SHOPPING GRAVITY OF LARGE-SCALE STORES – EXAMPLE OF TERNO OLOMOUC HYPERMARKET (CONTRIBUTION TO THE STUDY OF THE PROBLEMATIC)

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ABSTRACT

The article deals with the issue of the present condition of the shopping gravity of the large-scale stores in the Czech Republic. Using selected aspects, it creates a model that documents the gravity conditions of the Terno Olomouc hypermarket. Considering its localization within the city geographical structure, it is a peripheral location in a close contact with a trunk road.

1. INTRODUCTION

The Czech Republic retail environment has undergone some substantial changes in the last couple of years, which is reflected in the buying behavior. These changes are brought by the large-scale shopping formats introduced by the international companies, which established about 130 hypermarkets in the Czech Republic within the period 1996–2001 (Szczyrba, 2002). Generally, all hypermarkets are new halls built on the green fields. Hypermarkets are located especially at city peripheries, using the advantage of the trunk roads proximity and sufficient space for further development (essential requirement for construction of large parking lots). Such a location enables the hypermarkets to maximize the territorial service parameters. Large hypermarkets (over 5,000 m^2 of selling space) at the periphery of large cities often integrate in regional shopping centers. Besides the shopping purposes, these centers also function as integrated free-time centers (catering, entertainment, gastronomy, etc.). The effects of service parameters of the shopping centers increase by higher mobility of population.

2. SHOPPING GRAVITY DETERMINATION

The area around, in which the store is able to meet the demand for the provided goods and which, on the other hand, is needed for keeping its existence, is called **operational range** (gravity field). Its **minimum extend** is given by its size, i.e. the number of people needed by the store for its existence. On the other hand, the **maximum extend** of the gravity field is defined as a distance between the store and the place of residence that is the buyer still willing to travel (Cimler, 1994). Actually, the maximum extend of store operation reflects the present state of the retail network and the resulting competitive relationships.

In the theory of economy, the shopping gravity means the money spent in a retail shop outside the place of residence. It is one of the reasons of territorial differences in sales (Pražská, Jindra, 1997). The shopping gravity directions depend on different levels of shopping abilities (attractiveness of the offer, store location), as well as a number of other factors relating to buyers mobility (commuting, civic amenities, etc.). Within the shopping gravity, we differentiate the outer shopping gravity, expressing the territorial movements of the population expenditures in the retail network between the individual settlement units (municipalities) and the inner shopping gravity that represents the movements in the population expenditures in the retail network within one municipality. The shopping gravity is always expressed as a summary of positive and negative reallocation of expenses, i.e. as so-called shopping gravity balance. Its volume, direction and intensity is influenced by a number of various factors, of which the most important are as follows:

- function and importance of the municipality (locality) within the settlement structure,
- attractiveness of the retail network of the locality (capacities, structure),
- socio-professional structure of population in the municipality (locality),
- motorization level of population,
- quality of the communication network and transport.

To assess the shopping gravity, the territorial analyses most often use consumer surveys for a selected population sample (representative sample). Using ques-

tionnaires, the surveys find out data on the volume, kind and place of expenditures within the retail network for a defined period, paying regard to individual characteristics of socio-professional structure of the population including questions on the respondent's place of residence, the time to travel and the distance from the store. Considering the demandingness and information capability of such inquiries, consumer surveys are used especially in places with high concentration of shopping population, i.e. in a store, in front of the store, etc. In the past, the gravity field of the city of Brno has been defined using the consumer survey of buyers in the PRIOR department store (Wokoun, 1983). Under the condition of economical transformation in the Czech Republic after 1989, the consumer surveys finding the shopping gravity are mostly used as complementary instruments of the town and country planning. Their use is multilateral, mostly in traffic surveys within the communication network optimization processes in large cities. In Brno, the survey has found out that the number of outside-Brno visitors of the largest Brno shopping centers (Shopping Park and Olympia) is higher than 50 %. The majority of buyers come from remote places around Brno, or even from Slovakia (Department of the architect-planner, Brno, 2002).

