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MANAGEMENT AND BUSINESS ADMINISTRATION PH.D. SCHOOL

PH.D. THESIS

PROPERTY DEVELOPMENT, THE ROLE OF STORE FORMAT AND SIZE IN THE HUNGARIAN RETAIL BUSINESS

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1. BACKGROUND AND OBJECTIVES

1. 1. Thesis history - the timeliness and relevance of the topic

The credit rating agencies downgrade Hungary in November 2011 and January 2012 were in many ways very unfortunate for both, the country and the Hungarian real estate market. The effectiveness of domestic commercial property market is also influenced by such actions of the government as the 'plaza stop' or the solidarity tax paid by the retail chains in 2010. Among such circumstances developers easily stop their investment activities in the coming years. Therefore the question is more current than ever, where does the commercial property and the retail property market proceed.

Hungary could still be an attractive investment location due to its central and geographical location and logistics capabilities, skilled workforce and both state and EU funds, together could help that the country remains a popular long term destination for investors. This would be a major priority as the economic growth is expected to create jobs and increase of consumption. Currently, however, the withdrawal of capital from the country is continuous; investors have negative judgment, investment fall. **In 2011, the country risk has grown significantly, investors were nervous because of the exchange rate, so a drastic reduction was detected in the volume of investments. After the 2008 credit crisis the Hungarian economic and legal environment did not provide an impetus for development neither in 2011 nor in 2012.** In addition to difficulties in obtaining bank financing in the current political situation the economy also reduces the scope for real estate developers. The ongoing commercial projects have been approved at the pre-crisis period, but many of the previously approved property developments have not yet been started to be implemented due to the changing circumstances. The real estate market analysts only count recovery with respect to Hungary in 2013. The funding not only important in Hungary, but throughout the European Union is a key issue in the property sector.

The CSO (Central Statistical Office) states in its 2011 report that the construction industry downturn in 2011 was 7.8 percent lower than a year before, since 2000 in this year was the smallest volume. Between 2006 and 2011 the rate of decline was more than 30 percent. The commercial property investments decrease has significantly contributed to the decline.

Small format or large format?

The hypermarket in the early nineties was a novelty not only in Hungary but also in Central Europe. However, the world has changed since then, along with trade and consumer habits, expectations. Today the trend shifts towards smaller stores, the emphasis is on the convenience of shopping together with the online and other shopping options. Due to these changes and to the hypermarket market' saturation, it is worth rethinking the hypermarket format. Global trend shows that more and more people prefer to buy locally. Three or four times a month people visit the large stores but if there is a well-equipped store in their area they do their daily shopping there during the week. 'During the crisis, 70% of consumers switched to cheaper food. It is a contradiction that - against the increasing price sensitivity – more and more costumers shop in the local supermarkets, instead of buying food for 20% less in the hypermarkets on the outskirts of the city. As a result of the high gasoline prices the consumers buy locally, more frequently and spend less per visit. A few years ago the market was completely transformed by the large expansion of hypermarkets, but since then the number of large shops - producing 30% of the total turnover of daily consumer goods - remained unchanged.

In Hungary there are currently 13 retail chains, whose main business is food retail trade. (see Table 1.) To prove my second hypothesis, I have learned these companies' balance sheet and profit and loss statements in detail.

Table 1: Major local and international players of the Hungarian retail market

Company Name	Owner	Turnover in 2009 (billion HUF)	Turnover in 2010 (billion HUF)	Change of turnover	Market Share (July 2010)	Market Share (July 2011)	Number of Shops (December 2011)
Tesco-Global Áruházak Zrt.	Tesco Group	573 309	583 596	1,8%	18,1%	18,9%	212
Spar Magyarország Kft.	ASPIAG (Austria SPAR)	360 233	336 848	-6,5%	9,8%	9,6%	389
Auchan Magyarország Kft.	Groupe Auchan	226 742	227 404	0,3%	4,6%	4,2%	12
Metro Kereskedelmi Kft.	Metro Group	198 360	180 182	-9,2%	1,5%	1,1%	13
Lidl Magyarország Bt.	Lidl	152 138	175 796	15,6%	6,1%	6,1%	148
Penny Market Kft.	Rewe Group	137 181	131 833	-3,9%	5,5%	6,4%	190
Magyar Hipermarket Kft. (CORA)	Delhaize	79 640	69 618	-12,6%	1,6%	1,5%	7
Csemege Match Zrt.	Delhaize	45 257	38 048	-15,9%	n.a.	n.a.	121
Aldi Magyarország Élelmiszer Bt.	Aldi Süd	35 458	43 527	22,8%	1,4%	2,3%	78
Profi Magyarország Zrt.	Delhaize	25 163	20 946	-16,8%	1,1%	n.a.	73
Co-op Hungary Zrt.	Hungarian-franchise	13 630	12 431	-8,8%	10,4%	9,8%	5525
CBA Kereskedelmi Kft.	Hungarian-franchise	26 812	26 851	0,1%	6,2%	6,2%	3077
REÁL Hungária Élelmiszer Kft.	Hungarian-franchise	3 981	3 896	-2,1%	2,6%	3,2%	2140

Source: own collection

Comments:
CORA, Match and Profi – shared procurement named Provera
Auchan bought Cora in December 2011. (deal still under approval by the Competition Authority in April 2012)
Spar includes Spar, Interspar, Kaisers and Plus (since 2008)
CBA, Co-op, Real –data is not consolidated
CBA's total chain turnover was 565 billion forints in 2011 [PENZCENTRUM, 2012b]
Co-op's total chain turnover is was 510 billion forint in 2011
Real's total chain turnover was 367 billion forint in 2011

The Plazastop' legislation

The Hungarian Parliament voted the so-called '**Plazastop**' legislation 28th November 2011. **This legislation forbids the development of retail units bigger than 300 square meters between 1 January 2012 and 31 December 2014.**

The 'plazastop' can put to a hold – for a while - the growth of Lidl and Aldi. The multinational retail chains are not opposed to the idea of the 'plazastop' as the industry's crisis taxes have already stopped their development. In March 2012 the European Union examined the Hungarian plaza stop legislation. It was studied whether the law corresponds with the guidelines, the freedom of establishment and freedom of services. In the meantime (April 2012) the Hungarian Ministry of Economy had been working on an alternate legislation, which would increase the upper limit to 1000 square meters. In time of the closing of my thesis I could not obtain further information with.

1. 2. The study objectives

The fundamental aim of this study was to examine, among the present Hungarian conditions (high population density, fragmentation) what format of retail stores' development would be feasible – concerning economic and other criteria. It was also my intention to identify, which format could bring further growth opportunities in the future.

The research has three objectives:

1. My first research objective is to qualify the pre-qualification, decision making analysis system - before any shop openings - whether these systems and analysis reports carry enough and sufficient information to support the decision making process. I wish to qualify the current testing systems, namely on what criteria should the focus be and also their reliability in support of the store's implementation. This goal was mainly achieved through the analysis of the professional literature.

2. My second research objective was to examine 'Tesco, as an entrepreneurial form', and also the evaluation of its competitiveness compared to the local and international similar profile enterprises. Thus, to examine how the social-cultural environment and other aspects influence the Tesco stores, which are the factors mostly influence the future competitiveness and how these factors would likely change.

3. The third objective of the study was to indentify the correlation and regression relationship between the business size and profitability indicators (which future store size format should be chosen).

