the frame of marketing environment. Based on the obtained information, the main attention of this paper is devoted to the analysis of wholesale firms from the viewpoint of their size, owners, location, labour productivity and efficiency.

MATERIAL AND METHODS

The selected set of wholesales includes the number of 30 firms in the Slovak Republic, of which 20 (67%) were in the Western Slovakia, 7 (23%) in the East Slovakia and 3 (10%) in the Middle Slovakia. Firms were selected according to size, labour, equipment, efficiency of firms, ownership, location and distance from the competitive firms. Data for analysis were obtained from the operative and accounting evidence. Evaluation of firms was made by selection methods, solution of medium values as well as single and multiple regression.

RESULTS AND DISCUSSION

In many cases, there are differences among the following basic indicators according to Table 1.

Highly different values are caused by the size differences of the individual wholesales. Differences of the basic indicators were obtained from the foodstuffs wholesales from the viewpoint of the ownership, location and distance from the competitive firms. These differences can be seen from the Table 2. More than 83% of wholesales are managed by owners. These have a

Table 1. Characteristics of the basic indicators in the set of wholesales

Indicates	min.	max.	$\bar{x}$	s	v (%)
Number of employees	1	81	22.8	21.62	94.8
Sale place (m²)	15	1 300	392	411.84	105.11
Storage space (m²)	106	6 500	1 291	1 659.45	128.5
Yearly turnover (thousand SKK)	219	2 748	975	1 138.90	116.8

Notes: min – minimum; max – maximum; $\bar{x}$ – average; s – standard deviation; v – variance coefficient

Table 2. Differentiation of wholesales according to ownership, location and distance from competitive firms

Indicate	Number of wholesales	Number of employees	Sale place (m²)	Storage place (m²)	Yearly turnover (thousand SKK)
Ownership of wholesales					
Own	25	24	454	1 429	11 4257
Leasing	5	20	103	753	5 7631
Wholesale's location					
In the village	8	35	659	1 784	146 300
In the habitation	2	46	354	1 590	103 000
In the suburbs	5	16	283	922	126 077
In the town centre	15	15	291	1 111	71 972
Distance from competitive firms (in m)					
0–10	3	32	791	810	134 233
11–100	7	16	397	959	103 629
101–500	6	23	260	1 187	40 544
501–1 000	3	34	694	2 159	245 115
1 001–2 000	6	13	373	1 269	12 188
2 001 and more	5	31	146	1 675	181 420

larger sale space and storage space, higher number of employees and higher turnover level than the wholesales on lease.

According to location, the main part (50%) introduces the wholesales located in the centre of town, but they have the least number of employees and the lowest yearly turnover. On the other hand, the wholesales have the most suitable results according to size (sale and storage space) and yearly turnover when they are located in the village.

Wholesales located in the suburbs have a higher average number of employees than in the surroundings. The distance from competitive firms is different with regard to the level of the analysed parameters. The highest number of firms is with the distance 11–100 m (23%), lower number of firms is with the distance 101–500 m, 1 001–2 000 m (20%). Interval with the lowest distance has the highest size of sale place, but the interval with the distance from competitive firms 501–1 000 m has a larger storage space. On the other hand, the storage space is twice as large as the sale place (11.5%) at long distances from the competitive firms. The highest number of employees and the highest obtained yearly turnover are marked at the interval 501–1 000 m, but the lowest turnover and the number of employees are marked at the interval 1 001–2 000 m.

Labour productivity and efficiency of wholesales

Labour productivity is defined by the volume of yearly turnover per 1 employee as well as the efficiency of firms by the volume of yearly turnover per 1 unit of sale or storage space. From the viewpoint of firm capacity in relation to labour, the recalculation of sale or storage space per 1 employee was used. The results according to the categories of wholesales can be seen in the Table 3.

Based on the definition mentioned above, labour productivity of firms in ownership (1.65) is higher than at the firms on lease. More differences of labour productivity exist according to the location of firms or distance of firms from the competitive firms.