Another method how to determine the shopping gravity is using mathematical models based on modifications of the basic principles of Reilly interaction model (The Law of Retail Gravitation, 1929). The disadvantages of this method are in the model database (e.g. the retail turnover data availability), as well as in the application phase. Therefore, the complicated mathematical formulas have been abandoned.

The issue of determining the shopping gravity is not discussed very often in the Czech literature. Before 1989, this issue was examined by a small group of geographers working in the former Výzkumný ústav obchodu (Business Research Institution) in Prague or at University geographical workplaces in Prague or in Brno. Their studies mostly dealt with the issue of the civic amenities in centers (Hebák, Novák, Kroc, 1972, Očovský, 1973, Čadková, Krásný, 1985, Perlín, 1990), less attention was devoted to the shopping gravity of stores (Bičík, 1975, Wokoun, 1983). After 1989, the range of works on the shopping gravity has been radically narrowed. Výzkumný ústav obchodu has been dissolved and the University workplaces deal with retail and shopping gravity only marginally. Some issues of the shopping gravity of the new large-scale stores under the condition of the economical transformation are examined by Hospodka (2001). Outside the academic field, the issues of the shopping gravity are often solved by consulting firms who work for the large store chains entering the Czech retail market (GfK and Incoma Praha).

The issue of the shopping gravity is properly examined neither in the Polish literature. The few contributions to this issue include the work of Rembowska (2000), who examines the perception of supermarkets and fast-food shops by the inhabitants of the city of Łodz. Unfortunately, the sample is not representative enough as she does not work with a sufficient number of respondents, and the results of her work can be taken only for reference. The information capability is much higher in analyses performed by German authors Brandenburg (1985), Jürgens (1994) or Kulke (1994), who analyze and discuss economical and geographical parameters of regional services availability on the examples of some large-scale shopping centers.

3. TERNO OLOMOUC HYPERMARKET – MODEL STORE

Hypermarket Terno in Olomouc was opened in 1997. It was one of the first hypermarkets in the Czech Republic and the first ever in Olomouc. The total floor space is 2,700 m^2. The Terno hypermarket offers more than 10,000 items of goods, especially food products. As by the range of products, the store can be ranked among supermarkets, although the share of the non-food products is higher than usual (chemist, stationary, sports equipment, electrical appliances, textile, etc.). As by the size of the floor space, the store belongs to so-called small hypermarkets. Within the Terno hypermarkets network, the Olomouc Terno hypermarket is one of fore Terno sales outlets in the Czech Republic[1]. The store is owned by the Jednota Olomouc cooperative.

Terno Olomouc is, together with other non-competing stores (e.g. OBI hobby market), situated in the area near the highway to Prostějov and Brno in the southwest suburb called Horní Lán. Thanks to its location, this area is very attractive for store operations[2]. The existing Brno highway and the construction of the bypass road around Olomouc allow the hypermarket to increase its outer shopping gravity. In the spatial structure of the purchasing power at the city level, the nearby housing estates Neředín, Nová Ulice, Povel and Nové Sady constitute a relatively substantial capacity of buyers (20,000 inhabitants). The inhabitants of the more remote neighborhoods of Olomouc can use the city public transport (streetcars). The remotest suburbs of Olomouc are about 8 kilometers from Terno.

Besides Terno, the large-scale stores network is constituted by a large Globus hypermarket located at the west suburb near the highway to Mohelnice and Prague (15,000 m^2) and a small Kaufland hypermarket (3500 m^2) inside the city. Other large-scale stores (Billa or Albert supermarkets) meet the demand of local area and cre-

[1] The other Terno hypermarkets are in České Budějovice, Hradec Králové and Zlín

[2] This is supported by the fact that the Horní Lán suburb was chosen by Carrefour and Tesco store chains for operations of their stores in the city of Olomouc. At present, both store chains finish their expansion into the Czech Republic. Carrefour has already set up a large hypermarket within the **Haná Shopping Center** in September 2002.

ate the basic retail sales outlet of so-called urban district amenities.