1. 3. Research hypotheses

The following hypotheses had been formed based on the aims of the study and literature:

1.) The establishment of any individual retail unit requires a proper, scientifically supported efficiency and investment economy analysis, regardless of the format or the size of the future store. Consequently, I assume that the pre-development investment analysis structure and expectations should not differ in case of the small and large format (size) stores.

2.) I assume, that the 'Tesco, as an entrepreneurial form' stores, compared to the other competitors on the market, can be categorized as good, so it is competitive, and therefore the expected further expansion is possible. Based on the expected result I presume that the analysis of the balance sheet and profit and loss statements can confirm the elements of competitiveness and the future investment opportunities can be estimated.

3.) I presume that there is a strong stochastic relationship between the size of the business and the profit level outcome indicators (profitability, efficiency ratio). The profitability of the small stores is significantly better than the larger ones, and as a result the growth of smaller stores is expected in the near future in Hungary.

2. RESEARCH MATERIAL AND METHODOLOGY

This chapter describes the data used for analysis, the sources of data, and the methods used for their processing. Given that the first hypothesis has been proved by the adequate literature by secondary research, my second and third hypothesis will be supported by primary research data.

3. 1. Database used in the study

In addition to Tesco's financial statements I have collected and created a **first database** of the biggest market players (together with Tesco a total of 13 local and international retail companies) balance sheet and profit and loss accounts between the 2007-2010 period, which is the core data of the analysis used to support my **second hypothesis**.

Based on the available balance sheet information I have created various indicators, using the following data: fixed assets, tangible assets, current assets, inventories, supplies, accounts receivable, accounts receivable of goods, cash, total assets, equity, capital, liabilities, current liabilities and obligations supply of goods. Based on the P&L statement the followings have been taken into account: net sales, operating profit and profit after tax and dividend.

Given the specialized nature of the research, the **second database** is of Tesco's own database compiled on the basis of small and large format stores, with which I intend to prove the **third hypothesis**.

The database contains the following major information regarding the chosen 71 small and large format stores. These stores give 20% of the total net sales revenue of the company:

1. important information regarding the store (format, net sales area, store age)
2. environmental data - site selection data (the number of people within the catchment area, catchment area competition)
3. operation information (customer number, average basket value, net sales)
4. major operational costs (marketing, known and unknown loss, distribution, labour costs, property related and other costs)
5. profit indicators related to the net sales in volume and percentage (operating profit)

Explanation:
   a) Small format stores are those convenience stores, which net sales area is between 200-350 square meters, whereas large formats are those hypermarkets, which net sales area is ten times bigger, around 3 000 square meters.
   b) Catchment area: in case of small stores 1 kilometer and the residents within this are, in case of the large stores is 15 km and the residents within.
   c) Catchment area competition: in case of small stores 1 km and the competition/retail area in square meter, with respect to large stores competition/retail units are in square meter, within 15 km.
   d) Number of customers = issued receipts
   e) Average gross basket value = average gross value per 1 issued receipt (forint)
   f) Net sales = net sales revenue (forint)

3. 2. The applied data analysis methods

Proccesment of specialist, scientific literature

Evaluating the chosen specialist, scientific literature, with secondary research studies I would like to prove my previously formulated hypothesis and goals. I have subordinated the analysis of all written information to this. My research is based on the domestic and international literature published by eminent representatives. Books, journal articles and studies were used, which provided a complex approach in forming of my opinion. The unique problems and novelty of this specific area required that I evaluate and analyse all available local market analysis, regulations, laws, statistical databases.

Statistics, quantitative methods, data analysis

I have compiled special databases and performed primary researches, and used **mathematical statistics methods**: both univariate and multiple linear and nonlinear regression equations were calculated, the Cobb-Douglas production functions (how the individual factors influence the level of profitability) and analysis of variance (ANOVA) (to compare small and large format) had been used.

With respect to the methodology, I have paid special attention to the multivariate linear production functions, through which I have chosen the following formula version:

Two-variable linear regression functions

$$y_1 = f(x_1)$$
$$y_2 = f(x_2)$$
$$y_3 = f(x_3)$$
$$y_4 = f(x_4)$$
$$y_5 = f(x_5)$$
$$y_6 = f(x_6)$$
$$y_7 = f(x_7)$$

Multiple linear functions, which general version is the following:

$$y = f(x_1, x_2, x_3, x_4, x_5, x_6, x_7)$$

This formula after a logarithmic transformation can be transformed into a linear version, and after these steps the weight percent of each individual factor is relatively easy to ascertain.

x_1 = net sales area floor space (m2)
x_2 = store age (years)
x_3 = number of customers (number of transactions) (per capita / year)
x_4 = sales excluding VAT (net sales) (HUF / year)
x_5 = catchment area competition (m2)
x_6 = catchment area / number of people in the surrounding area (per capita)
x_7 = average gross basket value (HUF)

The new indicators from the ones shown above were formed to exclude multicollinearity:

x_{25} = customer number per one square meter of the sales area (specific customer number) (per capita/sq m)
x_{26} = potential customers per square meter of commercial space (per capita/sq m)
x_{27} = operating profit per own commercial space (specific operating profit) (HUF/sq m)

Cost indicators used for the analysis of volume (in value):

x_{11} = marketing costs (HUF)
x_{13} = property related costs (HUF)
x_{24} = other costs (HUF)
x_{10} = labour costs (HUF)
x_{16} = distribution (HUF)
x_{23} = stock loss (HUF)

Cost analysis and ANOVA test indicators as a percentage of net sales:

x_{12} = marketing costs (%)
x_{15} = stock loss (%)
x_{17} = distribution (%)
x_{18} = labour costs (%)
x_{19} = other costs (%)
x_{14} = property related costs (%)

Data processing and statistical analyzes were performed using SPSS 19.0 for Windows statistical software package and *Microsoft Office Excel*.

Presentation and application of the multiple linear regression model

The regression analysis is used when looking for a function-like relationship with one or more explanatory variables (or independent variable) and dependent variables. The explanatory variables note with X, Y is the dependent variable. We assume that the X and Y can be expressed in the relationship between the form of a function, i.e.:

Y =f(X) or Y=f(X$_1$,X$_2$,...,X$_i$)

In order to perform regression calculations, both the explanatory and dependent variables must be known in the same units of observation. The input data, with one explanatory variable (x_1, y_1), (x_2, y_2), (x_3, y_3)… (x_n, y_n) is a pair, and several explanatory variables $(x_{11}, x_{12}, x_{13},…, y_1)$, $(x_{21}, x_{22}, x_{23},…, y_2)$, $(x_{31}, x_{32}, x_{33},…, y_3)$ ... $(xn_1, xn_2, xn_3,…, y_n)$ are vectors. This is called the "Data Matrix".

The basic multiple linear regression equation is as follows:

Y = a + b$_1$X$_1$ + b$_2$X$_2$ + b$_3$X$_3$+ ... + b$_i$X$_i$ + ε

Y: dependent variable
X$_1$, X$_2$, X$_3$, ..., X$_i$: independent variables or explanatory variables
i: the number of explanatory variables
a: (another sign is α) constant, (gives the regression line and the vertical coordinate system (y) axis of the intersection).
b$_1$, b$_2$, b$_3$, ..., b$_i$: constant regression coefficients (gives the slope of the regression line, graphically shows that the if the independent variables changes per unit how it changes the dependent variable).
ε: error factor, error term, *random error* (the role of chance involved in the regression is shown by ε or *e* or *h* error factor).
Joint: calculation is based on the minimum mean square of the distance.
Graphical view: straight line through the linear relationship (that is where the name comes from)

A linear function is used in the modeling method, therefore the first step is to examine whether there is a real linear relationship between these variables. In the Cartesian coordinate system, the dependent variable is the vertical (y, ordinate), while the independent variable is on the horizontal (abscissa, x) axis curve, if it is similar to an elongated ellipse, the linear relationship is suspected between the variables. The parameter estimates carried out in the form of the least squares approximation method: minimize the actual and the estimated parameter squared deviations of the fitted models, i.e. the sum of the squares of the differences is reduced to a minimum, to minimize distortions arising from the estimate. The result of standardization, the resulting average of the coefficients b is 0, while the variance is 1. They give the slope of the regression line. According to the null hypothesis method there is no linear relationship between the independent and dependent variables.

