

Keynes' Theory of the Interest Rate: A Critical Approach

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SUMMARY

John M. Keynes – the author of General Theory of Employment, Interest and Money – assumed that the interest rate is the price which brings into equilibrium the desire to hold wealth in cash with the supply of cash resources, and the reward for parting with liquidity at the same time. He indicated liquidity preference as the key element of the theory of the demand for money, whereas the supply of money is a discretionary factor, i.e. depending on the policy pursued by monetary authorities. It has been proven that such an approach comes with at least three errors: inconsistency in defining the rate of interest, vicious circle in arguing and departure from the economics of value for functional adequacies.

Key words: interest rate; liquidity preference; demand for money; classical school, Keynes

Journal of Economic Literature (JEL) codes: B41, B50, E43

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INTRODUCTION

For over 50 years the works of John Maynard Keynes have exerted a profound influence on the development of economic thought in Europe and North America. Today Keynesianism is at the cornerstone of the majority of principles of economic policy pursued by states. *The General Theory of Employment, Interest and Money* (first published in 1936) provided the grounds on which a system of political and economic indications has been developed.

The theory of the interest rate is a key element of the Keynes' system. According to Keynes the rate of interest determines the level of employment. It affects the money supply and, thus, the investment processes in the economy. In a system in which the rate of interest is shaped by a central monetary institution, it appears as a powerful tool to influence the allocation of resources, including production.

How did Keynes define the interest rate? Is the theory of interest rate a good cognitive tool? Is the state's interference in the economy by means of the monetary interest rate (i.e. the discount rate) theoretically substantiated? Addressing this seems to be of prime importance for the investigation of the reasons behind today's financial and economic crises.

THE THEORY OF INTEREST RATE

The Keynesian theory of interest rate refers to the market interest rate, i.e. the rate 'governing the terms on which funds are being currently supplied' (Keynes, 1960, p. 165)¹.

According to Keynes, the market interest rate depends on the demand and supply of money. It is the price which brings into balance the willingness to hold wealth in the form of cash with the supply of cash². The author of *The General Theory of Employment, Interest and Money*³ puts forward the rate of interest as 'the reward for parting with liquidity for a special period of time' (167) or 'for not-hoarding' (182). The interest rate is 'a measure of unwillingness of those who possess money to part with their liquid control over it' (167). Keynes proves that to view the rate of interest as a price which brings the demand for savings into equality with

¹ Keynes also uses the concept of the so-called marginal efficiency of capital, maintained at a level equal to the monetary rate of interest. The marginal efficiency of capital curve shows under which terms funds are sought for new investments. The schedule of the marginal efficiency of capital may be said to govern the terms at which loanable funds are demanded for the purpose of new investment (Keynes, 1960, p. 165).

² 'It is a "price" which equilibrates the desire to hold wealth in the form of cash with the available quantity of cash' (Keynes, 1960, p.167).

³ In this paper, when further references are made to *The General Theory*..., henceforth only the page number will be given.

the supply of savings would be a mistake (165, 167)⁴. It cannot be assumed that it constitutes compensation for saving, either⁵. According to Keynes, the key variable determining the interest rate is the form in which the command over future consumption is reserved, i.e. the fact whether an individual wishes to hold it in a liquid form (cash), or if he or she is ready to part with control of cash for a specified period of time (166)⁶. Keynes refers to this "factor" as liquidity preference. Liquidity preference is 'a potentiality or functional tendency, which fixes the quantity of money which the public will hold when the rate of interest is given; so that if r is the rate of interest, M the quantity of money and L the function of liquidity preference, we have $M=L(r)$ ' (168).

Keynes distinguishes three liquidity preference motives for holding one's resources in cash⁷: the transaction motive⁸, the precautionary motive⁹ and the speculative motive¹⁰ (170).

If M_1 is the amount of cash held to satisfy the transaction and precautionary motives, and M_2 the amount held to satisfy the speculative motive, then the demand for money is shown in the equation (199):

$$M = M_1 + M_2 \quad (1)$$

Keynes argues that the demand for money to satisfy the transaction and precautionary motives changes in response to changes in income, while the demand due to the speculative motive is sensitive to changes in interest rate. *The General Theory* ... reads as follows: (...) 'the aggregate demand for money to satisfy the speculative motive usually shows a continuous response to gradual changes in interest rate; i.e. there is a

continuous curve relating changes in the demand for money to satisfy the speculative motive and changes in the interest rate as given by changes in the prices of bonds and debts of various maturities' (197). Thus, the categories M_1 and M_2 are attributed by Keynes with two liquidity functions: L_1 and L_2 , where L_1 is the function of the level of income Y and L_2 depends on the relation between the current interest rate and the market forecasts¹¹. The demand for money is expressed as a function of the choice of liquidity L_1 and L_2 .

Liquidity preference takes the following form (199):

$$M = M_1 + M_2 = L_1(Y) + L_2(r) \quad (2)$$

By incorporating the concept of liquidity preference into the theory of demand for money, Keynes argued that money supply in conjunction with liquidity preference determines the rate of interest (Rączkowski, 1948, p. 135; Taylor, 1958, p. 293; Duwendag and others, 1995, p. 188; Schaal, 1996, p. 232). Money supply is predetermined by the state policy – Keynes treats it as a discretionary factor¹².

Although Keynes proposed a purely "monetary" theory of the interest rate, this rate is linked to the marginal efficiency of capital. A decline in monetary interest rate "positively" affects the marginal efficiency of capital: entrepreneurs expand their investments, and global demand, employment and income are on an increase. A high level of interest rate in turn inhibits the production of goods and fosters unemployment.

Given the above, the monetary authorities should – in Keynes' opinion – use the monetary interest rate for stimulating productivity and employment as well as for satisfying liquidity preference L_1 and L_2 . Growth in employment can be achieved through changes in the money supply – by lowering the interest rate. A reduction in the interest rate increases investment rates and changes the propensity to consume, i.e. liquidity preference. A rise in income Y translates into a rise in cash resources L_1 , and a declining interest rate into an increase in cash inventories which secure funds for speculative purposes L_2 .

Keynes emphasizes that monetary authorities influence investment processes not only by regulating the amount of money; they also influence the decisions that individuals make with regard to liquidity, as driven by speculative motive¹³. In his theory of the interest rate

⁴ 'The rate of interest is not a "price" which brings into equilibrium the demand for resources to invest with the readiness to abstain from present consumption' (167).

⁵ 'It should be obvious that the rate of interest cannot be a return to saving or waiting as such' (166).

⁶ In Keynes' theory, psychological time preferences of an individual determine the level of income that will be used for current or future consumption.

⁷ A person can maintain their resources in liquid or non-liquid form as capital goods or securities which represent them. Various reasons (three liquidity-preference motives) underlie an individual's desire to hold a certain part of their wealth in cash.

⁸ The amount of cash reserves held by households and businesses for current transactions. The transaction motive is related to the consumption of income by households (the income motive) and the need for maintaining liquidity linked with business operation (the business motive).

⁹ The amount of cash reserves held for unforeseen contingencies. The precautionary motive encourages people to hold liquid funds to meet unforeseen expenses that might occur.

¹⁰ The amount of cash reserves held for speculative purposes. Uncertainty as regards the future course of the interest rate encourages individuals to enter into speculative transactions. Such transactions are either *bearish* or *bullish* with regard to the rate of interest. In the "General Theory ..." a special place is occupied by the speculative motive, which can be used by monetary authorities as a means for achieving their policy objectives.

¹¹ The size of demand M_2 is determined not by the absolute level of the interest rate, but by its deviation from the level that is considered safe.

¹² The supply of money is a value that enables influencing (decrease/increase) the level of interest rate.

¹³ '(...) it is by playing on the speculative motive that monetary management (or, in the absence of management chance changes in the quantity of money) is brought to bear on the economic system' (196). 'Open-market operations may (...) influence the

Keynes criticized the output of the classics in this area. The criticism focused on an erroneous take on the rate of interest which – according to Keynes – was due to disregarding the impact that income has on the level of the interest rate.

Keynes' theory of the interest rate was approved by the majority of economists; on the one hand this entailed rejecting the previously held doctrine, and on the other accepting a different way of arguing in economics. This analysis is a critical study of the theory of the interest rate based on the concept of liquidity preference introduced by Keynes.

THE RATE OF INTEREST AS PRICE AND COMPENSATION

In *The General Theory of Employment, Interest and Money*, Keynes defines the interest rate in three different ways.

The rate of interest is a measure of reluctance to part with money in liquid form and, at the same time, as the price which brings into balance the desire to hold wealth in the form of cash with the supply of cash. Keynes also captures the rate of interest as a compensation for parting with liquidity or as a reward for not-hoarding.

Let us check such a take on interest rate for consistency, i.e. *whether the rate of interest understood as a measure of reluctance to part with cash can be the price which balances the desire to hold wealth in cash with the supply of cash. Can the interest rate be price and compensation at the same time?*

Answers to these questions – if not explicitly negative – indicate that the essence of the theory of interest rate has not been formulated clearly.

If the rate of interest is the price which brings into equilibrium the desire to hold wealth in cash with the supply of cash, then this price cannot represent the actions (valuations) that are opposite (i.e. reluctance to part with cash).

If we assume that the rate of interest is a compensation for parting with liquidity – then how can the amount of this compensation be determined by the desire to hold the command for future consumption in cash? Liquidity preference means the choice of liquidity by the individual; not parting with liquidity.

Attention should be brought to the fact that the category of price is related to the category of supply and demand, whereas the category of compensation is not – despite its indirect reference to the concept of profit/annuity from capital. If the rate of interest is a

price, its amount should be determined by the relationships between supply and demand which assume the valuation of goods (the importance of desire satisfied by a good) and their rarity. In the theory of economics the category of price is unambiguous. Let us therefore assume for a moment after Keynes that the rate of interest is the price which equilibrates the desire to hold wealth in form of cash with the available quantity of cash. Keynes' theory of demand for money is brought down to the theory of liquidity preference. The amount of money required to satisfy the transaction and precautionary motives¹⁴ depends on the overall activity of the economic system and the level of nominal income. Thus formulated theory does not relate the demand for money with the goods which satisfy the requirements of individuals, namely the concepts capturing valuation processes. Demand for money should be explained in terms of the demand for goods purchased using the means of exchange, whereas the demand for goods is related to the importance of the desire which a given good satisfies. In this sense, Keynes' assumption that demand for money depends on income is non-economic. A relationship of functional adequacy exists between demand and income, precluding any causal relationships that could influence valuation processes. A situation in which the demand for money does not grow with an increase in income is possible in theory. The demand for money will not grow unless an individual has needs that could be met through the means of exchange.

Keynes' theory of the interest rate does not explain why reluctance to part with liquidity (i.e. the choice of liquidity) generates interest rate in the meaning of compensation. *The General Theory* ... only states that the interest rate is compensation for a temporary renunciation of liquidity. Such a take on the matter is a description and provides no clarification; it explains neither the cause nor the essence of interest rate understood as compensation for parting with liquidity. This aspect also challenges the Keynes' assumption that the rate of interest can be a reward for parting with liquidity (cash), but cannot be a reward for saving (which was assumed by the classical school according to Keynes).

The line of argument above shows that there is no denying the vagueness of the concept of interest rate viewed in terms of the category of price and the category of compensation.

LIQUIDITY PREFERENCE VS. THE RATE OF INTEREST

The concept of liquidity preference is instrumental in Keynes' theory of the interest rate. Let us summarize

rate of interest through both channels; since they may not only change the volume of money, but may also give rise to changed expectations concerning the future policy of Central Bank or of the Government' (197).

¹⁴The speculative motive was disregarded for the purposes of analysis.

– the key insight from this theory is that what determines the rate of interest is the quantity of money in conjunction with the liquidity preference. Liquidity preference is a decisive factor as regards the demand for cash requirements.

The phenomenon of liquidity preference is undoubtedly one of the most interesting elements of the theory of the interest rate by Keynes. The psychological time preferences of an individual determine the level of income allocated for current and future consumption and the form in which the so-called command over future consumption is held. An individual may aim for increasing/reducing cash resources for three motives (see above).

The General Theory of Employment, Interest and Money says that the liquidity preference is a (...) functional tendency, which fixes the quantity of money which the public will hold when the rate of interest is given (...) i.e. $M=L(r)$ (168). It should be noted, however, that the theory of interest rate viewed from such an angle comes with a logical error in proof, widely referred to as *circulus vitiosus* (vicious circle). As a dependent variable the rate of interest cannot depend on itself – the rate of interest is predicated on liquidity preference, which depends on the rate of interest. If r , namely the rate of interest, depends on M , then M cannot depend on r . The rate of interest cannot be dependent on itself. The price of potatoes cannot be explained in terms of the impact that the price of potatoes exerts on the demand for potatoes. The key law of economics is the one which says that a rise in demand for potatoes increases their price, whereas a rise in the supply of potatoes reduces their price. The theory of valuation cannot be tantamount to the description of the phenomenon within the framework of functional dependencies which represent the relationship of adequacy or co-existence of phenomena. A high price of potatoes corresponds to (is accompanied by) low demand, a low price of potatoes corresponds to a high demand. These are the relationships of correspondence, which do not explicate the reasons underlying these phenomena. The same applies to the analysis of the interest rate. If time preference determines the rate of interest, it cannot depend on it.

On top of the above, the mere notion of liquidity preference as a factor influencing the demand for money raises doubts in Keynes' theory of the rate of interest. It should be observed that liquidity preference in Keynes' theory of money is used for explaining the changes in the cash resources held by individuals. The shifts in the individual's liquidity preference which result in renunciation/resignation of or an increase in liquid cash holdings, determine, as a matter of fact, the supply of cash. An individual willing to have more cash for future consumption contributes to reducing the supply of money, whereas an individual renouncing such a possibility contributes to increasing the supply of money. This relationship is confirmed by Keynes

himself – *The General Theory* ... states that 'an increased income velocity of money may be a symptom of decreased liquidity preference' (194). As a matter of fact, changes in liquidity preference result in shifts in supply relationships. They release cash resources, which increases the quantity of money in the economic system. If the rate of interest belongs to the category of price, then liquidity preference as a factor conducive to releasing the quantity of money influences the supply of money in the economy instead of demand. Keynes is acknowledged to have developed the theory of the demand for money, which he actually did not. The theory of demand for money should take into account the valuation relationships reflected in the price, which means – according to Keynes – in the interest rate.

KEYNES VS. THE CLASSICAL SCHOOL

It should be stressed at the start that in his criticism of the classical theory of the rate of interest Keynes does not present the output of the classics in this area. He refers to the representatives of neoclassical school instead, highlighting at the same time that their exposition of the rate of interest is vague and ambiguous.

The General Theory of Employment, Interest and Money provides no grounds for attacking the classical school from the standpoint adopted by the author. The classical school approached the concept of interest rate in a similar fashion as it did the issue of the valuation of goods. The rate of interest is the price that equates the demand for savings with the supply of savings. Such a take on the matter seems perfectly viable except for the otherwise reasonable doubt: are savings a good whose valuation determines the level of the rate of interest by way of demand and supply relationships?