3.1. Consumer Survey

The shopping gravity survey at the Terno hypermarket was carried out in September and November 2000, i.e. at the time, when only the second hypermarket (Globus) was set up in the area of the city of Olomouc. At the time of this survey, there were no relevant selling areas in the neighboring localities of Prostějov and Přerov[3]. As for the possible competitive environment, the agents seriously influencing the shopping gravity field conditions were considerably eliminated. Therefore, this survey is a model sample of the buying behavior of the city inhabitants and its background under the following business conditions:

1. the buyers' will to buy under the new conditions of large-area stores is only initially tested,

2. the hypermarket position within the information array of consumers is dominant considering the range of products, goods prices, level of provide services, etc.

The consumer survey was scheduled on several days in September and November 2000, so that the obtained information properly reflects the gravity relationships of Terno hypermarket in time, without elimination of coincidences. In total, 560 respondents have been inquired both in the morning and in the afternoon. For the structural and spatial analyses, only those questionnaires were taken into account, where the respondents stated that they are regular Terno hypermarket buyers. The final number of them was 522. The respondents were selected under the general rules for sociological and marketing surveys, i.e. appropriate representation of respondents as by their basal demographical features, as gender, age, etc.

3.1.1. Spatial – Structural Analysis, Selected Aspects

In the examined sample of the Terno hypermarket buyers, the buyers from Olomouc prevailed within the whole period of the survey. In average, this prevalence equaled about two thirds of Olomouc buyers to one third of extra Olomouc buyers (64,1 % to 35,9 %). The survey results also suggest that higher number of Olomouc buyers was observed on weekends (Saturdays, Sundays), while in workdays, the extra-Olomouc buyers prevailed.

According to the answers on the question about the way of travel, which is an important feature of the buying behavior of the buyers, it was apparent that about two thirds of the hypermarket Terno buyers used a car for their shopping. Considering the short distance from the Olomouc Nová Ulice and Neředín housing estates, about one fifth of the buyers come to Terno on foot, and only one tenth of buyers use public transport. The car is used much more by productive-age buyers than by seniors. The share of motorized buyers in the age category 40–49 years is nearly 80 %, while in the category of people older than 60 years of age, the share of motorized buyers is less than 40 %.

Another feature characterizing the buying behavior of population is the shopping frequency. Considering the above information, it is obvious that this is a function of the sales outlet size and the range of goods. In Terno hypermarket, the shopping frequency is mostly once a week (33,6 % of respondents). About one fifth of respondents stated that they do their shopping several times a week (18,9 %). The frequency of the above two groups (making more than 50 % of all buyers) is determining for the hypermarket general buyer orientation. About one fifth of buyers do their shopping several times a month (21,1 %). In the examined sample of population, the main reasons for shopping are: **lower prices of goods**, **wider range of products and suitable location of the store,** in this order.

Another question in the questionnaire asked about the average sum of money spent at one shopping. It is interesting that there was no substantial difference between weekdays and weekends, when the buying behavior should have different model. As for the sum of money spent, all weekdays were nearly equal. However, the age categories and socio-professional groups behaved differently, which reflects their unlike economical activities and various level of motorization inside these social groups. The sum of money spent in the age categories 20–29 and 50–59 correspond with the average, while the category of productive age 30–39 and 40–49 showed above-average expenditures of (+ 25 %) and (+ 12 %), respectively. The age group of people over 60 is markedly below average (– 30 %). Considering the professional categorization, the highest sums spent on shopping were declared by people from the "businessperson" category (+ 30 %). Another differentiation feature is the size of the family, according to that the sums spent on shopping rise proportionally to the number of family members (see Tab. 1).