The connection strength information:
1. Determination of coefficient: r^2, its value is between 0 and 1.
2. It shows what percentage of the independent variables explains the dependent variable in the total sum of squared differences.
3. If the slope (linear coefficient standard value: b) is 0, than the determination coefficient is 0, so there no correlation can be demonstrated between them.
4. The determination coefficient is maximized when all the values from the regression function are straight. This match is very rare, usually there are excursive values.
5. The determination coefficient falling between 0 and 1 (r^2) values show the strength of the relationship between variables, the unpredictable nature of dependent variables by independent variables, in summary whether the regression function values are correct.
6. The significance of r^2 can be checked by the F-test, which could be perceived as the generalization of the t-test.

Residuals (error terms) role: The restrictive clauses apply mainly with respect of the error terms, so that the regression analysis can be made.
Multicollinearity exclusion: The correlation coefficient between two independent variables cannot not exceed 0.7, while the coefficient of determination cannot exceed 0.5. If this does occur, it must be left out from the model because it may distort the results. If it is left in the model, we will not be able to clearly distinguish the individual effects of the explanatory variables.

Multivariate modified Cobb-Douglas function

This function is a linear function of the transformed multivariate logarithm linear function, which allows to easily determine the weight of each factor.

$$y = a * x_1^{\alpha} * x_2^{\alpha} * x_3^{\gamma} * x_4^{\delta} * x_5^{\varepsilon} * x_6^{\zeta} * x_7^{\eta}$$

$$log\ y = log\ a + \alpha\ log\ x_1 + \beta\ log\ x_2 + \gamma\ log\ x_3 + \delta\ log\ x_4 + \varepsilon\ log\ x_5 + \zeta\ log\ x_6 + \eta\ log\ x_7$$

With the help of the adapted linear function the different factors influencing weight ratio can be shown, assuming that the function is linearly homogeneous.

Balance sheet and profit and loss analyses

Through the balance sheets and P&L statements I have revealed the past and present processes and financial performances of the enterprises listed.

I have used a holistic approach to analyze the competitiveness of the companies, using **seven groups of indicators**:

1. Wealth structure indicators
   - permanently fixed assets ratio (current assets to total assets)
   - current assets to total assets
   - tangible asset coverage
   - capital structure indicator
   - wealth indicator

2. Valuation of fixed assets
   - tangible asset ratio
   - fixed assets coverage (coverage ratio I.)

3. Resources analyses, Equity assessment, Liabilities evaluation
   - equity ratio indicators
   - growth in equity index indicator
   - debt ratio

4. Profitability and Return on investment indicators
   - ROA (return on asset)
   - ROE (return on equity)
   - ROI I. (return on investments)

5. Financial solvency (liquidity) evaluation
   - liquidity index II.
   - short term liquidity
   - quick ratio
   - net working capital
   - Coface corporate evaluation system

6. Inventory Analysis
   - inventory speed

7. Profit analysis
   - turnover result

Other methods

The above calculations have been followed up by personal consultation. It is equally important that I have had the chance to obtain several local and international real estate experts' opinion, which supported the evaluation of the more complex issues. During the evaluation of the various calculations my more than 10 years professional experience played an important part. I have also utilized my knowledge collected on various national and international conferences, when preparing my thesis both technically and professionally.

3. RESULTS

3. 1. The results of the secondary research

My primary aim was to prove the first hypothesis with the support of the secondary research results, while processing the scientific literature. According to the hypothesis each individual retail unit establishment should be supported by scientifically prepared pre-investment return rate analysis, regardless of the operating format, size of the future store or the amount of the investment. As a result there should be no difference in the pre-investment return rate analysis and calculations in case of small or large format store establishment. This was my focus when processing the literature. Both, the professional literature and the examined enterprise's real estate investment practice have supported my first hypothesis. Utilizing the results of the third hypothesis, I strongly believe that the accuracy of all future pre-investment economic and revenue calculations can be more precise if in case of the two formats the profitability factors (e.g., net sales, customer number, basket value, agglomeration competition, number of people in the catchment area, operation costs) are considered with different weights.

3. 2. The results of the primary research

In the first part of this chapter of the dissertation I have scientifically examined Tesco's competitive position based on the balance sheet and profit and loss statement. Among other things, I analyzed the market share of the major market players, their effectiveness based on indebtedness and liquidity trends. In the second chapter I have analyzed the relationship of the store format versus the profitability, the number of customers, the net sales, the cost structure – by applying multivariate regression models and production functions.

3. 2. 1. In order to prove my second hypothesis, that 'Tesco, as an entrepreneurial form' is competitive with other market players I believe the following indicators are important:

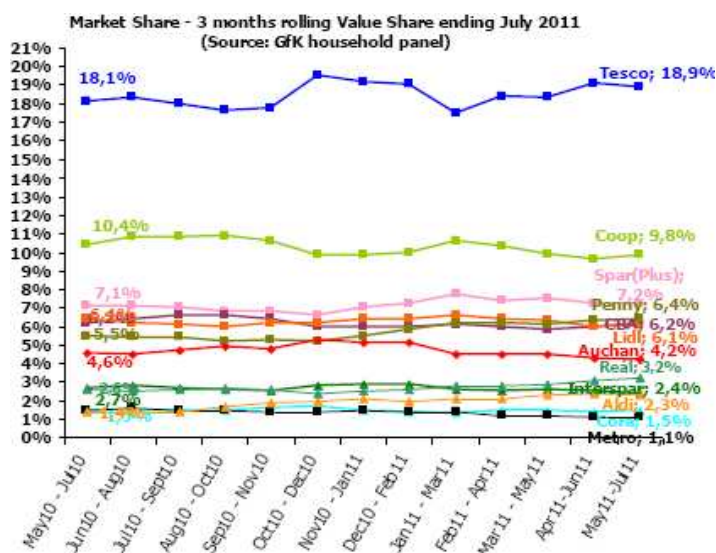**1. Market share** (Figure 1)

Figure 1: Market Share between May 2010 and July 2011
Source: TESCO [2011b]

Comments:
Market Share – Piaci részesedés
Source Gfk household panel – Forrás Gfk háztartási panel

Tesco's market share increased between 2010 and 2011, while Spar's, Auchan's and Metro's (the other members of the hypermarket sector) market share have declined. This is not surprising given that Tesco is one of the world's most successful retailers, currently present in 14 countries, and its market share is almost without exception, everywhere and continuously growing. Among the discounter stores Aldi's and Penny's market share increased, Lidl's is stagnated.