The most suitable situation is for wholesales which are located in the suburbs of towns and the level of labour productivity is 3.5 times higher than that of the firms located in the habitation. In the centre of town, the location of wholesales means a double (2.14) production effect of the employees than at the location in the com-

Table 3. Labour productivity, relative efficiency of wholesales, implementation of employees, sale place and storage space according to ownership, location and distance from competitive firms

Indicate	Yearly turnover in thousand SKK per			Place per 1 employee (m^2)	
	1 employee	1 m^2 of sale place	1 m^2 of storage space	sale	storage
Wholesale ownership					
Own	4 760.7	251.7	79.9	18.92	59.54
Leasing	2 881.6	559.5	76.5	5.15	37.65
Location of wholesales					
In the village	4 180.0	222.0	82.0	18.83	50.97
In the habitation	2 239.1	290.9	64.8	7.69	34.56
In the suburbs	7 879.8	445.5	136.7	17.68	57.62
In the town centre	4 798.1	247.3	64.8	19.40	74.07
Distance from competitive firms (m)					
0–10	4 194.8	169.7	165.7	24.72	25.31
11–100	6 476.8	261.0	108.1	24.81	59.94
101–500	1 762.7	155.9	34.2	11.30	51.61
501–1000	7 209.3	353.2	113.5	20.41	63.50
1001–2000	937.5	32.7	9.6	18.69	97.61
2001 and more	5 852.2	1 242.6	108.3	4.71	54.03

mune. On the other hand, it means only 60% production effect in comparison with location of wholesales in the town suburbs. The most suitable parameters of labour productivity were obtained for the interval 501–1 000 m of competitive distance and the worst ones at the distance of competition for the interval 1 001–2 000 m with the difference about 6 271.8 thousand SKK (7 times difference). Other case of low labour productivity (24%) includes the distance interval of 101–500 m.

The efficiency of the following wholesales shows the differences according to the relevant parameters. The yearly turnover per 1 unit of sale area of wholesales on lease has a more than two-fold (2.33) value compared to those in ownership. From the viewpoint of production efficiency per 1 unit of storage space, the value of firms in ownership is 1.04. Both the highest efficiency of sale area and storage space were achieved for wholesales located in the town suburbs. These differences are more than double. The distance from competitive firms depends on the size of the efficiency with regard to the sale area and storage space. If we look at the results of the research, it is obvious that in the interval with the farthest competitive firms, there is achieved the highest volume of turnover per 1 m^2 of sale place. It is more than 38 times higher than that per interval 1 001–2 000 m with the lowest efficiency of place. Among other intervals, there exist smaller differences in efficiency of sale place. Production ability per 1 unit of storage space for two intervals (11–100 m, 2 001 and more) is similar, but third interval (501–1 000) has a higher value (1.05). The role of intervals is there played by the so-called distributors for the judgement of the competitiveness of firms. Another important attention is devoted to the

evaluation of firm size with regard to the number of employees, but also this indicator is 3.7 times higher for wholesales in ownership and sale area than storage space per 1 employee of the wholesales on lease. Both big and small distances from the competitive firms introduce the low share of sale or storage space per 1 employee. Difference between the maximum and minimum is higher (2.52) for sale place than for storage space (2.14).

The dependence of yearly turnover and number of employees on the selected indicators

Results following from the regression analysis of linear and exponential type can be seen from the Tables 4 and 5. The high tightness of the linear dependence of yearly turnover depends on the size of storage space, number of employees as well as on the size of sale and storage space in total. It means that these indicates determine the yearly volume of turnover in the wholesale, i.e. storage space in 72%, number of employees in 74%, both storage and sale space in total in 81%.