Tab. 1: Buyers in Terno Olomouc hypermarket – average sum of expenditures according to the site of the family (average value = 1)

Number of members in the family	Average sum of money spent on shopping
1	0,48
2	0,86
3	0,99
4	1,23
5 and more	1,50

[3] A large Tesco hypermarket was set up in Prostějov (20 kilometers from Olomouc) only in 2001. The small Kaufland hypermarket in Prostějov (1999) has no influence on the Olomouc retail market, considering its size and offer. The existing large-scale stores in Přerov (20 kilometers) have minimum influence on the shopping gravity in Olomouc.

Whereas it is always possible to suppose some socio-demographical regularity in the buying behavior, in the case of Terno Olomouc hypermarket no dependency was proved between the sum spent on shopping and the level of education of the respondents, or between the shopping frequency and the education of buyers (Hospodka, 2001). This may be explained by narrow specialization of the hypermarkets on the articles of daily use (especially food) in comparison with other hypermarkets[4], which influences the buying behavior and level out the shopping population in some of their features.

The operational range of the Terno Olomouc hypermarket is remarkably influenced by its location, which determines the shift of the gravity field to the west from Olomouc. At the time of the survey, the gravity field contained a number of villages between Olomouc and Prostějov. The shopping gravity was also substantially influenced by buyers who travel to the hypermarket from other Olomouc neighborhoods. As finally appeared, the maximum extent of the gravity field can be defined as an area in maximum twenty-kilometer distance from the hypermarket, i.e. at the borders of the operation of retail network of neighboring cities of Prostějov and Přerov. At the time of the survey, Terno hypermarket substantially limited their outer shopping gravity.

Table 2 shows very close contacts between the Terno hypermarket and its nearest surroundings, as nearly 80 % of all respondents live in the distance less than 12 kilometers from the hypermarket. This inner shopping gravity is realized from the nearest suburbs (Nová Ulice, Neředín). Considering the spatial relationship of the hypermarket and the remotest suburbs at the north and east periphery of the city of Olomouc (Chomoutov, Holice – 8 kilometers), then only a small part of the shopping gravity belongs to the Olomouc background.

Tab. 2: Buyers in Terno Olomouc hypermarket according to the place of residence

Distance (in km)	Number of respondents	Share (in %)	Σ (in %)
up to 1	146	27,9	27,9
1,1 – 2	54	10,3	38,2
2,1 – 4	97	18,6	56,8
4,1 – 8	78	15,0	71,8
8,1 – 12	40	7,7	79,5
12,1 – 16	49	9,4	88,9
16,1 – 24	35	6,7	95,6
more than 24	23	4,4	100,0

Fig. 1 evaluates the relationship between the distance and the way of transport of respondents to the hypermarket. It is obvious that, due to the large housing estates in close proximity and thanks to good availability of the place by the means of the public transport, the

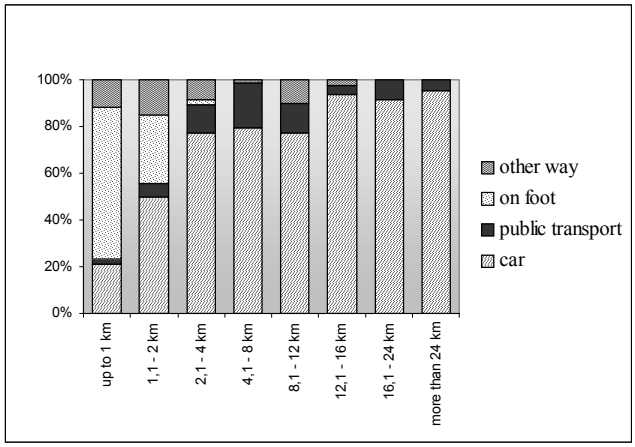

Fig. 1: Buyers in Terno Olomouc hypermarket as by the way of transport (N = 522)

use of cars for shopping is relevant for respondents who are more than 4 kilometers away. For shorter distances (up to 1 kilometer), the buyers mostly walked. Their number is substantially increased by buyers in the age category 60+, who have also higher frequency of shopping. In the other, productive age categories, the rising distance of their place of residence from the hypermarket results in a decrease of shopping frequency (see Fig. 2). The buyers use cars as the major mean of travel to minimize the shopping frequency. From the distance of 12 kilometers, there is a remarkable decrease of regular frequency "at least once a week" and the share of less regular frequency "several times a month" or "at least once a month" is getting higher.