2. Profit after tax and dividend (Table 2)

Table 2: Profit after tax and divident in 2010 for the 13 chains

Data in Million HUF (2010)	SALES EXCLUDING VAT	OPERATING PROFIT	PROFIT/LOSS AFTER TAX AND DIVIDEND
TESCO	583 596	4 899	4 796
SPAR	336 848	-14 092	-25 945
AUCHAN	227 404	-4 952	-8 451
CORA	69 618	-3 623	-3 605
Metro	180 182	-2 843	-1 252
Lidl	175 796	6 398	-9 556
Aldi	43 527	-7 561	-7 207
Penny	131 833	403	702
Profi	20 946	-966	-1 122
Match	38 048	-2 798	-3 341
CBA	26 851	1 084	1 016
Co-op	12 431	66	93
REÁL	3 896	1 639	0

Source: own collection

As per their balance sheet only Tesco and Penny Market completed the 2010 year with positive result, out of the nine international corporations. The other market players had losses in that year. Out of the three Hungarian franchise network operating stores, CBA and Coop closed with profit, while Real finished the year with zero earnings.
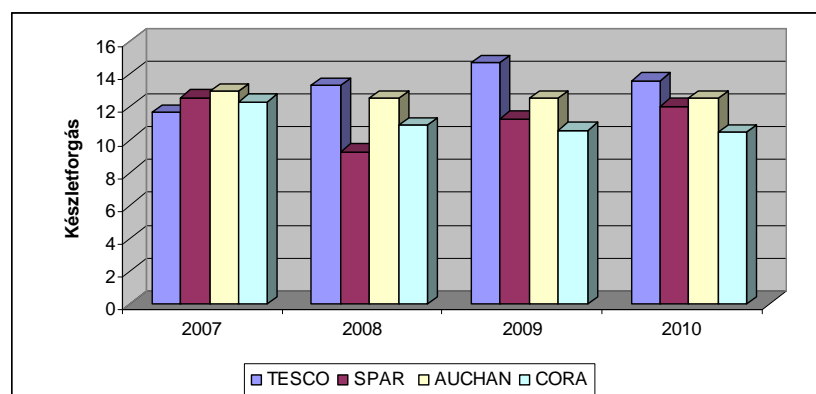
3. Inventory (Figure 2)

Figure 2: Inventory comparison (2007-2010)
Source: self calculation

No significant differences or outliers can be discovered in each of the companies' inventory turnover. From the period 2007 to 2010, Tesco's competitive position is (except in 2007) at first place.

4. Profitability – ROE (Figure 3)

The equity ratio test results differ significantly between the examined companies. From 2007 to 2010 Tesco's competitive position was in 2009 and 2010 first place, in 2007 and 2008 second place.
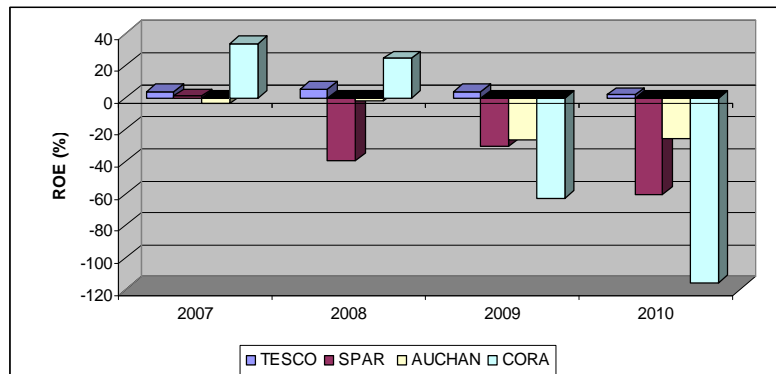

Figure 3: ROE (%) trend (2007-2010)
Source: self calculation

5. Profitability – ROA (Figure 4)

The return on asset ratio is very different across the studied companies. From 2007 to 2010 Tesco's competitive position was in 2009 and 2010 first place, in 2007 and in 2008 second place.
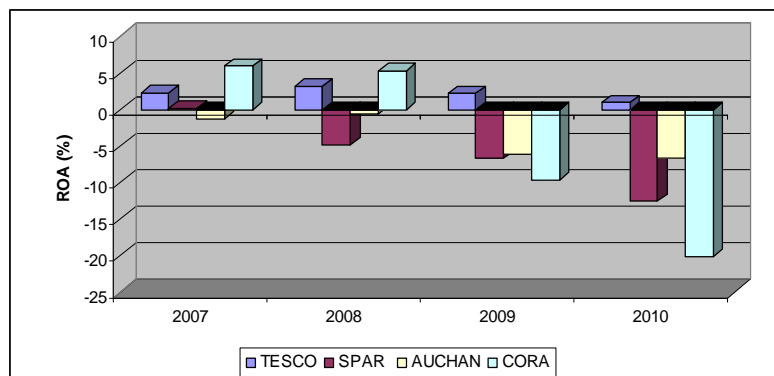

Figure 4: ROA (%) trend (2007-2010)
Source: self calculation

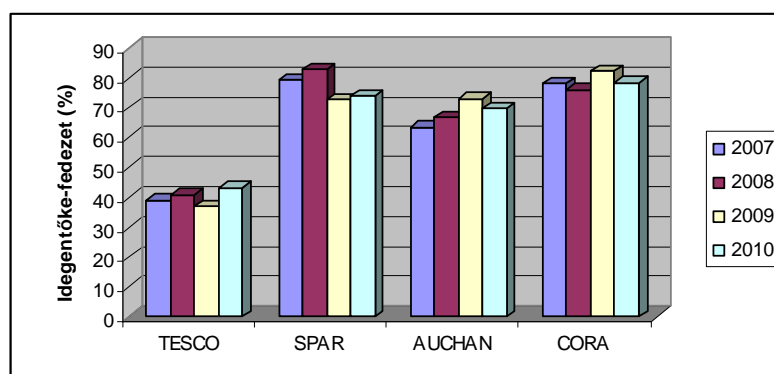## 6. Indebtedness (Figure 5)

Figure 5: Indebtedness trend (%) (2007-2010)
Source: self calculation

Concerning debts there is a significant difference between Tesco and the other examined hypermarket chains. As the figure shows Tesco is the least indebted. From 2007 to 2010 the company's competitive position was first place.

7. Liquidity (Figure 6)

In terms of liquidity there are significant differences between the individual chains. From 2007 to 2010 the competitive position of Tesco is first place.
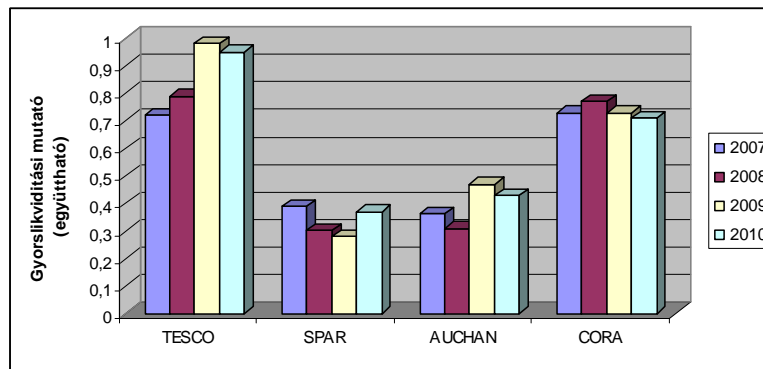

Figure 6: Quick ratio trend (2007-2010)
Source: self calculation

The detailed analysis of the indicators and also the time series (trend) analysis had proved my second hypothesis, according to which 'Tesco, as an entrepreneurial form' is competitive among the similar operating retail chains, competitors – based on the 2010 balance sheet and P&L analysis, and also the previous 3 years. In my opinion, these indicators also show that Tesco's future development is definite; the retail chain store is in a satisfying position.