The allegation of Keynes that 'traditional analysis is faulty because it has failed to isolate correctly the independent variables of the system' (183) is unfounded. The classics did not investigate the impact of income on savings with a view to expounding the essence and level of the interest rate. According to the classics, income is unrelated to the theory of the interest rate, i.e. it does not contribute to the theory of the interest rate because it is "divorced" from the theory of value. The focus of the classics was on the factors determining the rate of interest, i.e. on the supply and demand for savings. Keynes recognized the functional relationship between the level of income and the rate of interest and captured it as the law of cause and effect. A relationship exists between income and the rate of interest, but rather as a relationship of co-existing phenomena. A causal relationship – a law that would relate the level of income to the interest rate – is nowhere to be found here. The classical school properly recognized dependencies as the relationship of adequacy between the interest rate and the level of savings. The classical school did not address the

issue of the categories of interdependence – it searched (with greater or lesser degrees of success) for the laws behind the phenomena.

It should be observed while addressing further significant differences between the approach adopted by Keynes and the classical approach that the author of the *General Theory*... introduced a holistic analysis to the theory of the interest rate in place of the classical teleological analysis. Keynes' theory refers to: '(...) the amount of money required to satisfy the transaction and precautionary motive being mainly a resultant of the general activity of the economic system and of the level of money income' (196) or '(...) to the division of the increment of cash between M_1 and M_2 in the new position of equilibrium depending on responses of investment to a reduction in the interest rate and of income to an increase in investment' (201). Keynes used aggregate quantities in his theory and finally put the theory of the interest rate down to a description of functional adequacies. Such a take on the phenomenon is unrelated to the subjects of exchange relationships, that is, the subjects that determine prices.

It should be added at this point that Keynes' view of the classics' approach to the rate of interest is very narrow and somewhat superficial. The same applies to the output of the neo-classicists in this area – although *General Theory*... leaves the reader with an impression that a comprehensive range of issues related to the interest rate theories is covered exhaustively. It should be observed that the Keynesian theory of interest rate falls in line - to some extent - with the theory of interest rate put forward by Knut Wicksell. Wicksell (1936) was the first to propose a monetary rate of interest that shapes investment processes by way of the state's active monetary policy and a fully-developed capital market.

CONCLUSION

John M. Keynes, in his book *The General Theory of Employment, Interest and Money*, proposed a purely monetary theory of the rate of interest. He assumed that the interest rate is the price which brings into equilibrium the desire to hold wealth in cash with the supply of cash resources, and the reward for parting with liquidity at the same time. Keynes indicated liquidity preference as the key element of the theory of the demand for money, whereas the supply of money was treated as a discretionary factor, i.e. depending on the policy pursued by monetary authorities. Such an approach contains at least three errors.

Firstly, the concept of the rate of interest is lacking in consistency. The interest rate as a measure of reluctance to renounce money in liquid form cannot simultaneously constitute the price which brings into balance the desire to hold wealth in cash with the supply of cash resources – the rate of interest cannot reflect the actions (valuations) that are contradictory valuations. The recognition of interest rate as a price and as compensation at the same time is also unclear. What comes to the fore is that the definition of the rate of interest is evidently ambiguous.

Secondly, Keynes makes the logical error of *circulus vitiosus* that is critical from the point of view of a scientific method – the rate of interest depends on the demand for cash resources, determined, among others, by the speculative motive, whereas the motive itself is strictly determined by the rate of interest. A dependent variable (interest rate) depends on itself. The speculative motive which determines the rate of interest and is at the same time determined by the rate of interest constitutes a fundamental element of the theory of liquidity preference and plays a key role in the theory of money and employment.

Thirdly, the demand side of the theory under analysis is erroneous. The factors which determine liquidity preference according to Keynes release or limit cash resources, which has a direct bearing on the supply of money rather than the demand for it.

While formulating the theory of the interest rate Keynes disregarded the subjects of exchange relations as regards both the theory of interest rate and the demand for money. He departed from the economics of value, i.e. from the economics based both on prices in a classical, or even neo-classical meaning. He accepted the so-called holistic method of analysis of phenomena, which enabled the introduction of the category of income into the theory of interest rate. The causal method was replaced with the analysis of functional adequacies. Keynes was a precursor of a different way of thinking and arguing in economics, fitting very well in a trend in the economics which excluded the teleological character of this science.

The most important conclusion drawn from the Keynes' theory of the rate of interest is far-reaching as regards its implied consequences. A free market does not ensure an efficient allocation of resources. The intervention of the state is necessary to prevent excessive savings that could lead to unemployment. The rate of interest is the chief tool of such an intervention. This is the conclusion that Keynes arrives at with his vaguely and inconsistently explicated rate of interest, as has been shown. This invites further study and discussion on the cognitive value of the theory of the interest rate put forward by this British scholar and politician.

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Hungarian Energy Prices in an OECD Comparison

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SUMMARY

The goal of the study is to assess the effect of the utility cost reductions announced by the Hungarian government in 2012 on Hungarian energy prices. The effects are discussed in an OECD comparison. It is concluded that the government price control has resulted in a 15% steeper price reduction occurring 5-7 quarters earlier, compared to other OECD countries. The price reductions saved around 202 billion HUF for Hungarian households in 2014, which was around 0.63% of the GDP. If prices are compared to the monthly average wages however, household energy prices are still high in Hungary. One of the costs of the reduction in household energy prices was an increase in energy prices for industry: the industry/household price ratio is highest among OECD countries in the case of natural gas, and third highest for electricity.

Keywords: electricity, Hungary, natural gas, price control, utility cost reduction

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INTRODUCTION

Energy price developments, and especially the threat of ever-increasing future prices, have been a focus area in energy-related research. In a paper published in 1949, M. King Hubbert suggested that the discovery rate of fossil fuels can be best described with a logistic curve. His paper generated a lot of discussion and led to the framing of the well-known peak oil theory. The peak oil theory seemed to reflect reality, until the 1970s and 1980s. Oil production in the United States peaked at 9.6 million barrels per day in the 1970s (EIA), while the two

oil crises of the same decade pushed oil and energy prices to new heights (see Figure 1).

Starting from the mid-1980s, however, a different trend emerged: prices had fallen close to their pre-1971 values, and there was no significant change in the next two decades. Oil prices then peaked again in the early 2000s, but this latest peak coincided with the shale gas and oil revolution. As a result of increased shale oil extraction, the US oil production nearly reached its 1970s peak, with 9.4 million barrels a day in 2015 (EIA). Although in 2012-13 oil prices broke the 100-dollar ceiling, a huge drop in prices followed after that, and according to the forecasts made by the World Bank, no dramatic changes can be expected until 2025 (see Figure 1).

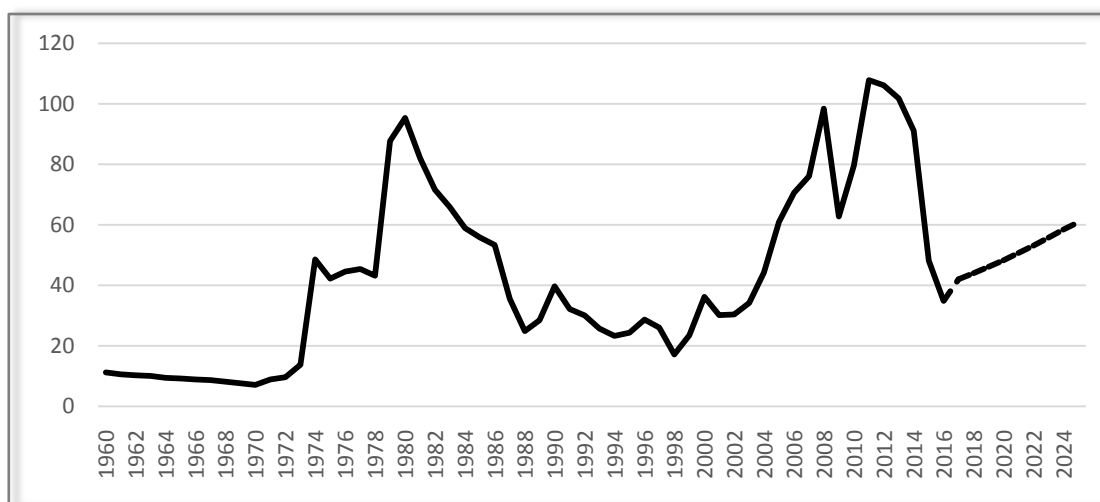


Figure 1 Oil price per dollar (measured in 2010 US dollars; Arab Light price until 1985, and North Sea price until 2015; later prices coming from the forecast of the World Bank)

Source: Own calculations based on IEA, OECD and World Bank data

According to recent calculations and estimates, global oil production is expected to peak between 2010 and 2030. Sorrellet al. (2010) conducted a meta-analysis focusing on 14 research papers written on the topic, and they conclude that a later-than-2030 peak can only be estimated if very optimistic or even unrealistic assumptions are made. It could well be that we will reach the oil peak in this decade (although global oil production kept rising until 2014 – the latest year that EIA data is available at the moment), so the threat of drastically increasing energy prices cannot be discarded.

In Hungary, energy prices had become one of the most discussed public issues after the government interventions announced at the end of 2012. This study starts with a short overview of the government price control interventions in Hungary, and its goal is to show the effect of the government intervention on energy

prices. This effect will be shown in a comparative approach, by comparing the Hungarian trends to those of the OECD ones.

Energy price controls in Hungary

The state minister responsible for the Cabinet Office of the Prime Minister announced in a press conference held at Budapest Zoo on 6th December 2012 that the government would decrease the price of household gas and electricity by 10% starting from 1st January 2013 (*Index* 2012). During the next two years the utility cost reduction was one of the most important messages in government communication. In a series of legislative changes the Hungarian parliament decreased the price of many public utilities (see Table 1).

Table 1

Government price control interventions in public utility services in Hungary, 2012-15

Time	Intervention
1 January 2013	10% decrease in household gas and electricity prices
1 July 2013	10% decrease in LPG prices
1 November 2013	11.1% decrease in household gas, electricity and district heating prices
1 April 2014	6.5% decrease in household gas prices
1 August 2014	3.3% decrease in district heating prices
1 September 2014	5.7% decrease in household electricity prices

Source: own work

By 2015 the waves of the utility cost reductions seemed to have settled down. According to *HVG*, a weekly newspaper focusing on business and politics, the Hungarian minister for justice expressed his government's willingness to change the public utility price control system in a letter sent to the EU commissioner responsible for the energy union in May 2015 (*HVG* 2015). However, the topic of low energy prices continue to be featured in the government communication. In a speech given by the prime minister during the 2014 election campaign, the topic of energy prices was even given a whole new perspective. The prime minister announced that it was his government's goal to make Hungary the most industrialised country in Europe, and part of this vision was that Hungary would have the lowest industrial energy prices in Europe as well (*Magyar Nemzet* 2014). Similar announcements have been made by other government members since then. The need for cheap energy for the industrial sector was an argument used to support the idea of constructing a new nuclear power plant, as well.

DATA AND METHODS

The following data sources were used during the analysis:

- STADAT database of the Hungarian Central Statistics Office (HCSO): <https://www.ksh.hu/stadat>
- Energy consumption statistics provided by the Hungarian Energy and Public Utility Regulatory Authority (EPURA): <http://www.mekh.hu>
- Energy prices and taxes database compiled by the International Energy Agency (IEA): <http://dx.doi.org/10.1787/eneprice-data-en>
- OECD database (OECD): <http://dx.doi.org/10.1787/data-00285-en>

- US Energy Information Agency database (EIA): <http://www.eia.gov>
- World Bank's Commodity Markets database (WB): <http://go.worldbank.org/4ROCCIEQ50>
- Hungarian National Bank's exchange rate database (MNB): <http://www.mnb.hu>

IEA was the primary source of data, but EIA, OECD or World Bank data were also used in case of missing values or time series not available in the IEA database. Long-time series data for oil prices (e.g. Figure 1) was created by combining different spot prices (Persian Gulf prices and Northern Sea ones). This method does add some distortion to the analysis, but the use of it can still be justified since oil prices in different regions are closely matched.

MS Excel was used for the calculations (regression, significance values, trends and distributions), and for the creation of figures.

RESULTS

Household energy prices dropped considerably between the last quarter of 2012 and the first quarter of 2015. The drop was universal; it affected markets with government control (e.g. household electricity and gas prices), but markets with little government control also (e.g. fuel prices). Figure 2 illustrates the price trends for the 2012Q4-2015Q1 period. The first quarter 2015 household electricity price was only 61.5% of its last quarter 2012 value; the household gas price dropped to 64% of its 2012 Q4 value. These are very significant changes, and the rate of decrease is much sharper than the price decreases dictated by the government regulations (which would have meant around a 25% cut in prices).

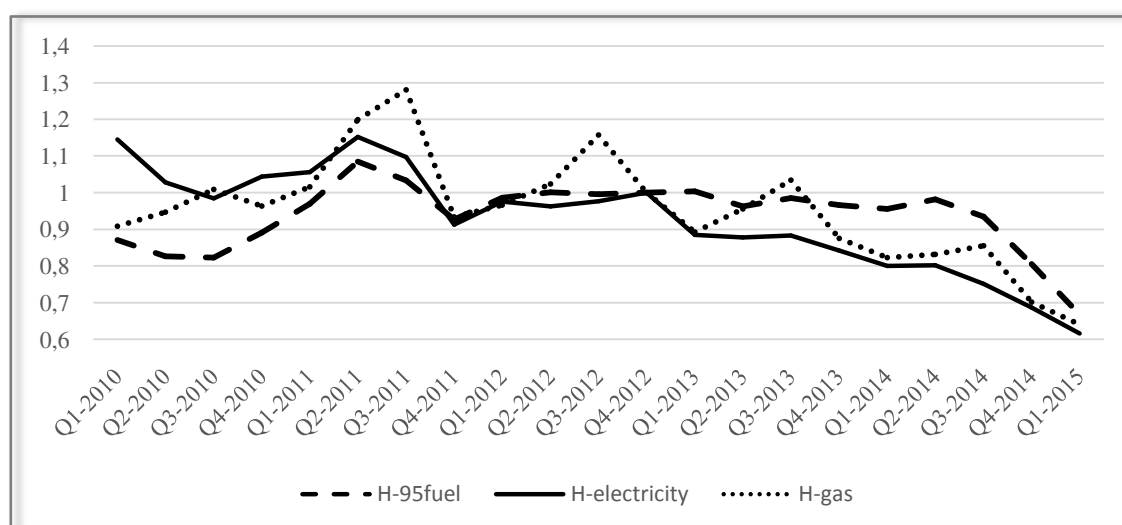


Figure 2 Change in unleaded 95 fuel, household electricity and gas prices in Hungary (last quarter of 2012=1)

Source: own calculations based on IEA data

The price of unleaded 95-octane fuel decreased to 67% of its 2012 value in the same period. Fuel prices are mostly influenced by the price of oil: since 2004, 94% of the changes in the price of the 95-octane fuel in Hungary is explained by the changes in the North Sea oil price. The same value is 96% in the OECD on the average. The same is only partially true of household gas and electricity prices: in the period 2004-2012 only 46% of the household gas prices and 49% of the household electricity prices were explained by the oil price variations. Based on the price data analysis we can conclude that household energy prices would have dropped in Hungary even without government intervention, however the rate and the timing of the change would have been different.