Based on the obtained results, we can say that the linear relations are better for the analysis of the single dependence of the selected indicators than non-linear relations, excluding the value between the volume of yearly turnover and size of sale space ($y = 10.61 \times 0.0018^x$, R-SQ = 41%). Influence of the analysed indicators on the volume of yearly turnover is presented by higher declaring ability than the influence of these indicators on the number of employees. The results can be seen from the Table 5.

Table 4. Linear dependence of the number of employees and yearly turnover on the analysed factors

| Dependent variable (y) | Independent variable (x) | Equation parameters | | R − SQ (%) |
		A	B	
Number of employees	Storage space	12.1587	0.0082	40.03
Number of employees	Sale and storage place	9.993	0.0076	42.73
Yearly turnover	Sale place	75 690.2	166.304	26.12
Yearly turnover	Storage space	46 211.3	73.0331	72.21
Yearly turnover	Number of employees	−6 724.23	5 251.38	74.65
Yearly turnover	Sale and storage place	22 242.0	70.4032	80.67

Table 5. Exponential dependence of the number of employees and yearly turnover on the analysed factors

| Dependent variable (y) | Independent variable (x) | Equation parameters | | R − SQ (%) |
		A	B	
Number of employees	Sale and storage place	2.0900	0.0033	33.17
Yearly turnover	Sale place	10.610	0.0018	41.45
Yearly turnover	Storage space	10.689	0.00048	42.49
Yearly turnover	Sale and storage space	10.1673	0.0407	61.25
Yearly turnover	Sale and storage place	10.4635	0.0005	56.20

Number of employees belongs among the decisive factors for the creation of the yearly turnover of the selected set of wholesales.

The increase by 1 unit of the following factor means:
– 1 employee, increase of yearly turnover by about 5 251 SKK (R-SQ = 74.6%),
– size of sale place, increase of yearly turnover by about 166 SKK,
– size of storage space, increase of yearly turnover by about 73 SKK.

On the other hand, the declaring ability between linear relation of yearly turnover and sale place is very low (26%) in comparison with the relation of yearly turnover and storage space (72%).

Correlation coefficients expressed in the Table 6–8 include the mutual tightness of dependence on individual analysed indicators. Table 6 shows the indicators for the wholesales in total.

Table 7 and 8 explain information about tightness dependence according to several ways of wholesales ownership, location and distance from competitive wholesales. In the selected set of wholesales, there exists a small dependence between the index of sale or storage space and yearly turnover or number of employees.

Table 7 presents the distance between competitive firms and the selected set of wholesales (to 100 m) by several intensity of tightness of dependence analysed indicators.

On the other hand, strong dependence was obtained between the number of employees or yearly turnover and size of storage space at the competitive firms with distance of more than 2 km. Number of employees effects the volume of yearly turnover at several distances from the competitive firms. Another similar case from the viewpoint of the ownership is in the Table 8.

Wholesales on lease use sale or storage space and number of employees more rationally, what is reflected in the strong dependence between size of sale or storage space and yearly turnover on number of employees.

Wholesale location in town centre has a suitable effect on the strong influence of storage space on the number of employees and yearly turnover. The influence of size of sale place on the number of employees deals with low dependence in all the following ways of wholesale location. The analysis of relations regarding the dependence of the following factors proves a high declaring ability of dependence among the yearly turnover and number of employees and storage space as well as number of employees and storage space. The medium level of declaring ability was obtained at the dependence of yearly turnover on sale place and number of employees on sale place.