3. 2. 2. My third hypothesis was that there is a strong stochastic relationship between the size of store and the profit level outcome indicators (profitability, efficiency ratio). The profitability of the smaller stores are significantly better than the larger format stores, which as a result could increase the number of smaller sized stores in the near future in Hungary.

Test I.

Dependent variable:
Operating profit per own commercial space (specific operating profit) (HUF/ square meter) (x_{27})

Independent variables:
- Store age (years) (x_2)
- Average gross basket value (HUF) (x_7)
- Customer number per one square meter of the sales area (specific customer number) (per capita/sq m) (x_{25})
- Potential customers per square meter of commercial space (per capita/sq m) (x_{26})

The model explanatory power in case of the small format (r^2) is 86.4% and 72.5% for the large format. When comparing the two formats (ENTER version) the gross average basket value (x_7) and the number of customers per 1 sq m of sales area (specific number of customers) (x_{25}) proved to be the common variables. Whereas the age of the store (x_2) is only significant in case of the large format stores, the potential number of customers per 1 sq m of sales area (x_{26}) is only important for the small format stores. Running the FORWARD model the combined explanatory power is 86.3% for the small format stores, and 71.2% in relation to the large format. **According to the standardized regression coefficients the specific results' evolution showed that in case of both formats there are three factors proved to have a significant effect.**

Test II.

Dependent variable: Operating profit (compared to net sales) (%) (x_{32})

Independent variables:
- Store age (years) (x_2)
- Average gross basket value (HUF) (x_7)
- Customer number per one square meter of the sales area (specific customer number) (per capita/sq m) (x_{25})
- Potential customers per square meter of commercial space (per capita/sq m) (x_{26})

The model explanatory power (r^2) is 60.8% for the small format and 57.4% for the large format. This means that x_2, x_7, x_{25} and x_{26} independent variables predict the difference in the own business operating profit per sales area (x_{32}) in 60.8% for the small format stores, and this number is 57.4% for the large format stores. **When entering the different variables one-by-one into the comparison model, the average gross basket value (x_7) and the number of customers per 1 sq m of sales area are proved to be the common variables, while the age of the store (x_2) only in case of the hypermarkets have a significance compared to the operating profit (compared to net sales) (%) (x_{32}).**

Test III.

Dependent variable: Operating profit (HUF) (x_{31})

Independent variables:
- Value of goods procured (HUF) (x_{30})
- Net sales (HUF) (x_4)
- Labour costs (HUF) (x_{10})
- Net sales area (sq m^2)(x_1)

The complete database analysis showed that the four independent factors affect the operating profit in 87.43%.

Test IV.

Dependent variable: Number of customers (per capita/year) (x_3)

Independent variables:
- Net sales area (sq m)(x_1)
- Store age (years) (x_2)
- Catchment area competition (sq m) (x_5)
- Number of residents in the catchment area (per capita) (x_6)

The above written four independent variables affect the number of customers in case of the small format with 41.8% and 71.7% with respect to the large format. When entering the different independent variables one-by-one into the comparison model the explanatory power of the model is 40.4% for the small stores and 71.2% for the large model. Two factors had been added in case of both formats. The first independent variable was the catchment area competition (x_5) for the small format, second was the store age (x_2). **The above suggests that for the small format stores the competitors play an important role.**

Test V.

Dependent variable: Sales excluding VAT (net sales) (HUF/year) (x_4)

Independent variables:
- Store age (years) (x_2)
- Number of customers (per capita/year) (x_3)
- Catchment area competition (sq m) (x_5)
- Number of residents in the catchment area (per capita) (x_6)

The above written four independent variables affect the number of customers in case of the small format with 76.2% and 77.1% with respect to the large format. First I added the number of customers (x_3) and second the store age (x_2) into the FORWARD version. Only the number of customers (x_3) had significant importance in the evolution of net sales with respect to the large format.

Comparison of the main operating costs

As the 100% stacked bar graph shows (Figure 7) there are differences between the two formats regarding the proportion of the major operating costs.
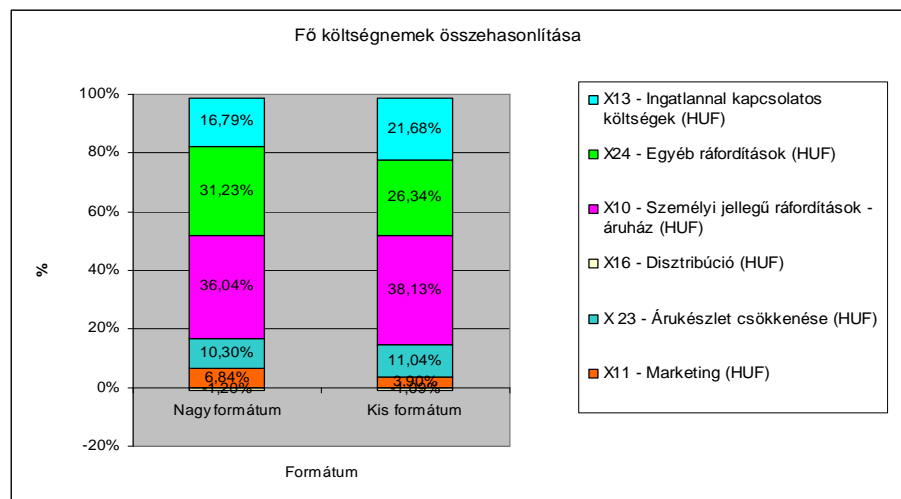

Figure 7: Comparison of the main operating costs (small and large format)
Source: self calculation

Comments:
x_{11} = marketing costs (HUF)
x_{13} = property related costs (HUF)
x_{24} = other costs (HUF)
x_{10} = labour costs (HUF)
x_{16} = distribution (HUF)
x_{23} = stock loss (HUF)

The property related costs are higher in case of the small format, similar to labour costs and the stock loss (known and unknown loss). In case of the large stores the other costs and marketing costs were higher than in case of the small format stores. Because of the centrally operated supply chain unit the cost of logistics are forming revenue in both formats and as a matter of fact they got divided equally compared to the net sales figures percentage.

Comparing the total operating cost with the net sales (Figure 8) it is very visible, that this number is higher in case of the small format. **It can be stated that higher part of the margin is used to finance the operating costs in case of the small format stores from the net sales than in case of**

the large stores. This would indicate that with the same margin the small format stores would produce less profit, than the large ones.
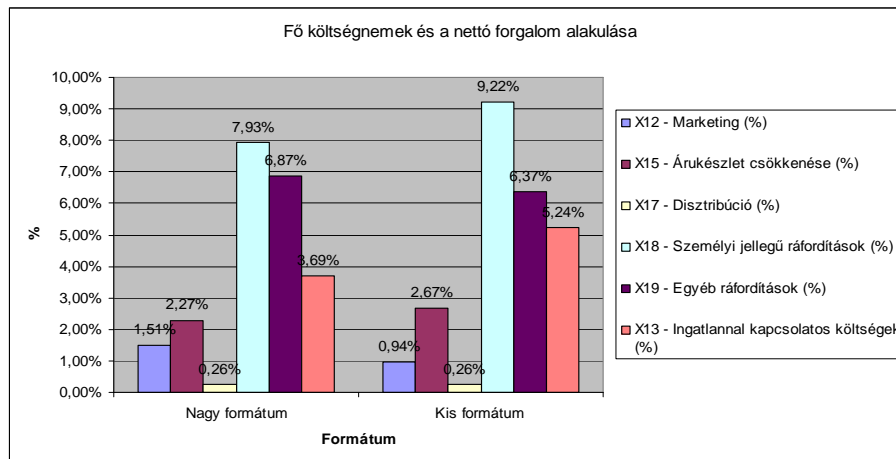

Figure 8: Main operating costs and the net sales comparison for the two formats
Source: self calculation

Comments:
x_{12} = marketing costs (%)
x_{15} = stock loss (%)
x_{17} = distribution (%)
x_{18} = labour costs (%)
x_{19} = other costs (%)
x_{14} = property related costs (%)

Specific costs comparison

I have employed the method of variance analysis in order to examine the 5 various cost elements – apart from the distribution, as it has been left out from the method due to the equality in case of both formats. I have investigated the cost ratios compared to the net sales (in percentage). I have studied the labour costs, the stock loss, marketing costs, property related costs and other costs. My hypothesis has been proved, as there is a significant difference among these cost elements with respect to the two different formats.