- Without intervention, the decrease in household energy prices would have only been around 15%, instead of the actual 36% (gas) and 38% (electricity). So the utility cost reduction added an extra 20% price reduction for households (58% of the whole change was caused by the price control in case of gas, and 61% in case of electricity). This argument is supported by at least two statistics. As was mentioned above, fuel prices are almost completely determined by oil price variations; the

interdependence between oil prices and the price of gas and electricity on the other hand is below 50%. If fuel prices dropped by 33% in the 2012Q4-2015Q1 period, the interdependences would indicate an estimated 15% drop in gas and electricity prices. On the other hand we can also check what happened with household energy prices in other OECD members from the region (countries considered: Austria, Czech Republic, Estonia, Germany, Poland, Slovakia and Slovenia), where the price setting system was not changed after 2012. The drop in household gas prices was 19%, while for household electricity prices it was 14% in the seven selected OECD countries.

- Without intervention, the drop in prices would have only begun in the second part of 2014, and not as early as the beginning of 2013. Oil prices only started to come down in the second part of 2014. Household gas prices in the European OECD members peaked in the second quarter of 2014, and the peak in the household electricity prices in the European OECD countries was in the first quarter of 2014.

Table 2
Hungary's rank in household energy prices among OECD members (n=34), rank in low household energy prices

Component		Quarter 4 2012	Quarter 1 2015
Unleaded 95-octane fuel			
	Hungary's rank	13th	8th
	No. of missing countries (no data available)	1	2
Household electricity			
	Hungary's rank	16th	5th
	No. of missing countries (no data available)	4	4
Household natural gas			
	Hungary's rank	5th	4th
	No. of missing countries (no data available)	6	6

Source: own calculations based on IEA data

Table 2 reveals that the utility cost reduction had considerably improved Hungary's position on the list of OECD members with cheap household energy prices. In the first quarter of 2015 Hungary had the fourth lowest household gas price in the whole OECD, which meant a 1 place improvement compared to the last quarter of 2012. The three North American countries were the only ones ahead of Hungary in 2015, and Turkey was overtaken.

In the case of household electricity prices, Hungary's jump is more spectacular: from the 16th place in 2012 the country had leapt to 5th place. In fact, in the first quarter of 2015 Hungary had the lowest household

electricity price in the European Union. The cheapest four countries were Mexico, South Korea, Norway and the United States (no data is available for Canada).

Somewhat surprisingly, Hungary's position improved on the list of the 95-octane fuel price as well: 8th in 2015 compared to 13th in 2012. However, the difference in fuel prices is not large within the European Union, so a shift of a few places is not necessarily an indication of a different price trend.

Analysis of the natural gas prices

Both Figure 2 and Table 2 show that the reduction in household gas prices in Hungary was significant, and much steeper than the OECD average. If industrial prices are considered as well, the picture changes somewhat. Figure 3 shows how the Hungarian household and industrial gas prices changed compared to the OECD average in every quarter of the 1993-2015 period. While the household gas price had decreased by around 25-30% compared to the OECD average (in the 2012 Q4-2015 Q1

period), and in the first quarter of 2015 it was only 78% of the OECD average, the price of industrial gas had risen from 174% of the OECD average to 189% of it. In the eight quarters of 2013–2014 Hungarian industrial gas prices were 1.71times higher than the OECD average, which is the highest 8-quarter average for the 1993-2015 period (Hungarian industrial gas prices were 1.68times higher in 2011-12; 1.63times in 2009-2011; 1.66times in 2007-2009; 1.21 times in 2005-2007; and 1.1 times in 2003-2005).

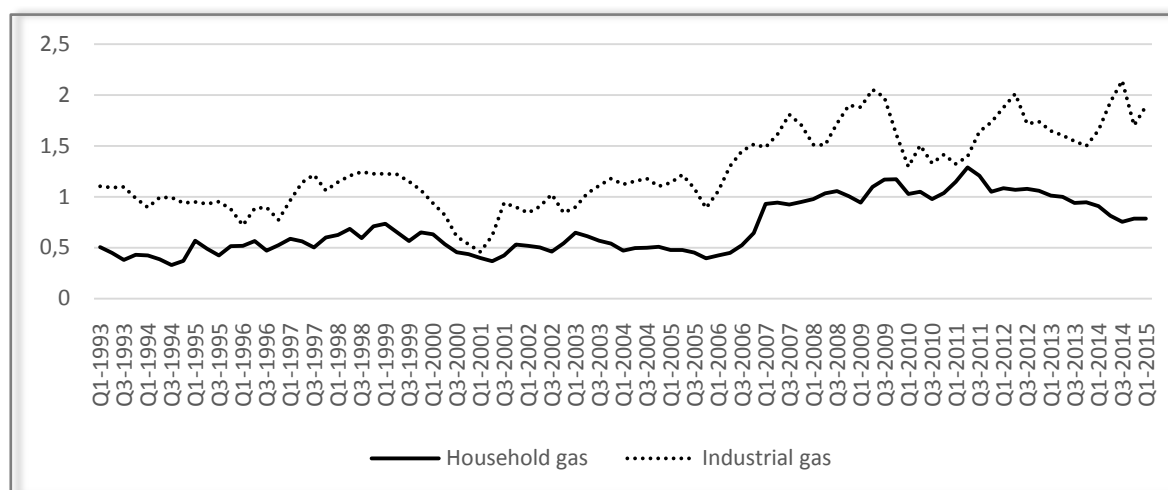


Figure 3 Hungarian industrial and household gas prices compared to the OECD average (OECD average=1)

Source: own calculations based on IEA data

Caution is advised when Figure 3 is interpreted. Natural gas still does not have a world market, and its price changes from continent to continent. There is a big difference in the spot market natural gas price within Europe as well: due to the lack of competition, prices tend to be higher in the central and eastern part of the continent (Barnes&Bosworth 2015). Hungarian prices, and especially Hungarian industrial prices, seem to be so high compared to the OECD average because prices in North America are much lower as a result of the shale gas revolution (Duangnate et al. 2015; Horváth, 2014). In the beginning of 2015 the price of natural gas in the United States was only 41% of the average of the European OECD members, meaning that gas prices in Europe are almost 2.5 times higher.

Figure 3, on the other hand, makes it clear that industrial gas prices have risen in Hungary compared to the OECD average. The decreasing trend of household prices and the increasing trend for industrial prices have brought Hungary back to the old system of having higher prices for industry. In the OECD industrial prices are around half of the household prices on average, but starting from 2014, industrial gas prices have exceeded household prices in Hungary, just as they did before 2008 (see Figure 4). This is a unique Hungarian phenomenon; in all other OECD members industrial prices are much lower than household prices (in Estonia and Turkey, where the two prices are closest to each other, industrial prices are 76% and 80%, respectively, of household prices).

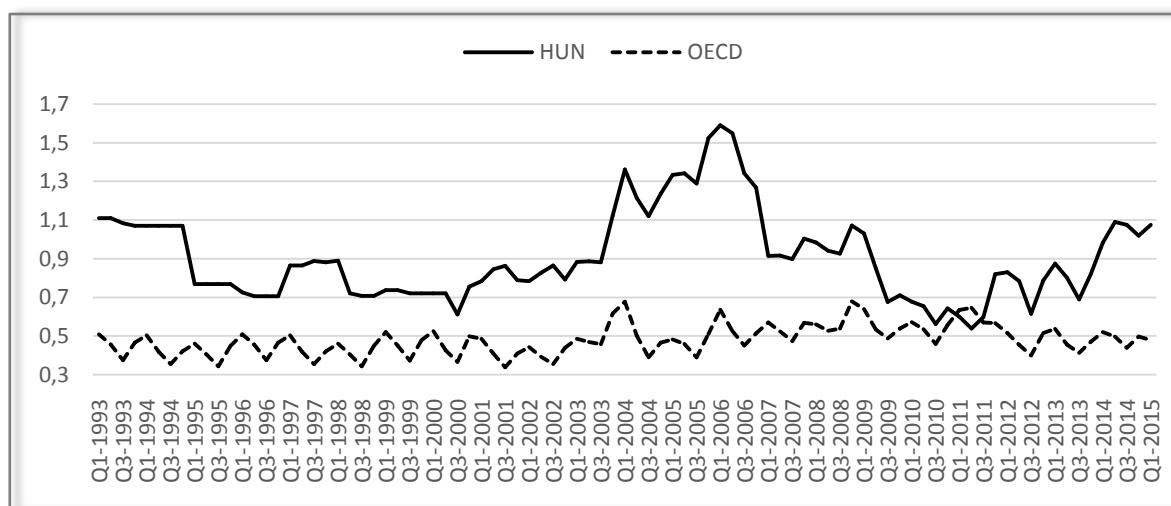


Figure 4 The price of industrial gas compared to the price of household gas in Hungary and in the OECD

Source: own calculations based on IEA data

But international comparison is only one of the possible approaches to the assessment of energy price costs. One of the government messages arguing for the utility cost reduction was that energy prices should be compared to the income of households. Since some data is available on household incomes for the OECD members, this comparison can also be done. OECD provides data on the average annual wages measured in the local currency. One can convert these values to US dollars using the average annual exchange rate, and the household gas price can then be expressed as the ratio of the average US dollar wage. If we multiply this ratio by 12, we get the cost of purchasing one unit household natural gas as a share of the average monthly wage in a country.

The result of these calculations is shown in Figure 5. Figure 5 only consists of countries for which the 2012 and 2014 quarter 4 household gas price and the 2012 and 2014 annual average wage data were available. Countries are ranked according to the share of one unit (1 megawatt

hour, MWh) of household natural gas cost within the monthly average wage in the final quarter of 2014 (dotted bar). The same calculations were made for the final quarter of 2012 (black bar).

Comparing the dotted and black bars, one can observe that no major changes took place in the 2012-14 period. We have data for 23 OECD countries, and among the 15 “cheapest” countries (where 1 MWh equivalent of natural gas had the lowest share within the average monthly wage) there were only two changes in places: the United Kingdom and Belgium swapped the 7th and 8th places, and Spain and Slovenia the 14th and 15th places. Hungary made the biggest improvement, but this was only enough to climb from the 19th to the 16th place. In most countries the burden of buying a unit of natural gas had decreased (Portugal was the only country where it increased, while it basically remained unchanged in the US, Canada and Spain). Hungary had clearly had the largest decrease: in two years the share of household gas in the monthly average wage had decreased by around 30%, while the OECD average drop was only 10%.

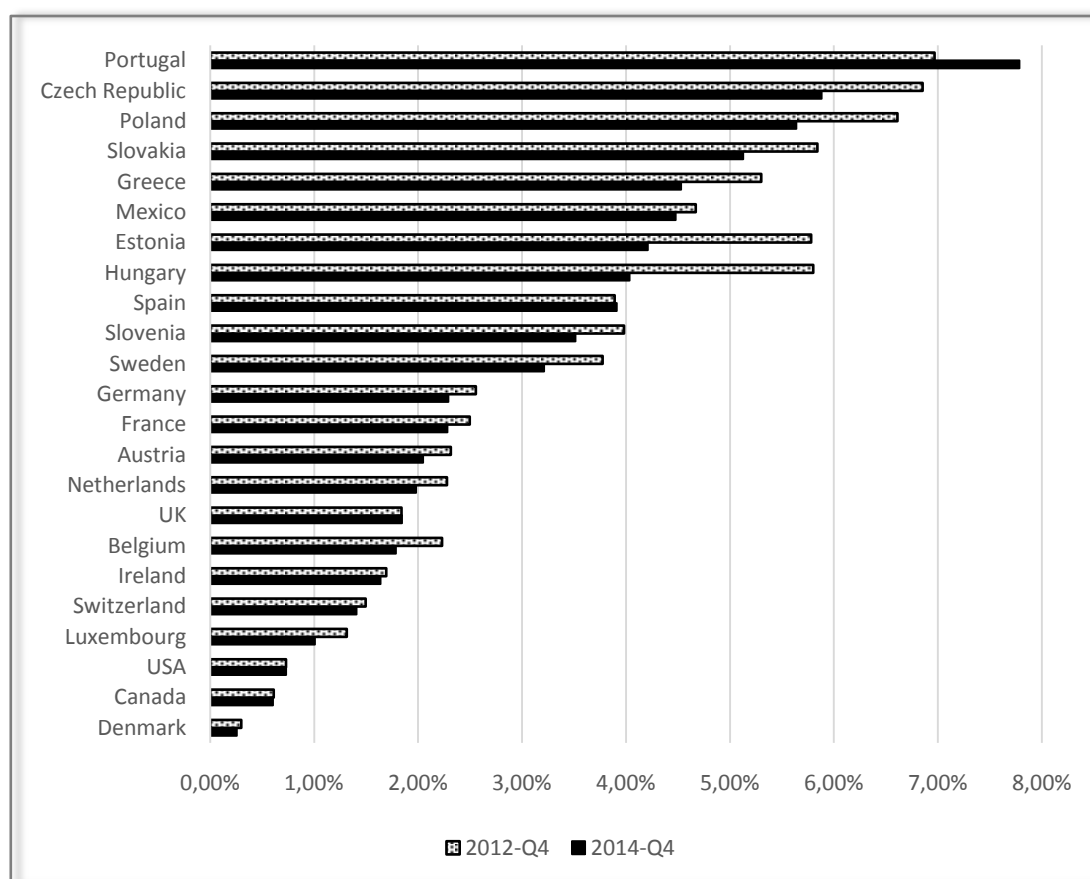


Figure 5 The price of 1 MWh equivalent natural gas as a ratio of the average monthly wage in the OECD

Source: own calculations based on IEA and OECD data

We can also calculate the amount of money saved by Hungarian households as a result of the household gas price drop. The database of the Hungarian Energy and Public Utility Regulatory Authority provides statistics on the monthly household natural gas consumption in gigajoules (GJ). The GJ values can be converted into MWhs, and the result of this calculation is shown by column 2 of Table 3. Using the IEA database we can also find by how much lower the 2014 prices were than in the final quarter 2012 value (column 3). Multiplying column 2 and 3 gives us the amount of US dollars saved by

Hungarian households in a given quarter of 2014. Using the quarterly average exchange rate of the Hungarian National Bank we can find the forint value of column 3 (column 4). The total amount of savings on household gas consumption coming from the drop in prices compared to the final quarter of 2012 is 83 billion Hungarian forints, which is around 0.26% of the 2014 Hungarian GDP, and 0.43% of the total household consumption in 2014.