The distance influences the shopping frequency as well as the total sum of family expenditures. Generally, it may be said that the longer distance is between the buyer's place of residence and the hypermarket, the higher are the shopping expenditures. This is proved in Tab. 3, where the data are converted according to the average expenditures.

Tab. 3: Buyers in Terno Olomouc hypermarket – the average sum spent on shopping according to the distance of the place of residence from the hypermarket (average value = 1).

Distance (in km)	Average sum of money spent on shopping
up to 1	0,62
1,1 – 2	0,87
2,1 – 4	0,93
4,1 – 8	1,21
8,1 – 12	1,37
12,1 – 16	1,37
16,1 – 24	1,40
more than 24	1,47

4. CONCLUSION

The issue of the shopping gravity of large-scale sales outlets is an important instrument for learning the buy-

[4] Hypermarket is a large-scale store with the majority of non-food products.

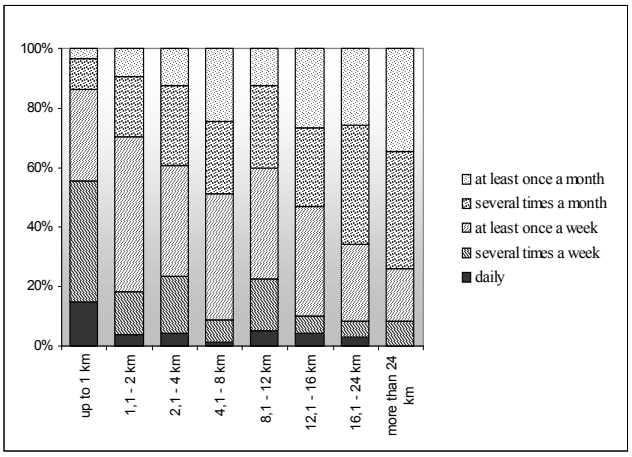

Fig. 2: Buyers in Terno Olomouc hypermarket as by the frequency of shopping (N = 522)

ing behavior of the consumer population. It includes a range of economical and geographical phenomena with apparent sociological and psychological context.

As for the space-structural relationship, the shopping gravity survey results proved that, in this type of store, there is a dependency between the floor space (range of products) of the store and the extent of the gravity field. The majority of the shopping gravity falls into the inner shopping gravity area, while the Terno outer shopping gravity has only a small space. This is caused by relatively narrow range of products in competition with the existing large-scale stores within and around the city of Olomouc.

The results also proved that the buyers' resulting buying behavior has its real structured socio-geographical dimensions. For example, the higher distance from the hypermarket results in lower shopping frequency and higher share of mobile buyers, and the family expenditures increase according to the higher distance of the buyer' place of residence from the hypermarket.

SUMMARY

The Czech Republic retail environment has undergone some substantial changes in the last couple of years, which is reflected in the buying behavior. These changes are brought by the large-scale shopping formats introduced by the international companies, which established about 130 hypermarkets in the Czech Republic within the period 1996–2001. Hypermarkets are located especially at city peripheries, using the advantage of the trunk roads proximity and sufficient space for further development. Large hypermarkets at the periphery of large cities often integrate in regional shopping centers. Besides the shopping purposes, these centers also function as integrated free-time centers (catering, entertainment, gastronomy, etc.). The effects of service parameters of the shopping centers increase by higher mobility of population.