Applying the Cobb-Douglas function for analyzing the main operating costs

I have transformed the Cobb-Douglas function into logarithm form, in order to examine the various cost elements' effect on profitability. Applying this method I can prove how the different cost elements contribute to the profitability indicators based on net sales. I take into account that the studied cost elements add up to 100 percent; therefore the effect of the analyzed major factors are 100% as well.

The following conclusions were drawn for the large format stores (Figure 9):

The following factors have a significant effect on the operating profit (x_{32}) (operating profit per net sales in %):

        1.) x_9 – Margin (%) – 33,16% (if the 5 significant factors are 100%)
        2.) x_{19} – Other costs (%) – 20,95%
        3.) x_{18} – Labour costs (%) – 15,81 %
        4.) x_{12} – Marketing costs (%) – 15,23 %
        5.) x_{14} – Property related costs (%) – 14,85 %

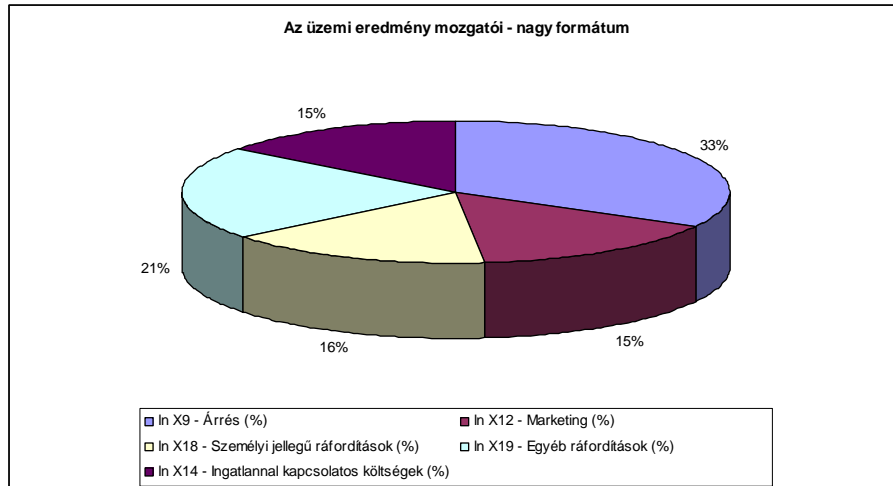**It is to be stated that the margin has the greatest impact (in percentage) on the operating profit.**

Figure 9: Analysis of the operating profit – large format
Source: self calculation

Comments:
x_{12} = *marketing costs (%)*
x_{15} = *stock loss (%)*
x_{18} = *labour costs (%)*
x_{19} = *other costs (%)*
x_{14} = *property related costs (%)*

I have completed the same analysis for the small format as well (Figure 10). In this case it is to be appointed, that the margin (x_9), the human labour (x_{18}), other costs (x_{19}) and the property related costs (x_{14}) have a joint impact on the operating profit, namely in 89.65%.

Similar to the large format the margin has the greatest impact (if these four factors are counted 100%) - as margin is 34.5%, which is followed by labour costs 31.10%, then other costs with 24.16% and finally 10.21% for property related costs.

As per the formula increasing the margin by 1% would result in an additional 3.38% increase of the operating profit, whereas increasing the HR costs by 1% would mean a 1.55% decrease in the profit per net sales. If changing both, the other costs and property related costs with 1-1% the result would be less, than 1% in the decrease of the operating profit for the small format stores.
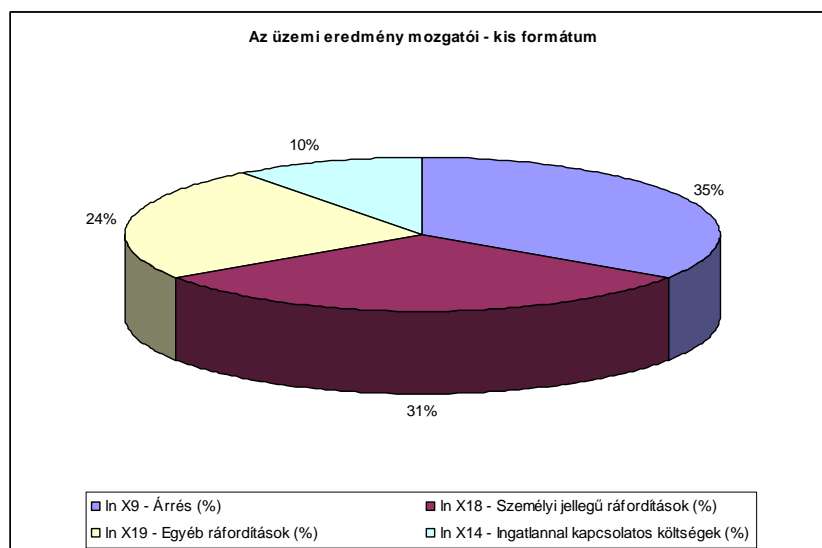

Figure 10: Analysis of the operating profit – small format
Source: self calculation

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Comments:
x_{12} = *marketing costs (%)*
x_{15} = *stock loss (%)*
x_{18} = *labour costs (%)*
x_{19} = *other costs (%)*
x_{14} = *property related costs (%)*

Table 3 contains all the results regarding both formats.

Table 3: Applying the Cobb-Douglas function for analyzing the main operating costs

Small and large format comparison		
VI. Applying the Cobb-Douglas function for analyzing the main operating costs		
SMALL FORMAT		**LARGE FORMAT**
X9 margin = 34.53%		X9 margin = 33.16%
X18 labour costs = 31.1%		X19 other cost = 20.95%
X19 other cost = 24.16%		X18 labour costs = 15.81%
X14 property related cost = 10.21%		X12 marketing = 15.23%
		X14 property related costs = 14.85%
	CHANGE effect	
additional 1% margin = + 3.38% additional operating profit	X9 margin	additional 1% margin = + 4.43% additional operating profit
additional 1% labour costs = - 1.55% additional operating profit	X18 labour costs	additional 1% labour costs = - 1.16% additional operating profit
additional 1% other costs = - 0.89% additional operating profit	X19 other costs	additional 1% other costs = - 1.25% additional operating profit
	X12 marketing costs	additional 1% marketing costs = - 0.67% additional operating profit
additional 1% property related costs = - 0.37% additional operating profit	X14 property related costs	additional 1% property related costs = - 0.72% additional operating profit

Source: self calculation

The above written tests show, that in case of both formats the margin (x_9) has the greatest impact regarding the operating profit. This indicates that when making a business decision as to what format store should be chosen to be developed, it is not sufficient to rely on the format size, as the operating profit is impacted by other factors as well. **The smaller format stores are more profitable, than the larger stores, because of the higher margin.**

3. 3. New and novel scientific results

1. According to the secunder research results of the professional literature, when developing commercial chain stores there is a significant effect of applying pre-investment studies and calculations, independently of the format or the invested amount. These factors are:
   - location, location classification,
   - expected sales forecast,
   - anticipated level of profitability and payback period (estimation).