The dependence of the number of employees on size of wholesales, including sale place and storage space, proves only a medium strong tightness. The influence of

Table 6. Correlation coefficients of analysed factors for set of wholesales in total

| Indicator | Indicator | | Number of employees |
| | place (m²) | | |
	sale	storage	
Number of employees	0.3995	0.6327	–
Yearly turnover (in thousand SKK)	0.3920	0.6226	0.8797

Table 7. Correlation coefficients of analysed indicates according to distance from competitive firms

Indicator	Indicator		number of
	place (m²)		
	sale	storage	employees
Near competition			
Number of employees	0.9985	0.9781	–
Yearly turnover (in thousand SKK)	0.9999	0.4902	0.9976
Competition to 100 m			
Number of employees	0.8475	0.9219	–
Yearly turnover (in thousand SKK)	0.9096	0.8568	0.9488
Competition to 500 m			
Number of employees	0.3822	0.5574	–
Yearly turnover (in thousand SKK)	0.8863	0.2835	0.6907
Competition to 1 000 m			
Number of employees	0.1572	0.6043	–
Yearly turnover (in thousand SKK)	0.1713	0.5928	0.9999
Competition to 2000 m			
Number of employees	−0.21138	0.1601	–
Yearly turnover (in thousand SKK)	−0.5701	−0.3918	0.4430
Competition more than 2 000 m			
Number of employees	0.5573	0.9097	–
Yearly turnover (in thousand SKK)	0.6688	0.9915	0.8543

Table 8. Correlation coefficients of the analysed factors according to way of wholesale ownership and location

Indicator	Indicator		number of
	place (m²)		
	sale	storage	employees
Wholesales in ownership			
Number of employees	0.3839	0.6116	–
Yearly turnover (in thousand SKK)	0.3351	0.5977	0.9153
Wholesales in leasing			
Number of employees	0.9693	0.9899	–
Yearly turnover (in thousand SKK)	0.9747	0.9798	0.9981
Location of wholesale in the town centre			
Number of employees	0.1679	0.9876	–
Yearly turnover (in thousand SKK)	0.0340	0.9708	0.9892
Location of wholesale in the suburbs			
Number of employees	0.3631	0.7662	–
Yearly turnover (in thousand SKK)	0.3304	0.8334	0.9722
Location of wholesale in the margin of habitation			
Number of employees	0.3671	0.3875	–
Yearly turnover (in thousand SKK)	0.3141	0.2280	0.8167

the storage place on the number of employees is higher than influence of sale place. Increasing sale place by 100 m² is reflected in the increasing number of employees by about 0.82 and spreading of the storage space by 100 m² means a higher number of employees by 0.76. On the other hand, the declaring ability of these relations is higher per sale place (by 43%) than storage space (by 40%).

Therefore, this paper presents one possible approach how the problems may be solved from the viewpoint of the multiple regression analysis of linear dependence of the turnover volume (y) on the size of storage space (x_1), sale place (x_2) and number of employees (x_3) in the selected set of wholesales. The result of analysis is explained by the equation:

$$y = 44.998x_1 + 66.228x_2 + 2\,067.5x_3 \ (\text{R-SQ} = 0.9209)$$

Both size of storage space and sale place as well as the number of employees belong to the factors which effected the volume of turnover by 92% and other factors by 7.9%. It confirms the suitable construction of the mathematical model with regard to the analysis of relations by F-test as well as the calculation of regression coefficients by t-test.

From the equation point of view, the importance of sale place (increasing of sale place by 1 m² means the increase of yearly turnover by 66 thousand SKK) for the volume of income is higher than that of storage space (increasing storage space by 1 m² means the increase of yearly turnover by 45 thousand SKK). Increasing number of employees by 1 is reflected in increasing the yearly volume of turnover by 2 067 thousand SKK.

In the second part of paper, we made the calculation of the multiple dependence of the number of employees (y) on the size of storage space (x_1) and sale place (x_2). The equation $y = 0.00866\,x_1 + 0.01819\,x_2$ (R-SQ = 0.6791) shows that increasing storage place by 100 m² effects increasing the number of employees by 1.82.

CONCLUSION

Wholesales play an important role in the distribution of the food products as the line between producers and retail. Their efficiency evaluated by the volume of yearly turnover is effected by the number of employees, storage space and sale place. With regard to the practice, it is necessary to devote the attention to the study of these three factors in connection with the question

how to achieve the most suitable efficiency of whole-sale.

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