The article deals with the issue of the present condition of the shopping gravity of the large-scale stores in the Czech Republic. Using selected aspects, it creates a model that documents the gravity conditions of the Terno Olomouc hypermarket. The shopping gravity survey at the Terno hypermarket was carried out in September and November 2000, i.e. at the time, when only the second hypermarket (Globus) was set up in the area of the city of Olomouc. At the time of this survey, there were no relevant selling areas in the neighboring localities of Prostějov and Přerov. As for the possible competitive environment, the agents seriously influencing the shopping gravity field conditions were considerably eliminated. Therefore, this survey is a model sample of the buying behavior of the city inhabitants and its background under the following business conditions:

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SOUHRN

NÁKUPNÍ SPÁD DO VELKOPLOŠNÝCH OBCHODNÍCH ZAŘÍZENÍ – PŘÍKLAD HYPERMARKETU TERNO OLOMOUC (PŘÍSPĚVEK KE STUDIU PROBLEMATIKY)

Poslední roky jsou v maloobchodním prostředí České republiky obdobím zásadním změn, které se mimo jiné promítají do oblasti nákupního chování. Jejich nositelem jsou především velkoplošné obchodní formáty zahraničních firem, které za posledních několik let (1996–2001) zprovoznily v ČR zhruba 130 hypermarketů. Hypermarkety jsou lokalizovány především na městské periférii, kde využívají blízkosti důležitých dopravních os v území a dostatek plochy pro svůj rozvoj. Velké hyper-

markety na okraji velkých měst se nejčastěji integrují do regionálních nákupních center. Kromě obchodní funkce plní tato centra také funkci zařízení pro komplexní využití volného času (stravovací služby, zábava, gastronomie ad.). Účinky obslužných parametrů nákupních center se při vysokém stupně mobility obyvatel ještě znásobují.

Příspěvek se zabývá problematikou současných podmínek nákupního spádu do velkoplošných obchodních zařízení v České republice. Modelově na vybraných aspektech dokumentuje spádové poměry do hypermarketu Terno Olomouc. Výzkum nákupního spádu před hypermarketem Terno probíhal v měsících září a listopad roku 2000, tj. v době, kdy se v Olomouci otevíral pro veřejnost teprve druhý hypermarket na území města (Globus). Rovněž v sousedních lokalitách Prostějov a Přerov nebyly v době výzkumu aktivní relevantní prodejní plochy. Z hlediska možného konkurenčního prostředí tak byly do značné míry eliminovány prvky, které podstatným způsobem zasahují do spádových poměrů ve městě. Jde tedy o modelovou ukázku nákupního chování obyvatel města a jeho zázemí v obchodním prostředí, které:

1. teprve testuje ochotu zákazníků nakupovat v nových podmínkách velkoplošných formátů,
2. pozice velkoprodejny v informačním poli konzumentů je dominantní s ohledem na sortiment, ceny zboží, úroveň poskytovaných služeb atd.

Z hlediska prostorově-strukturních vztahů výsledky šetření nákupního spádu prokázaly, že existuje u tohoto typu velkoprodejny závislost mezi velikostí její prodejní plochy (sortimentní nabídkou) a velikostí spádového území. Většina nákupního spádu je realizována v hranicích vnitřního nákupního spádu, zatímco vnějšímu nákupnímu spádu se u Terna otevírá pouze menší prostor. Je to způsobeno především poměrně úzkou sortimentní profilací hypermarketu v konkurenci existujících velkoprodejen na území města a okolí. Výsledky dále prokázaly, že výsledné nákupní chování zákazníků má své reálné strukturované sociálně-geografické dimenze. S rostoucí vzdáleností tak např. klesá frekvence nákupů, zatímco se zvyšuje procento mobilních zákazníků, nebo se zvyšují výdaje domácností s rostoucí vzdálenosti místa bydliště zákazníka od hypermarketu.

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