   The commercial retail property investment analyses, models can be further developed by weighing the various factors, variables - such as profitability, number of customers, net sales, and various cost elements – with respect to both format types.

2. Tesco, among the other commercial chain stores operating in Hungary, is a competitive business, albeit in time of the decrease of sales in this area.

I have proved my theory based on the analysis of other commercial chain-stores with significant importance. Studying their balance sheet and profit and loss statements I have managed to demonstrate it' competitiveness with the use of a complex model, combining many factors (market share, inventory, profitability, indebtedness, capital structure, liquidity). Tesco has very strong and stable financial background and has the least debt among the large store format retail chains. This greatly contributes to the fact, that even with the payment of the crisis and the special tax, was able to operate effectively.

The competitive advantages of Tesco can be validated with the following indicators (data from 2007 to 2010):

- market share,
- net sales revenue,
- profitability,
- speed of inventory,
- indebtedness,
- capital-intensity,
- liquidity.

3. From the company's own database I have created another analytics, to study the profitability of the various format stores. I have attested that the factors impacting profitability, number of customers, net sales, specific costs are partially different with respect to the two formats (small and large), and that the effect of the weight of each factors (according to the regression parameters) are different.

Examining the **specific operating profit** (taking into consideration for both formats the age of the store, the average gross basket value/paid amount, the specific number of customers per sales area and the potential number of customers per 1 sq m of sales area) the explanatory power of the model is 86.3% for the small format and 71.2% for the large format. The variables had been entered into the model one-by-one. The specific number of customers per sales area and the average gross basket value had been the most weighed factors, but in case of the large formats the store age had been added to the model. When calculating the model for the small format the last factor to be added was the potential number of customers per 1 sq m of sales area, which had an opposite (negative) effect on the variable, which indicates that the competition is more acute in case of the small format stores. The answer to the fierce competition is price reduction, which has an immediate effect on the profit.

Entering the explanatory variables into the model at the same time (taking into account the sales area, the age of the store, the catchment area competition and the catchment area population) in case of **the customer number** for the small format only the catchment area competition has significant effect, whereas in case of the large format the sales area and the store age have impact on the number of customers. The explanatory power of the model is 41.8% with respect to the small and 71.7% of the large format. This also indicates that the competitors play an important role in the life of the small format stores. This (catchment area competition) independent variable did not play a significant role in the number of customers for the large format stores. Most probably the reason for this is because there is less competition among hypermarkets, especially in the countryside, than amongst the small format stores.

Net sales analysis showed – when the independent variables had been entered one-by-one into the model for both formats (age of store, number of customers, catchment area competition, number of customers in the catchment area) that the four independent variables indicate the net sales differences in 76.2% for the small, and 77.1% for the large formats. The greatest effect variable is the number of customers, in both cases, but the store age has been considered additionally for the small format, whereas the large format is only affected significantly by the

number of customers. The increased competition has an utmost importance regarding the small format stores, as per the results, if the customers have an option to choose from several nearby shops, do not insist the same one, but change their preferred location if believe that the nearby competition store has a better aspect to offer.

4. I have examined the small and large format commercial enterprises competitive positions with multivariate linear and nonlinear regression analysis. Calculation results have proved that **despite the relatively high specific costs of the small format stores due to the applied higher margins these stores are proven to be more efficient in their operation**. The reason for this is because of certain customer behaviors, such as convenience shopping and cost-saving, the number of customers per unit will not expected to be less and will not decrease compared to the larger format commercial units. Based on the above it is to also be concluded, that the 300-1000 sq m store format limitation does not have a significant impact on the business position of the commercial retail chain stores. No remarkable reverse is expected in the retail business as it has already happened by the commercial special tax and the market saturation.

4. CONCLUSIONS AND RECOMMENDATIONS

Currently there are various formats and types of commercial enterprises operating in Hungary. They are partially owned by local or multinational companies. Given their sizes, in almost all retail chains there are small and large format stores. Recently the major concern of all retail chains is how to keep up and maintain the performance of the stores, as a result of the economic crisis and also the growth of competitors and number of stores. There is now a particular importance of any new store opening or network development.

Prior to the investment return calculations it is expedient to draw up many alternative scenarios, in order to choose the most likely appropriate version. The scenarios and alternatives should be prepared according to the probability of the expected occurrence of certain factors. In particular, the site selection rules and constraints should be taken into account, such as accessibility, expected number of customers, logistics, number of residents in the catchment area, competition etc. It is also equally important to taken into consideration the available resources, the composition of their source, the expected changes in consumer habits, the major product groups life-cycle trends, new products and services to emerge.

In order to improve the operation of these enterprises, although their present balance sheet and profit and loss statements provide sufficient information for their management, it would be highly recommended to further broaden their management information system, with respect to the following elements:
- to incorporate natural characteristic indicators into the management information system (e.g.: number of customers/1 sq m, net sales, costs and operating profit),
- it would also be highly recommended to integrate productivity and investment-efficiency factors into the information system.

These factors would significantly contribute into the short, medium and long term corporate decision making.

There are two opportunities to improve the business units' operating profitability:

On one hand, each commercial unit should have a greater concern regarding their operating cost optimization, where there should be more emphasis on the total cost and special costs. The decrease of the specific material, labour and operation cost should be considered, while maintaining the competitiveness, customer retention capabilities and image. Significant cost reduction is possible in relation to transport costs, and therefore the most modern methods should be introduced in the fields of transportation logistics, warehousing and inventory management. It is desirable to extend this work to the regional level, such as joining a Center-European level network.

On the other hand, various marketing tools, sales incentive promotions should be used to increase store profit and revenues. It is particularly important to enhance the range and services, to incorporate these into the main service activities, to introduce new product lines and services (e-commerce and m-commerce), to implement new marketing campaigns, sell out stocks and the continuous development of shopping experience.

From financial point of view, although the financial operation of the Tesco stores in Hungary are centrally regulated, but some stores would have opportunities to improve their financial ratios. This could be the further development of the financial controlling system, which includes the major processes from planning until operations. For this purpose new information technology innovations should be applied, and also the controlling and accounting systems should be developed.

5. CURRICULUM VITAE

Adrienn Kurucz has finished her high school studies in the Petőfi Sándor Secondary Grammar School Kiskőrös, in 1994. She has conducted her university studies in the Szent István University, Gödöllő - Faculty of Economics and Social Sciences (predecessor of Gödöllő University of Agricultural Sciences). She graduated and obtained her degree in 2000 (German language translator as well).

While studying at the University, from October 1998 she has received a Socrates-Erasmus scholarship to study abroad for five months in Germany, Bonn at the Rheinische Friedrich Wilchelm University.

After the completion of her university studies, she was admitted to Szent István University Ph.D. School of Management and Business Administration, where she began a correspondence course of doctoral studies and research in September 2000.

Adrienn Kurucz during and after her university studies, from April 1999 until January 2001 had been working for Kleffmann Affiliate Marketing and Market Research Ltd., first as a project and later as a team manager. Her career at TESCO-GLOBAL Stores started in July 2002. She was positioned at the company's assets and estates department, first as a financial controller, then from 2003 as a financial analyst, later from October 2004 the leader of Asset Management and Finance. She was appointed to become the Head of Assets and Estates Hungary 1st July 2009, since she is responsible for the whole asset management related activities of Tesco in Hungary.