Table 3
Household savings as a result of the drop in household natural gas prices in 2014 in Hungary

Quarter of 2014	Household gas consumption (MWh)	Price difference (2012-Q4 minus the price of the given quarter, USD/MWh)	Savings (HUF)
Q1	11 604173	10.8369	28 261 799 409
Q2	3172633	10.32799	7 309 976 496
Q3	1580955	8.848871	3 295 126 558
Q4	9823839	18.2574	44 260 105 385
2014 in total			83 127 007 848

Source: own calculations based on IEA, HEPURA and MNB data

Analysis of electricity prices

The price of household electricity in Hungary has developed similarly to the trends seen in gas prices (see Figure 6). At the end of 2012 it was slightly above the OECD average (1.2-times higher than the OECD average, but only 87% of the average of the European

OECD members). In the following years it began dropping, and by the end of 2014 it had fallen to 84% of the OECD average (59% of the European OECD average). Industrial electricity prices also decreased, but at a much slower pace.

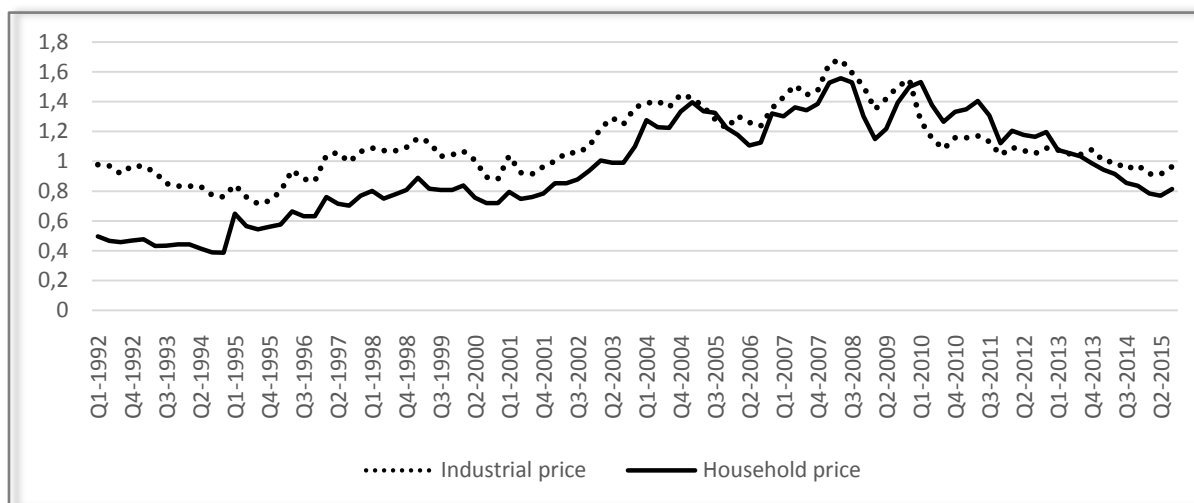


Figure 6 Hungarian household and industrial electricity prices compared to the OECD average (OECD average=1)

Source: own calculations based on IEA data

The relation between household and industrial prices goes against the OECD trends, just as it does in the case of natural gas prices. Between 2008 and 2012 the ratio of the industrial/household electricity price was below the OECD average in Hungary, but starting from 2013 the Hungarian ratio has risen above the OECD

average. In the end of 2014 there were only two countries where the industrial/household electricity price ratio was higher than in Hungary (0.81 in Hungary, 1.07 in Italy and 1.32 in Mexico). The average of this ratio was 0.7 in the OECD and 0.61 among the European OECD members.

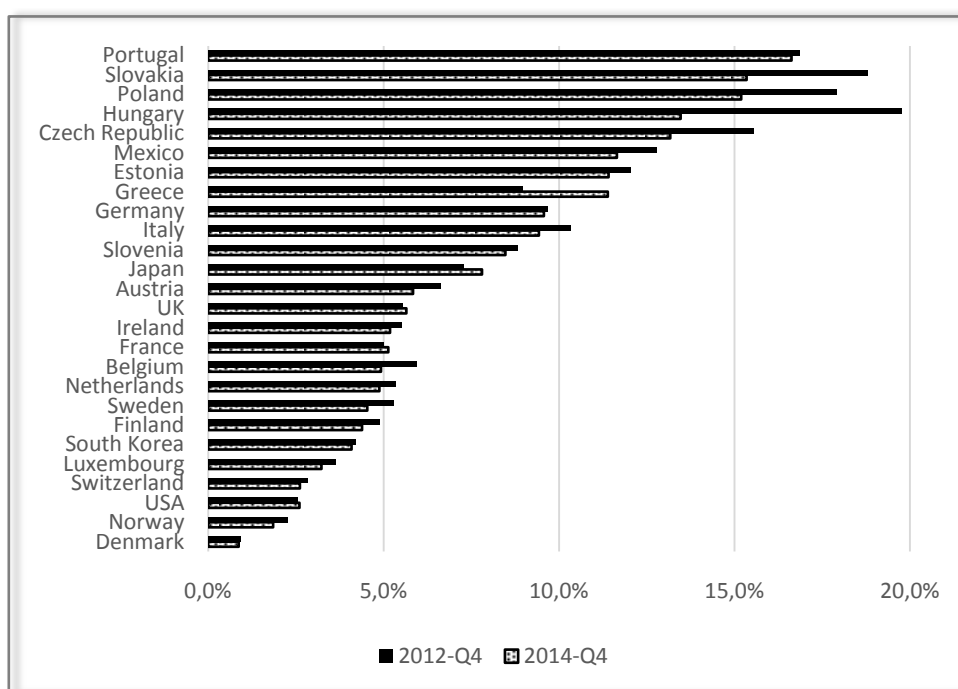


Figure 7 The price of 1 MWh household electricity as a percentage of the average monthly wage in the OECD countries

Source: own calculations based on IEA and OECD data

Figure 7 shows how the household price of 1 MWh electricity compares to the average wages. Data was available for 26 OECD members. The rank of countries is determined by the final quarter 2014 electricity price/average monthly wage ratio (dotted bar). As in the case of natural gas, household electricity prices compared to the average wage dropped in most OECD countries (there was a considerable increase in Greece and Japan, while the ratio had stagnated in some countries). At the end of 2012 Hungary was 26th from 26 countries (1 MWh household electricity cost around 20% of the monthly average wage); by the end of 2014 Hungary overtook 3 countries for the 23rd place (1 MWh household electricity cost 13.5% of the average monthly wage). Compared to

the monthly wage, household electricity prices are still very high in Hungary, although Hungary showed the biggest improvement (a drop of 32% compared to the OECD average decrease of 9%).

Applying the method described for the data in Table 3 to household electricity, we can estimate the household savings resulting from the electricity price reduction. Table 4 summarises the results of the calculations. In 2014 a total 119 billion HUF was saved because of lower prices, compared to the last quarter of 2012. This sum was 0.37% of the 2014 GDP, and 0.62% of the total household consumption.

Table 4
Household savings as a result of the drop in electricity prices in 2014 in Hungary

Quarter of 2014	Household electricity consumption (MWh)	Price difference (2012-Q4 minus the price of the given quarter, USD/MWh)	Savings (HUF)
Q1	2 588 599	41.60652	24 205 083 767
Q2	2 421 725	41.31356	22 320 173 671
Q3	2 469 425	51.90004	30 187 575 128
Q4	2 632 099	65.34867	42 445 470 722
2014 in total			119 158 303 289

Source: own calculations based on IEA, HEPURA and MNB data

CONCLUSIONS

In late 2012 the Hungarian government announced a new price control system for public utilities (the utility price reduction programme), and starting from 2013 the price of household gas and electricity was reduced in several steps. The study assesses the effect of these reductions in an OECD comparison. The period of analysis is quite large, however the last quarter of 2012 is often used as a benchmark, since that is the time when the price control intervention was announced. The analysis ends in the final quarter of 2014 or in the first quarter of 2015, because no further reductions were announced by the government after 2014. The following conclusions can be drawn after the analysis:

- The price of household gas and electricity fell considerably after the price reductions (by 36 and 38% respectively from the last quarter of 2012 to the first quarter of 2015). There was a drop in household prices across the OECD as well, although the rate of decrease was much slower (13.5 and 12%). Based on the oil price trends, on the sensitivity of gas and electricity prices to oil price changes, and on gas and electricity price trends in other OECD countries, we can conclude that household gas and electricity prices would have decreased in Hungary even without the

government interventions, but the rate of the decrease would have been less (only around 15%), and it would have happened later (starting from the second part of 2014 instead of the beginning of 2013).

- The drop in energy prices brought a total of 202 billion HUF savings to Hungarian households in 2014, which is 0.63% of the 2014 GDP, and 1.05% of the total household consumption.
- Within the OECD the price of household gas and electricity expressed as a percentage of the monthly average wage decreased the most in Hungary between the final quarters of 2012 and 2014, but it is still very high in OECD comparison. In the case of both gas and electricity prices Hungary's rank had improved by three places between 2012 and 2014, but that was only enough to go from the 19th to the 16th cheapest country for household gas (from the 23 OECD members for which data was available), and from the 26th to the 23rd cheapest country for household electricity (from 26 OECD members, so in 2012 Hungary in fact had the highest household/monthly average wage ratio).
- The significant reduction in household energy prices had a major distortion effect on industrial prices. While on average the industrial gas price is only around 50% of the household price in the OECD, in 2014 Hungary became the only country

where industrial gas prices rose above household prices. The same anomaly can be detected for electricity prices: Hungary has the third highest industrial electricity price compared to household price within the OECD. The industrial energy price developments make it extremely difficult to realise the government's stated plan to have the lowest industrial energy prices in Europe.

Some of the analyses conducted in the study were made with rather simplified assumptions. When the household savings are estimated, I disregard the fact that

if energy prices had been higher, households would have probably consumed less; because of seasonal differences in prices, comparing the last quarter of 2012 to each quarter of 2014 can be slightly misleading; and since IEA provided energy prices in US dollars, changes in the HUF/USD exchange rate might have also distorted the results somewhat. Some of the costs of the utility cost reductions were not discussed in the study. A 2014 report of the European Commission, for example, suggests that investment levels in the electricity and gas sectors have decreased (EC 2014, p. 112).

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DATA SOURCES

- EIA: US Energy Information Agency database: <http://www.eia.gov>
- EPURA: Energy consumption statistics provided by the Hungarian Energy and Public Utility Regulatory Authority: <http://www.mekh.hu>
- HCSO: STADAT database of the Hungarian Central Statistics Office: <https://www.ksh.hu/stadat>
- IEA: Energy prices and taxes database compiled by the International Energy Agency: <http://dx.doi.org/10.1787/eneprice-data-en>
- MNB: Hungarian National Bank's exchange rate database: <http://www.mnb.hu>
- OECD: OECD database: <http://dx.doi.org/10.1787/data-00285-en>
- WB: World Bank's Commodity Markets database: <http://go.worldbank.org/4ROCCIEQ50>

The Concept of Corporate Social Responsibility in Strategies of SMEs

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SUMMARY

In the modern-day economy, the success of an enterprise is increasingly decided by ethical issues. Enterprises are undertaking action in the sphere of building socially responsible firms whose bases are those of values and ethical norms. Corporate Social Responsibility (CSR) signifies long-term action that is directed towards the internal and external environment. With regard to the importance of the problematic issues of ethics in the business activities of enterprises, the main aim of this paper has been set out theoretical and empirical ways of utilising the concepts of corporate social responsibility in the development of small and medium-sized enterprises.

Key words: corporate social responsibility; small and medium-sized enterprises; strategy; business ethics.

Journal of Economic Literature (JEL) codes: L1

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INTRODUCTION

In the contemporary market, the success of an enterprise is increasingly decided by an image built on ethical values. One of the important ethical values is that of responsibility, which as an ethical notion signifies the relations between the deed of the entity and moral awareness; however, in economic life this takes on the form of the moral consequences of deeds in economic activities. Enterprises are increasingly running undertakings in the sphere of building socially responsible firms. Simultaneously, the intricacy of socially responsible firms and its significance for the market position indicates that the activities of CSR should be involved in the strategy of activities of enterprises in a deliberate and coordinated manner, particularly in the case of small and medium-sized enterprises.

With regard to the significance of the problematic issues of ethics in terms of the activities of enterprises, the main aim of this paper is the search for answers to the following research questions: Are the assumptions of CSR an element in the strategies of small and medium-sized enterprises? What barriers to the implementation of CSR prevail in small and medium-sized enterprises?

THEORETICAL ASSUMPTIONS OF THE CONCEPT OF CORPORATE SOCIAL RESPONSIBILITY

In defining the corporate social responsibility in subject-related literature the macro and micro-social approaches are in evidence. In the macro-social approach, the authors place emphasis on the personal engagement of the owner/entrepreneur with regard to the surroundings, while in the macrosocial approach CSR is treated as an element of the strategy of sustainable development. The first group includes the notion of the Ethos Institute, according to which corporate social responsibility is a form of management that is defined by the ethical relationship and transparency of the company with all the stakeholders with whom it has a relationship, as well as with the establishment of corporate goals that are compatible with the sustainable development of society, preserving environmental and cultural resources for future generations, respecting diversity and promoting the reduction of social problems (de Sousa, J.M Filho et al. 2010, p. 296). In the micro-social approach, emphasis is placed on the socially broader consequences of the business activities of enterprises. As correctly observed by Walkowiak (2009, p.10), an enterprise is morally

responsible and obliged to be appraised by the law and society in terms of its business activities. Hence, the implementation of CSR places greater emphasis on social and ethical effects, as well as ecological activity, in terms of the decisions of managers, as they have an impact on the evaluation of the activities of firms, as well as on the demand for their products.

The second group of definitions for CSR is characterised by the macro-social approach, in which it is perceived as an element of the concept of sustainable growth for the economy. Such an approach is exemplified by the definition of CSR formulated by the World Business Council, according to whom social responsibility is the obligation of business to lead to the sustainable growth of the economy by means of work with the employed and their families, the local community and society as a whole with the aim of increasing the level of quality of their lives (Kietliński et al. 2005, p.132). In this notion, emphasis is placed on the obligation of entrepreneurs/owners to undertake action on behalf of the prosperity of society. Social prosperity as an aim for the activities of enterprises is also referred to by Kotler and Lee (2005), who defined CSR as the obligation to improve social prosperity, which includes living standards and environmental issues. Hence, social responsibility is connected with the notion in which the enterprise is an element of the social structure and should be treated as a part of the greater social entirety within the framework it functions in (Freeman & Liedtke 1991, p.91-95). Thus it is necessary to pursue the maximisation of the positive impact and minimisation of the negative impact on society. The good of society should be taken into account when undertaking business ventures.

The combination of the macro- and micro-social approaches in the perception of CSR may be found in the definition formulated in ISO 26000 of the Working Group on Social Responsibility, Sydney, February 2007, according to which "Social responsibility is the responsibility of an organisation for the impact of its decisions and activities on society and the environment through transparent and ethical behaviour that is consistent with sustainable development and the welfare of society; takes into account the expectations of stakeholders; is in compliance with applicable law and consistent with international norms of behaviour; and is integrated throughout the organisation." (Hohnen & Potts 2007, p. 4)

In literature devoted to CSR, it is possible to encounter various approaches to defining its scope. One of them is a division into two levels, namely internal and external levels (Ubrežiová et al. 2012). Socially responsible activities directed towards the inside of the organisation first and foremost relate to the management of human capital, health and work safety, adherence to human rights, adaptation to change and management in the sphere of the impact on the environment and utilisation of natural resources. Nevertheless, external responsibility is focussed on the stakeholders operating

within the environs of the enterprise and the natural environment (Commission of The European Communities 2001).

Another approach is the distinction of the entity that the enterprise is responsible for. It is possible to distinguish the social responsibility of enterprises with relation to consumers, employees, society and the natural environment.

The latest attempt to define the scope of the responsibility of enterprises is ISO standard 26000, in which seven areas of CSR are specified and described in terms of the following: corporate structure (organisational), human rights, practices in the workplace (relations with employees), the environment, market practices, consumer issues (relations with consumers), social involvement and development (ECOLOGIA 2011). Hence, corporate social responsibility is seen as a way of sustainable development whereby organisations undertake to deal with social and environmental problems as integral parts of the business operations (Man & Măcriș 2015). By way of conclusion, the voluntary connection of social issues and environmental issues occurs in terms of the concept of CSR in business activities and in relations with stakeholders.

CORPORATE SOCIAL RESPONSIBILITY AS A STRATEGY FOR ENTERPRISES

CSR is not merely an addition to the activities of enterprises on the market, but is also becoming a strategic element. McWilliams et al. (2005) claim that the theory of CSR has several strategic implications. Firstly, it may be an integral business and corporate element in the strategies of the firm in spite of the fact that it is not directly associated with the process of production or provision of services. Secondly, it may be perceived as a form of building the reputation of enterprises on the market. Thirdly, it may constitute the basis for the generation of predictions relating to the effectiveness of investments in CSR.

The concept of CSR is more and more frequently becoming an element of strategy in enterprises. For instance, the model of strategy by Harvard Business School acknowledges social responsibility as the principal element in the creation of the corporate strategy (Husted & Allen 2000). Likewise, Molteni (2006) is of the opinion that social responsibility should be part of the strategy of a firm, as it may help in finding innovative production solutions based on the expectations of the interested parties, meaning that it may become a significant factor in the increased competitiveness of the enterprise. In order for CSR to become part of the strategies of enterprises, it should include four basic elements: (a) structure of industry,

(b) internal resources of the firm, (c) corporation ideologies and values, and (d) the relationship with stakeholders (de Sousa et al. 2010).

The benefits that a firm achieves from being socially responsible have an impact on the decision to build a strategy of social responsibility. Husted and Salazar (2006) analysed the strategies of CSR in firms in the direction of maximisation of both profits and social efficiency. The authors in question defined three types of motivation that influence the decision to become involved in social activities as follows: altruism, “coerced egoism,” and the strategic use of CSR. In the case of altruism, firms sincerely want to be socially responsible regardless of whether they gain benefits from such activities or not. In turn, “coerced egoism” has an impact on the socially responsible activities only when firms are forced to implement the assumptions of CSR by directives and other legislative acts or external factors. Nevertheless, the strategic use of CSR as a strategic investment takes place in the case of attaining both profits and benefits to society and the local community. Likewise, Siegel and Vitaliano (2007) claim that firms become involved in CSR due to the strategic maximisation of profit. Thanks to CSR, this is easily integrated into a firm’s differentiation strategy.

The findings from the research carried out by Husted and Salazar (2006) indicate that a firm may gain a competitive advantage by means of socially responsible activities, but it must act in a strategic sense, namely it must integrate the strategy of CSR with the corporate strategy. Socially responsible activities may become added value to products in the eyes of consumers and thus improve the market position.

SOCIAL RESPONSIBILITY OF SMALL AND MEDIUM SIZED ENTERPRISES

Characteristics of the analysed population of small and medium-sized enterprises

A survey technique was applied to research on the opinions of entrepreneurs and managers on the scope of applying the principles of social responsibility in economic activity. The analysis was carried out in March and April 2015 and was participated in by 40 micro-sized enterprises (0–9 employees), 31 small enterprises (10–49 employees) and 37 medium-sized enterprises (50–249 employees) involved in business activities in the province of Silesia in Poland. Over 46% of those surveyed conducted business in mixed sectors, 32% conducted

retail and wholesale trade and 22% ran manufacturing activities.

Position of concept of CSR in the strategies of enterprises from sector of SMEs

Strategic management in the case of the sector of SMEs, particularly in the sphere of CSR, is a great challenge. Research on small and medium-sized enterprises in Poland reveals that the percentage of those that have documentation stipulating the key categories of strategy such as vision, mission and values of an enterprise is relatively low (Millward Brown SMG/KRC & PwC 2011). This is confirmed in the research run by the author on the sphere of the application of CSR in small and medium-sized enterprises. Such an view in the scope of strategy is illustrated in the current research of the author in the field of the application of CSR in small and medium-sized enterprises. Research indicates that 18% of micro enterprises had their vision registered in documentation, whereas this was true of 17% in the case of small enterprises and 24% of medium-sized enterprises. In turn, the mission was written in documentation in 24% of micro-sized enterprises, 19% of small enterprises and 21% of medium-sized enterprises. Likewise, the values of the firm were written in documentation only in the case of every fifth enterprise under analysis.

In the context of analysis of the areas where CSR occurs in enterprises, it is worth analysing the types of aspects of CSR that appear in the strategic documents of firms. The current research of the author reveals that in documents containing the vision, mission and values, the issues of CSR are touched on in a significant proportion of the analysed enterprises. Table 1 shows the aspects appearing in documents that include the mission, vision and values of enterprises. The layout results from the fact that the greatest emphasis was placed by the analysed enterprises on the organisation of work in the firm and on relations with consumers. Although there were references to the categories of human rights, the natural environment and social involvement in the enterprises under analysis, their frequency was relatively low.

By way of conclusion, it is possible to state that a majority of enterprises from SME sector do not possess documentation relating to the vision, mission and values. However, in the case of enterprises declaring the existence of such documentation, their content stipulates the principles of CSR implemented in a certain way, mainly in terms of the areas of relations with consumers, relations with employees, organisation of work and honest market practices in terms of relations with trading partners and business partners.

Table 1

Aspects of CSR contained in documents stipulating the mission, vision and values of enterprises from the sector of SMEs.

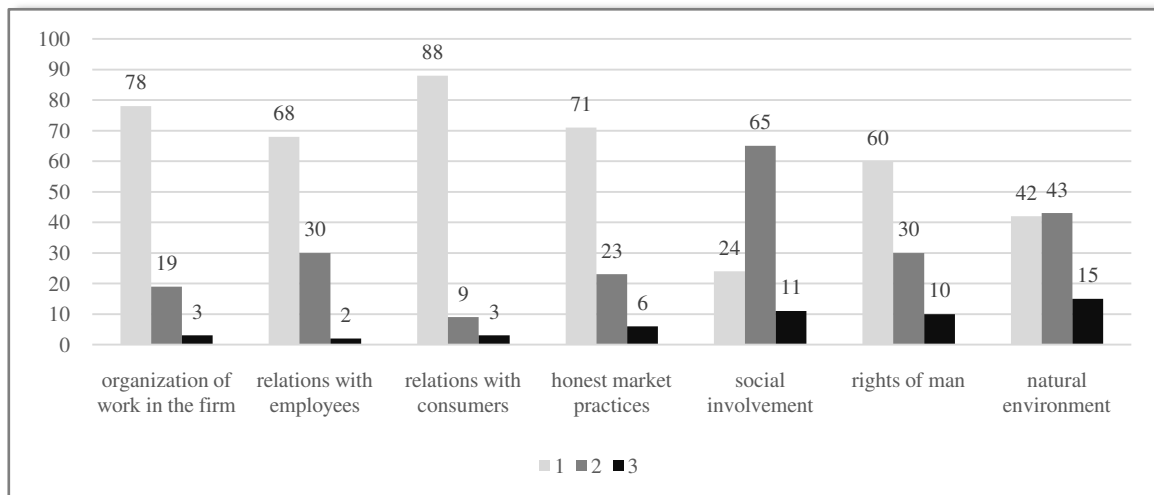
Aspects	Magnitude of Enterprises		
	Micro-sized enterprises n=40	Small enterprises n=31	Medium-sized enterprises n=37
Organisation of work in the firm (organisational structure)	28	24	26
Relations with employees	24	18	19
Relations with consumers	25	21	24
Honest market practices in relations with trading partners, business partners	20	17	19
Social involvement – action on behalf of local communities	11	10	9
Human rights	20	14	19
Natural environment	18	11	11

Source: own data

Areas of social responsibility in the business activities of small and medium-sized enterprises

On the basis of the results of research, it is possible to indicate the areas of socially responsible activities whose development is very important from the viewpoint of the social aspect, and that may bring both tangible and image benefits for micro-scale, small and medium-scale enterprises. Quazi and O'Brien (2000), in their typology

of CSR, attributed a particular role to the modern approach to social responsibility, in which a significant position is held by the relations with external stakeholders. Current research on the scope of applying the concept of CSR in SMEs reveals that the market relations with consumer and trading partners, as well as business partners, are of the greatest significance for their business activities (Fig.1). This approach is to a large extent convergent with the concept of stakeholders as the broadened perspective of viewing an organisation.



1 - key for development of business,

2 - important, but not decisive in terms of development of business, insignificant in terms of development of business,

3 - insignificant in terms of development of business.

Figure 1 Significance of particular areas of CSR in analysed enterprises, in percentage

Source: own data

In the context of the strategy of corporate social responsibility in SMEs, it is worth analysing the relations with external stakeholders. One of the significant stakeholders is clients or customers, who ensure the firm of survival on the market. Responsible behaviour with regard to clients is a very important business area of CSR that is directly reflected in the condition of the firm and its development. Monitoring the level of satisfaction of clients and the transparency of the company policies by providing access to and publishing information about the enterprise, its products and services are the most important activities that certify to the adherence to the principles of CSR in terms of relations with consumers. One of the indicators of relations with consumer is the access to information on the issue of a product or service. Complete information about a product, together with data relating to its utilisation, threats connected with its utilisation, whether the effects facilitate the restriction of costs associated with complaints or costs associated with the materialisation of risk accruing from the incorrect use of the given product. The current research on SMEs reveals that the majority of firms ensure access to information on the issue of their products or services in an exhaustive and ethical manner (92.6%).

Another indicator is the level of satisfaction of clients in terms of the purchased products or services. A satisfied client will not only purchase a product or service in the future, but will also recommend this to acquaintances, while simultaneously building the positive image of the firm. A client that is satisfied with a

purchase bestows trust in the firm and perceives it to be reliable and trustworthy. The majority of SMEs monitor the level of satisfaction of the clients on a regular basis. An appropriate system of monitoring has been implemented by 76.9% of enterprises. The most commonly applied methods of monitoring the level of satisfaction are direct contact with clients (42.2%), the analysis of the level of complaints (38.6%) and surveys (25.3%).

Another group of external stakeholders consists of business partners, which includes suppliers, cooperating firms as well as business partners. One of the important indicators of CSR is the adherence to timely financial obligations. Research on SMEs indicates that the vast majority of them conform with fixed deadlines for payment of obligations: 41.7% of firms always do so, while 51.3% usually do so. A mere 1% of the analysed enterprises seldom do so.

A further group of external stakeholders is that of the local communities in which an enterprise operates its business activities. The indicators of the level of relations with a community are, among others, notification of any damage caused by the enterprise, consultation relating to the ways of restricting pollution, consultation relating to investment decisions that may have a potential impact on the social environment and involvement in activities geared towards the local community. Responses from the analysed companies for these indicators are displayed in Fig. 2.

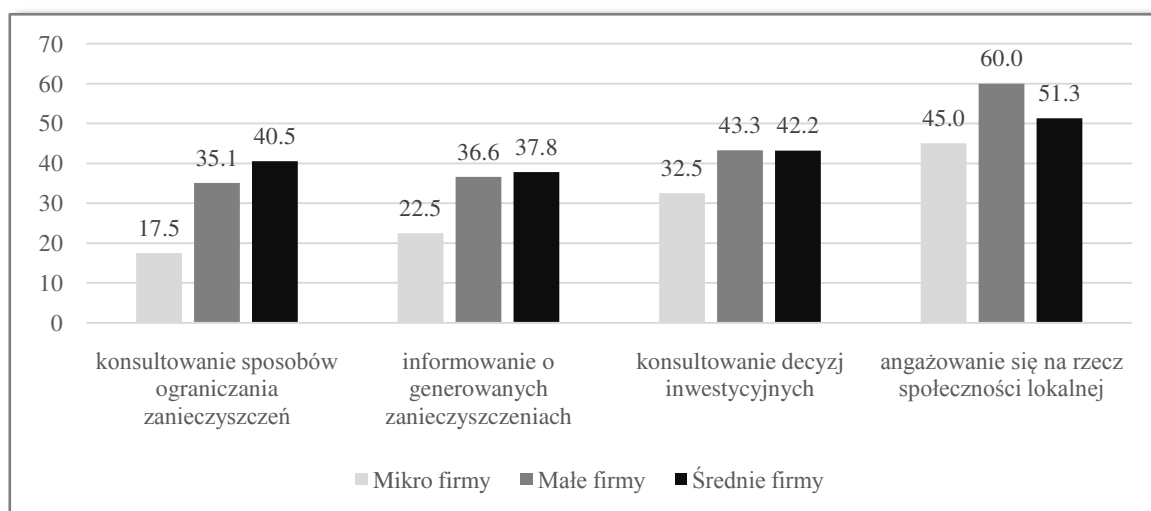


Figure 2 CSR indicators of relations of SMEs with the local communities, in percentage

Source: own data

Analysis of the results of the relations of SMEs with the local community in the field of CSR indicates that significant differences exist between enterprises with regard to their size. Micro-scale enterprises are least likely to take into account the interests of the local community as an external stakeholder. However, relatively good relations with the social environment are maintained by small and medium-sized enterprises,

particularly in the sphere of involvement in activities geared towards the local community. If the analysed firms undertake such activities, they most often take on the form of sponsoring sporting and cultural events (28.7%), financial support for social organisations (24.1%), lending equipment, premises and means of transport (10.2%), while also running educational activities (e.g. organizing theme workshops).