Since 2006, she is a member of the International Council of Shopping Centers, an international organization, through which she has participated in many foreign retail real estate and shopping center conferences. Since 2009, she is a board member of the Hungarian Council of Shopping Centers.

She was awarded with the Klauzál Gábor award, for the support of retail business on 3 November 2011.

Adrienn Kurucz has English and German high level (C) language exams.

Adrienn Kurucz accomplished the following publications on her subject:

- 5 Published scientific conference presentation in Hungarian language
- 6 Published international scientific conference presentation in English language
- 2 English language articles published in international scientific journals
- 2 Hungarian language articles published in national scientific journals
- 2 books chapters/pieces in Hungarian language
- 1 chapter of a scientific book published in English language

6. LIST OF PUBLICATIONS

a) Articles in scientific journals

Scientific articles published in Hungarian

1. **Kurucz Adrienn (2010):** Gondolatok a magyar földpiacról: Gazdálkodás Agrárökonómiai Tudományos Folyóirat, ISSN 0046-5518, 2010. 4. 54. évfolyam; p. 434 – 443, 10p.

2. **Kurucz Adrienn (2011):** Magyarország „Kelet Luxemburgja"? – mi az a szabályozott ingatlanbefektetési társaság?, Valóság, ISSN 0324-7228, 2011. december, LIV. Évfolyam 12. szám, p. 78-87. 10 p.

Scientific articles published in foreign language

1. **Kurucz Adrienn (2010):** The Relationship between General Economic Cycle and the Real Estate Cycle: Regional and Business Studies, Kaposvári Egyetem Gazdaságtudományi Kar, ISSN 1789-6924, Volume 2 No 1 2010, 2010 September, p. 41-56, 16 p.

2. **Kurucz Adrienn (2012):** Site Selection, Store Format, Customer Number, and their Context in the Retail Business. Regional and Business Studies. Kaposvári Egyetem Gazdaságtudományi Kar. IV. évfolyam. 1. szám. 16 p (under publishing)

3. **Kurucz Adrienn (2012):** The Future of the Retailing Formats in Hungary. Economics of Sustainable Agriculture. Szent István University Faculty of Economic and Social Sciences. Scientific Book Series Gödöllő, 2012. 18 p. (megjelenés alatt, befogadó nyilatkozat alapján)

b) Scientific conference presentation or paper published in conference proceedings

Proceedings published in foreign language

1. **Kurucz Adrienn (2005):** The financial difficulties of the property management, what to do when the tenant fails to pay. Széchenyi István Egyetem, Győr - 2005. december 2-3. – Átalakulási folyamatok Közép Európában. CD kiadvány, ISSN 1787-9698, http://www.sze.hu/etk, 5 p.

2. **Kurucz Adrienn (2006):** New development targets on the industrial real estate market: Budapest vicinity, what makes a project successful. Károly Róbert Főiskola Gyöngyös, 2006. március 30-31. - X. Nemzetközi Agrárökonómiai Tudományos Napok. CD és nyomtatott kiadvány, ISBN 963 229 623 0, összefoglaló konferencia kiadvány p. 243, 7 p.

3. **Kurucz Adrienn (2006):** Property development and the appearance of the industrial parks in the Hungarian agriculture. Károly Róbert Főiskola Gyöngyös, 2006. március 30-31. - X. Nemzetközi Agrárökonómiai Tudományos Napok. CD és nyomtatott kiadvány, ISBN 963 229 623 0, összefoglaló konferencia kiadvány p. 73, 7 p.

4. **Kurucz Adrienn** – Kerekes Margit **(2006):** Development of the Hungarian retail market – appearance of new types of shopping centers and trends. Nyugat-Magyarországi Egyetem Mosonmagyaróvár, 2006. április 6-7. – Within The European Union 3rd International Conference, CD kiadvány, ISBN 963 9364 67 3, 8 p.

5. **Kurucz Adrienn** – Kerekes Margit **(2006):** Development on the Budapest and Hungarian office market – foreseeable trends. Nyugat-Magyarországi Egyetem Mosonmagyaróvár, 2006. április 6-7. – Within The European Union 3rd International Conference, CD kiadvány, ISBN 963 9364 67 3, 2 p.

6. **Kurucz Adrienn (2010)**: History and Future of the Hungarian Hypermarket and Supermarket Industry. Szent István Egyetem Gödöllő, 2010. október 4-6. – 6th International Conference for Young Researchers, "Scientific Challenges of the 21st Century", CD kiadvány, ISBN 978 963 269 193 0,6 p.

Proceedings published in Hungarian

1. **Kurucz Adrienn (2005):** Az ingatlanbefektetés és az ingatlanfejlesztés elméleti és módszertani kérdései. Veszprémi Egyetem Georgikon Mezőgazdaságtudományi Kar, XI. Ifjúsági Tudományos Fórum, Keszthely - 2005. március 24., CD kiadvány, 6 p.

2. **Kurucz Adrienn (2005):** Az ingatlanalapok sikeres térhódítás Magyarországon. Miskolci Egyetem, Gazdálkodástani Intézet - 2005. október 13. - V. Regionális Tanácsadási Konferencia, Miskolc. CD kiadvány, ISBN 963 661 694 9, 7 p.

3. **Kurucz Adrienn (2005):** A magyarországi ipari parkok jövője az EU csatlakozás függvényében. Miskolci Egyetem, Gazdálkodástani Intézet - 2005. október 13. - V. Regionális Tanácsadási Konferencia, Miskolc. CD kiadvány, ISBN 963 661 694 9, 6 p.

4. **Kurucz Adrienn** – Kerekes Margit **(2006):** A budapesti és a magyar ingatlanpiac fejlődése – a jövőre vonatkozó várakozások. Nyugat-Magyarországi Egyetem Mosonmagyaróvár, 2006. április 6-7. – Within The European Union 3rd International Conference, CD kiadvány, ISBN 963 9364 67 3, 8 p.

5. **Kurucz Adrienn** – Kerekes Margit **(2006):** A Raiffeisen Zrt. tevékenysége. Nyugat-Magyarországi Egyetem Mosonmagyaróvár, 2006. április 6-7. – Within The European Union 3rd International Conference, CD kiadvány, ISBN 963 9364 67 3, 4 p.

c) Textbook, textbook chapters

1. **Kurucz Adrienn (2009):** Válságkezelés másképpen, avagy hogyan éljük meg jól a recessziót. Üzleti Ingatlan Évkönyv 2009 (Felelős szerkesztő: Mester Nándor). Zöld Újság Kiadó Zrt., ISSN 1788-5167, p. 52-53

2. **Kurucz Adrienn (2009):** Válságkezelés másképpen, avagy hogyan éljük meg jól a recessziót. Retail Évkönyv 2009-2010 (Felelős szerkesztő: Kalmár Zoltán). Iroda.hu Kft., p. 30-31

d) Scientific publications (books, book chapters, articles, research reports)

Book chapter in foreign language

1. **Kurucz Adrienn (2006):** The financial difficulties of the property management, what to do when the tenant fails to pay. Évkönyv 2005 - Átalakulási folyamatok Közép-Európában (Szerkesztő: Rechnitzer János). Széchenyi István Egyetem. Jog- és Gazdaságtudományi Kar. Multidiszciplináris Társadalomtudományi Doktori Iskola (Győr). ISSN 1787-9698, p. 201-205. (könyv, nyomtatott)