Research carried out on the range of application of the concepts of CSR in SMEs reveals that in certain areas such as human rights, the natural environment, or social involvement, there is relatively little involvement in terms of the realisation of its assumptions (Nikodemski-Wołowik 2011). Hence, it is worth considering the perspectives of broader implementation in terms of the activities of enterprises. A positive indicator that signifies the increase in the level of interest in this concept is the answers of the analysed enterprises to the question of whether increased involvement in CSR is planned in the next 12 months.

Research on SMEs indicates that firms are planning to increase their level of involvement in certain areas of responsibility in business. They are first and foremost planning to operate in a socially responsible manner in terms of relations with clients (74%), relations with employees (63%), organisation of work in the firm (54%) and applying honest practices with business partners (45%). Interestingly, they are relatively less often planning to become involved in social terms in activities on behalf of the local communities (28%). Thus, managers are noting the significance of good relations with stakeholders that have the greatest impact on the success of enterprises, consumers and employees.

BARRIERS TO IMPLEMENTATION OF CSR IN SMEs

The theory of CSR assumes a range of benefits for the enterprise. One of the main benefits is its favourable impact on the competitiveness of an enterprise. Of

course, social values play different roles at different stages of a company's lifecycle (Illés et al., 2012) and may have different impacts on the profitability of the enterprises (Hurta & Dunay, 2013; Illés et al. 2015). Other benefits are: improvement of the image, better position on the labour market, greater satisfaction and loyalty of clients, better network ties, and reinforcement of the staff potential (Bieńkiewicz 2008). These benefits are, generally speaking not visible straight away and small and medium-sized firms that are unaware of this state of affairs perceive CSR as solely a cost to the firm and not an investment. As a consequence, this category of entrepreneurs still shows great resistance to investing in CSR activities. Analysis of the results shown in Table 2 suggests that differences exist in terms of the perception of the barriers to activities in the areas of CSR depending on the size of the enterprises. In the case of micro-scale enterprises, the greatest barriers are the lack of knowledge and skills necessary to increase financial outlays. In the case of small-scale enterprises, the most significant barriers are the lack of relation to the everyday business activities and complexity of CSR, while in the case of medium-sized enterprises, the most significant barriers are the complexity of CSR and the lack of time. Overcoming these barriers is to a great extent dependent on shaping the awareness on the part of owners and managers of SMEs of the need to undertake ethical behaviour with regard to both internal and external stakeholders. Propagating good practices in this sphere should be one of the more important tasks of organisations that act as associations for small and medium-sized enterprises, e.g. chambers of commerce, business clubs, etc.

Table 2
Barriers that hinder the activities of CSR in SMEs, in percentage

Specification	Percentage of enterprises		
	Micro-sized enterprises n=40	Small enterprises n=31	Medium-sized enterprises n=37
Lack of knowledge and skills	45	27	22
Necessity of increasing financial outlays	42	23	24
Complexity of CSR	35	43	46
Lack of involvement of authorities	20	10	5
Lack of time	62	27	35
Lack of relation to everyday business activities	25	47	32

Source: own data

CONCLUSION

The results of the research have facilitated the definition of the scope of applications of solutions characteristic for CSR in the strategies of SMEs, as well

as in their business activities. In spite of the benefits that come with the application of the principles of CSR in economic practice, a multitude of small and medium-sized enterprises have not implemented these principles in their business activities. This is the consequence of the existence of many barriers such as : lack of time, lack of

knowledge and skills, necessity of increasing financial outlays and complexity of CSR.

In order for the concept of CSR to be applied on a wider scale, changes must take place in the awareness of managers and owners of small and medium-sized enterprises; they must begin to perceive the need to create CSR strategies. The starting point for the perception of the essence of the concept of CSR is that of its principles, values and benefits. Entrepreneurs and managers should identify those who are their stakeholders and define their expectations, while simultaneously cooperating with them. However, in order to implement socially responsible concepts and gain benefits from this, their association with the general strategy of the firm is key. As illustrated in the literature, the integration of corporate social responsibility with the general strategy of the

enterprises brings a multitude of benefits, first and foremost its level of market competitiveness (Husted & Salazar 2006, Siegel & Vitaliano 2007). This study indicates that relatively few enterprises have provisions in their general strategies relating to the areas of corporate social responsibility. Despite the lack of formal provisions in their general strategies, small and medium-sized enterprises apply solutions that are characteristic of this method of management. This particularly refers to relations with consumers and the associated honest market practices.

It seems likely that the placement of corporate social responsibility in the strategies of SMEs would facilitate the gradual implementation of its solutions in economic practices, which in turn would improve the competitive level of such firms on the market.

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Customer Participation: Mandatory or Voluntary Behaviour?

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SUMMARY

Service providers need to develop a competitive advantage in the market. One strategy is value co-creation, which means a mutual creation of value and experience. Two types of the customer value co-creation behavior have been identified; consumer participation behaviour and consumer citizenship behaviour. In our research we conducted a survey with two generation groups. We applied factor analyses and determined the factors of customer participation and citizenship behaviour. The findings can be used to identify the level of consumer value co-creation and to segment the service market.

Keywords: value co-creation; consumer participation behaviour; consumer citizenship behaviour; Generations Y and X

Journal of Economics Literature (JEL) codes: M31

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INTRODUCTION

Providing value to the consumers is relevant to business organizations, society, and consumers. Hungarian societal values in the business sector are discussed in the study of Tompos (2014). Previous studies have shown that keeping a consumer can be up to ten times cheaper than attracting a new one (Heskett et al. 1990), so companies have to make efforts to retain customers, attempting to minimise their migration.

The services sector faces challenges in the 21st century. Lifestyle and the structure of consumption has changed, especially among younger generations. Service providers need to obtain the competitive edge generated from memorable experiences in order to retain their customers. One strategy is co-creation, which means a mutual creation of value and experience, especially in the case of leisure-time services (Ercsey 2014). According to service dominant logic (SDL) the co-creation value is developed by the mutual activity of the consumer and the service provider through establishment of different sources. The concept of SDL places intangible resources, co-creation and relationships into the focus of marketing. The consumer activity during the process of co-creation value and the support of the activity during the co-creation process enable service providers to fit their services to the consumers' needs.

Hungarian marketing literature is lack of research regarding co-creation consumer behaviour about different services. The purpose of this study is twofold, first to

identify the dimensions of co-creation value from aspects of customer behaviour related to various service industries. Second, the study aims to investigate whether demographical features influence the level of customer participation in co-creation value. We formulated three research questions to investigate factors of customer participatory behaviour and customer citizenship behaviour in different service contexts. The findings can be used to identify the level of consumer co-creation and to support co-creation behaviour.

LITERATURE REVIEW

Meaning of customer value co-creation

Researchers' interest in service-dominant logic has increased in the last decade (Vargo & Lusch 2004). The concept of service-dominant logic (SDL) is that the customers are always active participants and collaborative partners in exchanges; customers co-create value with the firm. According to service dominant logic the customers are always active participants and collaborative partners in exchanges, customers co-create value with the firm (Vargo & Lusch 2008). Co-creation has been defined in terms of co-creation of value (Prahalad & Ramaswamy 2004; Vargo & Lusch 2004). They state that co-created experience becomes an important basis of value.

Previous research on co-creation focused on generic and industry-specific (retail, tourism, health, and

manufacturing) empirical studies (Oh & Teo 2010; Prebensen & Foss 2011; Gill et al. 2011; Zhang & Chen 2008). The authors discuss the frameworks of co-creation from the aspects of the encounters, the suppliers and the customers. In generic frameworks customer contributions and behaviour are distinguished (Hutter et al. 2011). Other studies describe the attributes of co-creation from the perspective of the customer (Tynan et al. 2010), the experience (Gentile et al. 2007; Prahalad & Ramaswamy 2004), the capability (Fujioka 2009), the service (Vargo et al. 2008), the value (Ueda et al. 2008), the roles (Andreu et al. 2010; Grönroos 2008), and the activities (Gebauer et al. 2010). Durugbo & Pawar (2014) developed a unified model for co-creation that integrates the functions of the supplier and consumer involvement based on existing value-in-exchange and value-in-use and for selecting co-creation techniques.

Organisations in leisure-time industries can be regarded as experience-centric places that offer emotional and cognitive stimuli and facilitate service experience consumption (Chan 2009). The dimensions of the experience are produced in part by the customers themselves through the personal thoughts, feelings, and imaginations that the visitors bring with them to the leisure setting. If we encourage people to co-create their service experience each individual consumers makes it through their own experiences. However, co-creation of an experience can take place without co-production, if the customer does not want to actively participate and produce any part of the service. In the context of the cultural sector, an example might be a visitor to an interactive museum who visits the exhibits to view the items on display, without actively taking part in any of the interactive activities. Therefore, in facilitating co-creation, it is important for an organisation to provide opportunities for voluntary co-production. Consequently, if visitors choose to co-produce they are tailoring an aspect of the service to their requirements (Hilton 2008). The customers are actively co-creating their experience in conjunction with the service provider.

Measuring the determinants of customer value co-creation behaviour

The value is determined in use through activities and interactions of customers with the service provider and other customers. Co-creative customers are those customers who are capable of applying their competencies, providing the service for the benefit of other customers and themselves. These customers not only co-produce but also co-consume or collaborate with firms and other customers.

In the marketing literature few papers have investigated the dimensions of customer value co-creation behaviour. Previous authors use a multidimensional approach to explore the components of customer value co-creation behaviour (Bettencourt 1997; Groth 2005; Bove et al. 2008). Other researchers have

tended to apply a one-dimensional approach and use single- or multiple-item measures (Cermak et al. 1994; Dellande et al. 2004; Fang et al. 2008). Yi & Gong (2013) identified the dimensions of customers' behaviour in co-creating value, and developed a scale to measure it. Companies can use this scale to detect the weaknesses and strengths of the customer value co-creation behaviour.

Some studies have explored the nature and the dimensions of customer value co-creation behaviour. In a conceptual paper, the authors divide value co-creation into six dimensions or types of actions are performed by users and providers. The researchers also identified the antecedents (communicative-interactive profile, relational-social profile and knowledge-cognitive profile) of the concept (Neghina et al. 2014). However, their model does not conform to the assumptions of Vargo & Lusch (2008), because it does not completely follow the SDL concept but complies rather with Grönroos & Voima (2013). Furthermore, this theoretical paper included no empirical validation. Regarding empirical research, Randall et al. (2011), McColl-Kennedy et al. (2012), Yi & Gong (2013) and Chen & Raab (2014) are particularly relevant. The first study (Randall et al. 2011) proposes the construction of a measurement scale composed of three dimensions: connection, trust and commitment. They used a mixed method combining qualitative (in-depth interviews) and quantitative (survey) analysis techniques, for examination of customer relationship management. In the second work, McColl-Kennedy et al. (2012) divided the construct into eight activities, pinpointing the different types of value co-creation practices in terms of activities and interactions actually accomplished by users, not only in the moment of interaction with employees. The researchers identified eight value co-creation activities: cooperating, collating information, combining complementary therapies, co-learning, changing ways of doing things, connecting, co-production and cerebral activities. However, they did not semantically analyse the differences between the dimensions, but merely present examples derived from respondents' answers. It is proposed that customer value co-creation behaviour has a hierarchical factor structure, which in turn can be divided into several sub-dimensions: cognitive activities, cooperation, information research and collation, combination of complementary activities, changing habits, co-production, co-learning and connection.

Yi & Gong (2013) applied a third-order factor through the lens of two theories: **customer participation behaviour** and **customer citizenship behaviour**, related respectively to the concepts of in-role behaviours and extra-role behaviours. Customer participation behaviour belongs to the behaviour which is necessary for successful value co-creation. Customer citizenship behaviour is voluntary behaviour that provides extraordinary value to the firm but is not necessarily required for value co-creation (Groth 2005; Bove et al.

2008; Yi & Gong 2008; Yi et al. 2011). The empirical results show that in-role and extra-role behaviours follow different patterns and have different antecedents and consequences (Groth 2005; Yi et al. 2011). Yi & Gong (2013) conceptualised the customer value co-creation behaviour as a multidimensional concept which consists of two factors (customer participation behaviour and customer citizenship behaviour), and each factor contains multiple dimensions. The customer participation behaviour comprises four dimensions: information seeking, information sharing, responsible behaviour and personal interaction, while customer citizenship

behaviour consists of feedback, advocacy, helping and tolerance. Finally, Chen & Raab (2014) developed and validated the mandatory customer participation (MCP) scale which was originated the Engel-Blackwell-Kollat model. This scale can be divided into three dimensions: information participation, attitudinal participation and actionable participation. The authors applied this scale to investigate the consumer decision process related to restaurant service. Figure 1 shows customer value co-creation activities.

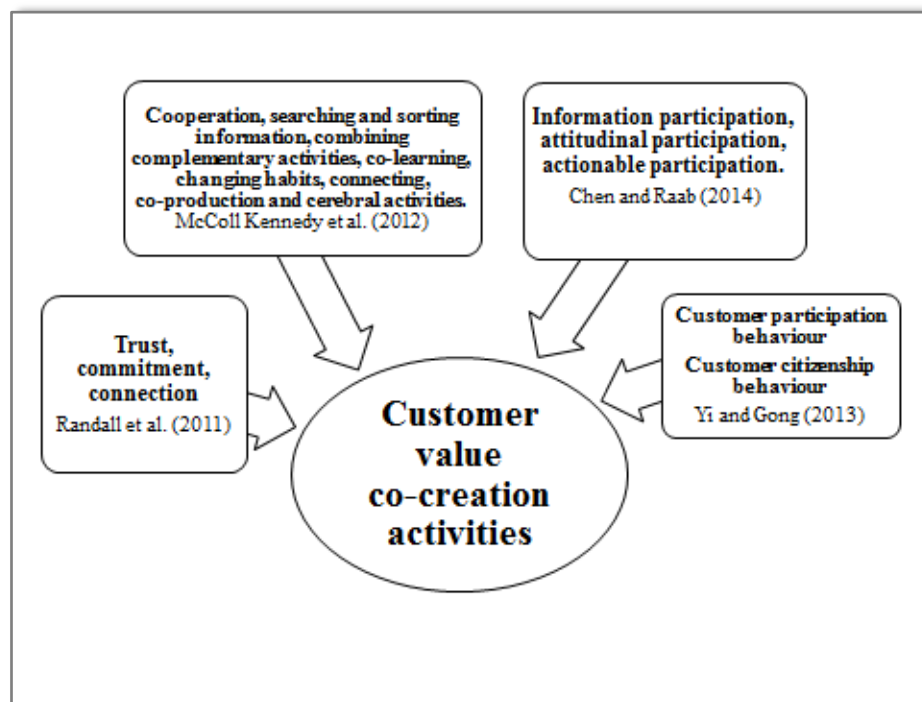


Figure 1 Customer value co-creation activities

Source: Compiled by the author

According to the literature customer participation behaviour contains four dimensions: information seeking, information sharing, responsible behaviour and personal interaction. **Information seeking** is important for customers because information reduces uncertainty and helps to understand and control their co-creation conditions. Besides, information seeking enables customers to perform their role as value co-creators (Kelley et al. 1990; Morrison 1993). For successful value co-creation, customers should **share information** with employees (Lengnick-Hall 1996). If customers do not share the essential information, the employees cannot begin or perform their duties (Ennew & Binks 1999) and the quality of value co-creation may be poor. The customers' **responsible behaviour** pertains to identifying their duties and responsibilities as partial employees in value co-creation. The customers need to be cooperative and accept directions from employees for successful value co-creation (Bettencourt 1997). **Personal**

interaction refers to interpersonal relations between customers and employees, which are necessary for successful value co-creation. The interaction between customers and employees contains courtesy, friendliness, and respect (Kelley et al. 1990; Ennew & Binks 1999). Besides, the positive social environment of service influences the customers to engage in value co-creation (Lengnick-Hall 1996). The customers' **feedback** gives information to the employee, which helps the employees and the firm to improve the service creation process (Groth et al. 2004). The customers offer suggestions to the employees, because the customers have experience with the service and are experts from the customer perspective (Bettencourt 1997). The feedback from customers can be valuable, and constitutes extra-role behaviour. **Advocacy** refers to recommending the firm or the employee to others such as friends or family (Groth et al. 2004). Positive word-of-mouth advertising contributes to the development of a positive firm reputation,

promotion of the firm's products and services and higher service quality evaluations, and is an indicator of customer loyalty (Bettencourt 1997; Groth et al. 2004). Advocacy is voluntary and optional for successful value co-creation. **Helping** means customer behaviour that directly assists other customers in a service co-creation process. Rosenbaum & Massiah (2007) note that customers recall and use their own experiences to help other customers experiencing similar difficulties.

Tolerance denotes the customer's willingness to be patient when the service delivery does not meet the customer's expectations of correct services (Lengnick-Hall 1996). Customer tolerance may help the firm because service encounter failure is the second largest cause of customer switching behaviour (Keaveney 1995). We applied dimensions from Yi & Gong paper concerning the customer value co-creation activities. The dimensions are summarised in Figure 2.

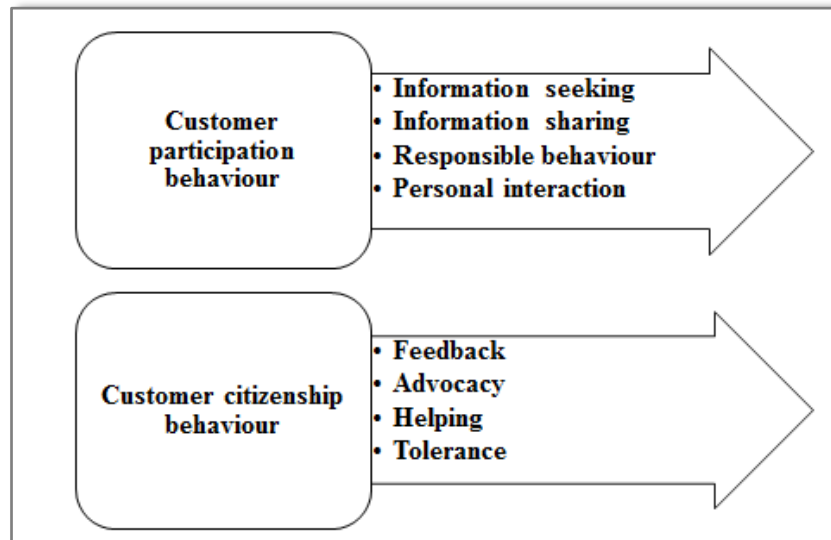


Figure 2 Dimensions of customer value co-creation behaviour
Source: Compiled by the author based on Yi & Gong 2013.

METHODOLOGY

In the empirical research we focused on the examination of the level of voluntary and non-voluntary co-creation behaviour in terms of different services. We search for answers to the next research questions in several service contexts:

1. What are the dimensions of customer participation behaviour in co-creation value of different services?
 2. What are the dimensions of customer citizenship behaviour in co-creation value of different services?
- In addition, we want to explore generation differences in co-creation value customer behaviour. Our research question is:
3. X or Y generation participates more actively in co-creation value of services?

We conducted a survey in April and May 2015, for more details, see Ercsey & Platz (2015). The target population of our quantitative research is two segments which can be separated based on age, family (parents and their children) and occupational (active earner and students) status: the Y (born between 1980-1994) and X

(born between 1965-1979) generations¹⁵. The consumption preferences of members of Y generation, especially students, are a meaningful research topic in Hungarian and also international research (Platz & Veres 2014). We applied a quota sampling method using quotas for ages and gender. The sample size is 335 people; 40% of the respondents are women and 60% are male. The respondents live in county seats (23%) (where more kinds of services are provided), other cities (46%) or villages (31%). The composition of the sample is based on ages: the rate of 18-26 age category is 57% (192 people), and the rate of those above 26 is 43% (143 people).

MAIN FINDINGS

Dimensions of customer participation behaviour and customer citizenship behaviour

For the examination of our research questions first we adopted the scale used by Yi & Gong (2013) to

¹⁵ Definitions of X and Y generations from McCrindle, M. (2014) The ABC of XYZ, Understanding the Global Generations, McCrindle Research Pty Ltd, Australia

measure co-creative customer behaviour. Our decision was confirmed by adaptation of scale in Spain and its results (Revilla-Camacho et al. 2015). First, we translated the scale items into Hungarian and after this potential respondents assessed the relevance of items. Based on their recommendation were modified five statements. Next we asked experts from the service industry to check the appropriateness of initial scale items; 28 items were retained for further analysis. Before data reduction it is important to conduct a range analysis for data cleaning. All statements were measured on a five-point Likert scale and the difference between the largest and smallest values was 4 for each items. A boxplot diagram was used to recognise the outlier cases and were deleted 13 cases which were come up at least two items. Data were collected from survey and we asked the respondents to evaluate their last cultural activities (e.g. theatre, interactive museum, festival) or wellness services or services to gastronomy to investigate customer co-creation behaviour. A notable proportion of respondents had participated in cultural activities (28%), used a wellness service (42%) or gastronomic service (30%).

For recognising dimensions of **customer participation behaviour** there were 15 items (on a five-point scale) according to a validated scale (Yi & Gong 2013). Exploratory factor analysis was conducted about the items of the customer value co-creation activities to

identify the dimensions of customer participation behaviour. The KMO (0.875 > 0.7,) and Bartlett test (2029.124, Sig.=0.000) indicate that the data are suitable for factor analysis (Malhotra 2009). We found three factors by applying Principal components analysis and the Varimax rotation method. The cumulative percentage of explained variance by extracted factors is 61.4%, which is above the expected level of 60%. The original 15 items are appropriate for measuring the individuals' role to perform the service. Cronbach analysis supported the reliability of the participation behaviour scale ($\alpha=0.896$). Information seeking and information sharing can be distinguished within the customer participation behavior, similarly to previous research about services. We found that the elements of responsible behaviour and personal interaction constitute one factor. These results are inconsistent with previous research (Yi & Gong 2013; Revilla-Camacho et al. 2015), where English and Spanish respondents made a distinction between the factors of personal interaction and responsible behaviour. The items of customers' responsible behaviour emerge in interaction between personnel and customers and they are necessary to produce the successful service expected by customers. This factor in connection with personal interaction contains the respondents' attitude and behaviour to the personnel and provider. We summarised the results of factor analysis in Table 1.

Table 1
Factors of customer participation behaviour

Variables of customer participation behaviour	Factor loadings	Factors Explained variance
I was friendly and kind to the employee.	0.799	F1 Personal interaction and responsible behaviour 37.4 %
I was polite to the employee.	0.764	
I fulfilled responsibilities to the business.	0.750	
I adequately completed all the expected behaviours.	0.749	
I performed all the tasks that are required.	0.723	
I was courteous to the employee.	0.672	
I followed the employee's directives or orders.	0.671	
I didn't act rudely to the employee.	0.632	
I gave the employee proper information.	0.855	F2 Information sharing 15.2 %
I provided necessary information so that the employee could perform his or her duties.	0.849	
I clearly explained what I wanted the employee to do.	0.791	
I answered all the employee's service-related questions.	0.693	
I have asked others for information on what this service offers.	0.720	F3 Information seeking 8.8 %
I have paid attention to how others behave to use this service well.	0.675	
I have searched for information on where this service is located.	0.542	

Source: own compilation

The order of the factors and the percentage of explained variance by factors show that in the service

production the respondents' responsible behaviour and the quality of personal interaction play a bigger role than

the information sharing and information seeking factors. As we expected, in customer participation behaviour we can highlight the **information sharing, information seeking, and the personal interaction–responsible behaviour dimensions**; these three distinct dimensions can be recognised in the co-creation of cultural, wellness and gastronomic services.

For identifying dimensions of **customer citizenship behaviour** there were 13 items (on a five-point scale) according to a validated scale (Yi & Gong 2013). Exploratory factor analysis was conducted about the items of the customer value co-creation activities to identify the dimensions of customer participation behaviour. The KMO (0.761 > 0.7,) and Bartlett test (1371.905, Sig. =0.000) indicate that the data are suitable for factor analysis (Malhotra 2009). We found four factors by applying Principal components analysis and Varimax rotation method. The cumulative percentage of

explained variance by extracted factors is 65.7%, which is above the expected level of 60%. The origin 13 items are appropriate for measuring the individuals' extra role to perform the service. Cronbach analysis supported the reliability of the participation behaviour scale ($\alpha=0.874$). **Helping, advocacy, tolerance and feedback** can be distinguished within customer voluntary behavior, similarly to previous pieces of research about services. Our results correspond to the numbers and names of factors in previous studies. These factors imply extra value to the provider in case of customer 'active' behaviour. Two factors – tolerance and feedback – emerge in the relationship between the respondents and personnel. The other factors – helping and advocacy – are realised in transactions between the respondents and the other customers. Factor analysis results are summarised in Table 2.

Table 2
Factors of customer citizenship behaviour

Variables of consumer citizenship behaviour	Factor loadings	Factors Explained variance
I teach other customers to use the service correctly.	0.826	Factor4 Helping 29.7 %
I give advice to other customers.	0.772	
I help other customers if they seem to have problems.	0.764	
I assist other customers if they need my help.	0.681	
I recommended the given service and the employee to others.	0.836	Factor5 Advocacy 14.7 %
I encouraged friends and relatives to use the given service.	0.829	
I said positive things about the given service and the employee to others.	0.757	
If the employee makes a mistake during service delivery, I would be willing to be patient.	0.844	Factor6 Tolerance 12.3 %
If I have to wait longer than I normally expected to receive the service, I would be willing to adapt.	0.833	
If service is not delivered as expected, I would be willing to put up with it.	0.574	
When I experience a problem, I let the employee know about it.	0.764	Factor7 Feedback 9.0 %
When I receive good service from the employee, I comment about it.	0.686	
If I have a useful idea on how to improve service, I let the employee know.	0.638	

Source: own compilation

The eigenvalues for four factors and the percentage of explained variance by factors demonstrate that in the service production the respondents' help and recommendations to potential customers play a bigger role than the other two factors. The respondents' positive attitude to personnel shown through tolerance and feedback is not significant. As we expected, in customer citizenship behaviour we can differentiate the helping, advocacy, tolerance and feedback dimensions four behavioural dimensions can be recognised in co-creation of cultural, wellness and gastronomic services.

Generation differences in the co-creation value of customer participation and citizenship behaviour

We assumed that a generation gap exists in cooperation skills of service production. Variation in age was analysed using analysis of variance (one-way ANOVA); Figures 3 and 4 show the scores for X and Y generations. Eight variables of the customer participation behaviour differed significantly between X and Y generations (Figure 3).

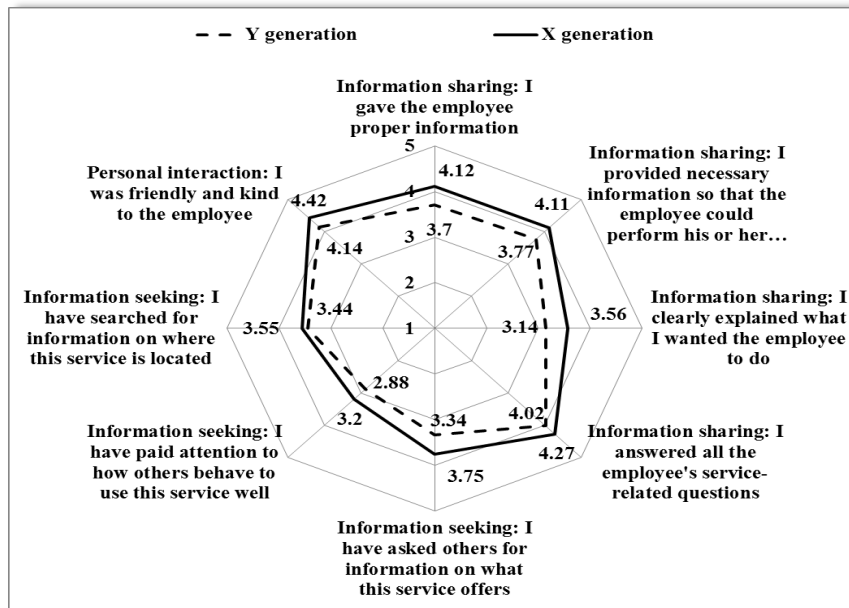


Figure 3 Average scores of variables of customer participation behaviour based on two generations (statistical significant differences)

Source: Compiled by the author

The members of the Y generation use preferably non-personal sources in information seeking for given cultural or wellness services. The older consumers prefer direct contact personally to gain information. Information sharing is information flow from consumers to personnel ("I provided necessary information so that the employee could perform his or her duties"; "I clearly explained what I wanted the employee to do") which is considered more important during the performance of services. In addition, information seeking plays a greater role for Generation X than for the younger respondents.

Furthermore, the older group has an open attitude in communication with service providers. We found congruently high scores for evaluation of the personal interaction and responsible behaviour.

According to our results, the elements of the respondents' citizenship behaviour are on a lower level than their participation behaviour. Only one variable of feedback, advocacy and helping gave appreciable values in the case of Generation X (Figure 4).

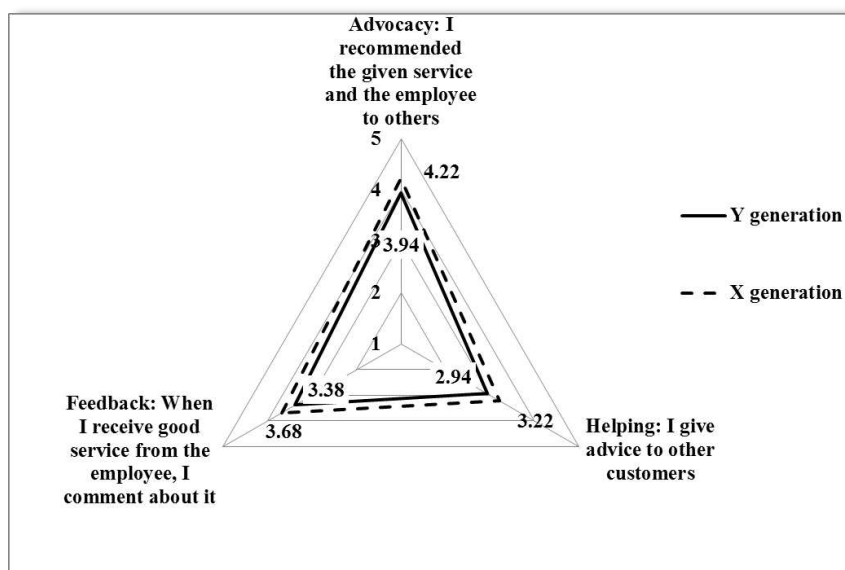


Figure 4 Average scores of variables of customer citizenship behaviour based on two generations (statistical significant differences)

Source: Compiled by the author

Providing feedback about consumer experiences is not typical, but Generation X is more likely to do so. Both age groups provide positive feedback about used services more gladly than negative feedback. We can conclude the same about the advocacy. Voluntary helping of another consumer is not standard, but in order to solve problems the consumers perform the activities. The tolerance for inadequate delivery is medium level for both groups.

After analysing the items of customer participation behaviour and citizenship behaviour we examined the factor scores related to two generations. For this analysis,

we added mean scores of items within a factor. This approach is advantageous when a researcher wants to compare results between different subsamples. Our results show that Generations X and Y differ significantly in seeking information, information sharing and feedback (mean scores are given in Figure 5). We explored the factors with the most active consumer participation are, namely personal interaction with personnel, responsible behaviour related to the staff and advocacy for other consumers. The mean value of helping other people (F4) is the least preferred within co-creation value consumer behaviour. Our results are shown in Figure 5.

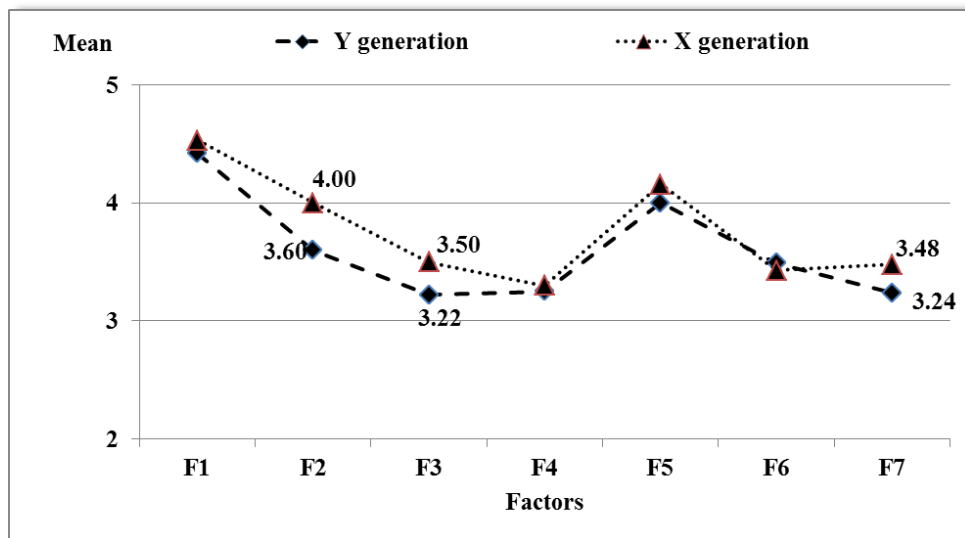


Figure 5 Average scores of factors in customer value co-creation behaviour based on generations

Source: Compiled by the author

As we expected, some consumer activities generation differences can be identified in the cultural, wellness and gastronomic service value.

CONSLUSIONS

Our results show that customers' perceptions of co-creation can be examined with a multi-dimensional construct. The activity and attitude of individuals related to performing extra roles in service interactions is less positive than for performing the required in-role behaviour. We conclude that value co-creation not only refers to co-production through company-customer interaction but also the co-creation of value through customer-to-customer interaction. In addition, the customers can search for information from the firm directly or indirectly. In our paper we highlighted the participation and citizenship behaviour of a young generation with older consumers by evaluating different cultural activities, wellness and gastronomic services which contribute to the improvement of their well-being.

According to our empirical research, the elder generation represents a bigger cooperation based on the customers' mandatory and voluntary behaviour. These results confirm the importance of market segmentation.

This study adds to the body of knowledge on value co-creation in service. We highlighted the determinants and structure of customer participation and citizenship behavior in some Hungarian service industries. Customer participation is influenced by intrinsic factors such as cutomers' personal characteristics, e.g. demographic issues, and this factor directly predicts customers' co-creation behaviour. This finding can be useful for managing a firm's marketing communications by delivering the right amount of information to the right customer.

Additional research with other generations could provide interesting and valuable insights into the dimensionality of customer participation. Future research should examine which psychological features (e.g. involvement) influence a customer to participation in co-creation service value. It would be very useful to pay more attention to the characteristics of the co-creative customers. Previous researchers revealed the

consequences of customer co-creation value behaviour in reference to buying intention, customer satisfaction and loyalty. We regard with great expectation to that whether the respondents' participation behaviour or citizenship behaviour influence bigger impact on the perceived value

of given service. The findings can be used to identify the level of consumer co-creation, to support co-creation behaviour and to segment the service market.

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Green Supply Chain Management – Motivation, Methods and Expectations – in Hungarian Automotive Oems

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SUMMARY

The aim of the paper is to analyse the green supply chain management (GSCM) practices of Hungarian automotive OEMs (original equipment manufacturers) – three car manufacturers and a truck manufacturer. For the analysis I performed a questionnaire survey that included the topics of motivation and barriers of GSCM, the methods applied, cooperation in the supply chain and green performance. The results show the importance of GSCM in Hungarian automotive OEM operation, the most improved fields and the most popular methods. We will see what the strongest motivation factors for green practices are, and what improvements the companies experience in their performance.

Keywords: supply chain management; green supply chain management; automotive industry; OEMs; Hungary

Journal of Economic Literature (JEL) codes: L24, L62

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INTRODUCTION

Environmental issues are becoming increasingly important, especially in industries with great environmental impact. The automotive industry is one of these, and in addition, its customers are increasingly environment conscious. The automotive industry is also a good choice for researching supply chain management topics thanks to its outstanding level of supply chain management (SCM) practice. The aim of this paper is to analyse the green supply chain practice of Hungarian automotive original equipment manufacturers (OEMs). The article is focused around three main questions:

- What motivates OEMs to use green supply chain management (GSCM) techniques?
- What kind of methods and techniques are used by OEMs and how developed are the separate fields of GSCM?
- What type of outcomes do OEMs expect from GSCM, and what performance categories do companies monitor?

LITERATURE REVIEW – THE THEORETICAL BACKGROUND OF GREEN SUPPLY CHAIN MANAGEMENT

Green supply chain management fields and methods

One of the main directions of green supply chain management research is the clarification of its fields of application, and the investigation of the applied management methods and techniques. It is important to make a distinction between fields and principles, where **fields** are the green equivalents of supply chain activities within the company, with a defined set of methods and techniques (Gábel 2013). **Principles** are general management methods that do not belong to any field of SCM, such as: cooperation with the other members of the supply chain (Dakov & Novkov 2008; Hsu & Hu 2008; Zhu et al. 2008 Eltayeb et al. 2011; Chan et al. 2012; Lin 2013); recycling (Dakov & Novkov 2008; Hsu & Hu 2008; Lin 2013); life cycle management (Hsu & Hu 2008) organisational/management commitment (Hsu & Hu 2008; Zhu et al. 2008;) and investment recovery (sale

of excess inventories, materials, equipment, scrap materials with the aim of improving equipment usage) (Zhu et al. 2008; Chan et al. 2012)

The aim of **green design** (or eco-design) is the reduction of a product's environmental impact during its whole life cycle without compromising other essential product criteria, such as performance and cost (Eltayeb et al. 2011). In other words, green design means the design of products or services with certain environmental consciousness. This is also a key issue for the EU: a main objective is to develop a safe, diversified and environment-friendly energy structure in all member states, which is a complex goal for the future (Illés et al. 2013). Green design includes the design of products for reduced consumption of hazardous materials (Zhu et al. 2008; Eltayeb et al. 2011; Lin 2011); product design for reuse, recycling or remanufacturing (Zhu et al. 2008; Eltayeb et al. 2011) and product design for resource efficiency (Zhu et al. 2008; Eltayeb et al. 2011; Lin 2011).

The interpretation of **green purchasing** in the literature is quite uniform. Researchers have similar ideas about the aim and the methodology of green purchasing. The basic idea is decreasing the environmental impact caused by materials used in the products. This can be realised by the selection of appropriate materials and suppliers. Methods and techniques include demanding supplier certifications, environmental management systems (ISO14000, OHSAS18000, RoHS) (Zhu et al. 2008; Ninlawan et al. 2010; Eltayeb et al. 2011); supplier environmental auditing (Zhu et al. 2008; Hsu & Hu 2008; Ninlawan et al. 2010; Eltayeb et al. 2011); establishing environmental requirements for purchased items (Garcia Martinez et al. 2006; Chien & Shih 2007; Zhu et al. 2008; Hsu & Hu 2008; Ninlawan et al. 2010; Eltayeb et al. 2011; Chan et al. 2012; Chen et al. 2012); and professional and financial support to the supplier to reach environmental objectives (Zhu et al. 2008; Eltayeb et al. 2011).

A **green manufacturing** process should use inputs with low environmental impact, work with high efficiency and generate the minimal amount of waste and pollution. The methodology of green manufacturing includes decreasing resource utilisation (Srivastava 2008; Chen et al. 2012); hazardous substance control (Ninlawan et al. 2010; Chen et al. 2012); decreasing energy utilisation by energy-efficient technologies and increasing the ratio of green energy (Ninlawan et al. 2010; Chen et al. 2012); and integration of different forms of material reuse into the manufacturing process – disassembly, refurbishment, remanufacturing or recycling (Srivastava 2008; Ninlawan et al. 2010; Chen et al. 2012).

According to Ninlawan et al. (2010) and Chan et al. (2012) **green distribution** consists of green packaging and green logistics. Green packaging involves downsizing packages, using “green” packaging materials, cooperating with vendors to standardise packaging,

minimising material use and time to unpack, adopting returnable package methods, and promoting recycling and reuse programs. Green transportation or green logistics means delivering directly to the user's site, using alternative fuel vehicles, distributing in large batches and changing to more environment friendly modes of transport (modal shift).

Two interpretations of **reverse logistics** can be found in literature. One group of researchers (e.g. Srivastava 2008; Eltayeb et al. 2011) view certain types of reuse activities (such as disassembly, refurbishment, remanufacturing and recycling) as part of manufacturing or as a separate set of activities. The other group (e.g. Beamon 1999; Ninlawan et al. 2010; Lin 2013) view them as part of reverse logistics. Although both views have valid arguments, if we interpret conceptions correctly, only real logistics activities should be considered as part of reverse logistics; these are collecting, inspection and sorting, pre-processing and location decisions and network design (Srivastava 2008).

Motivation

According to Bala et al. (2008), environmental supply chains emerge where environmental and supply chain pressures are synthesised. These pressures may come from multiple directions. The two external driving factors that are recognised by most researchers are regulations and pressures from stakeholders (Kálmán 2002; Lin 2013). Srivastava (2008) defines three sources of pressure: economical, regulatory and consumer. Kumar et al. (2012) give a longer list of motivators by breaking down economic and consumer pressures into smaller elements. Testa & Iraldo (2010) pointed out that external factors alone cannot explain the different attitude to GSCM of companies operating in the same industry. Strategy, values and targeted competitive advantages are the internal factors that motivate companies differently in adopting GSCM. According to Stevels (2002), the members of the supply chain and other stakeholders can be positively affected by greening the supply chain. The advantages can be material, immaterial and emotional, and are motivators at the same time.

Managerial attitude as a barrier is mentioned by Beamon (2005) and Wooi & Zailani (2010). According to Côté et al. (2008) many small and some medium-sized companies had problems with environmentally conscious operation due to lack of time, financial resources and doubts about the benefits of green policies.

Several attempts were made to classify the motivating factors and barriers. The Green Business Network (2001) separated primary and secondary motivations, and distinguished between internal and external motivations in the primary group. Walker & Jones (2012) widened the scope to the barriers of GSCM. They divided both motivations and barriers into internal and external categories. My two-layered model of motivations and barriers expresses the difference between

coercive and soft factors (first layer), while the second layer is about the internal/external and enabler/barrier type of factors. Coercive factors mean explicit pressure on organisations, while soft factors are rather enablers than motivators: they help the successful adoption of GSCM but they cannot force its adoption (Gábel 2014).

Possible outcomes of applying GSCM

Environmental performance is considered the most important result of GSCM, since this is the primary motivation for applying its techniques. Environmental performance is interpreted as the reduction of several negative environmental effects. The most often mentioned elements in the literature are: reduction of waste output and emission, a smaller carbon footprint (Beamon 1999; Eltayeb et al. 2011; Dey & Cheffi 2012; , Kumar et al. 2012; Zhu et al. 2012; Dos Santos et al. 2013); reduction of material usage (Beamon 1999; Kumar et al. 2012); reduction of usage of harmful materials (Beamon 1999; Eltayeb et al. 2011; Dey & Cheffi 2012; Zhu et al. 2012); reduction of energy and water consumption (Kumar et al. 2012; Dos Santos et al. 2013); reduction of packaging material usage (Kumar et al. 2012; Dos Santos et al. 2013); and reduction of accidents and safety issues (Eltayeb et al. 2011; Dey & Cheffi 2012, Zhu et al. 2012.).

The second most often mentioned effects are the ones on **economic performance**. Economic effects on company performance can be measured primarily in the form of financial and market advantages or disadvantages. Authors define several positive effects, most of which are deductible from environmental effects: reduction of energy consumption cost (Dey & Cheffi 2012; Zhu et al. 2012; Lin 2013); reduction of direct materials cost (due to less material used) (Dey & Cheffi 2012; Zhu et al. 2012; Lin 2013); reuse of materials (Al-zaidi & Dunay, 2016), reduction of waste disposal cost (Dey & Cheffi 2012, Zhu et al. 2012; Lin 2013.); reduction of fees and penalties (Illés & Kohlhé, 1999; Dey & Cheffi 2012; Zhu et al. 2012; Lin 2013.); and increase of revenues and market share (Eltayeb et al. 2011; Dos Santos et al. 2013).

The strongest negative effects appear in this category. These are caused by the large investment requirements of GSCM. The most important effects are the increased investments and the increased material costs (due to more expensive materials) (Lin 2013).

According to the most widely accepted interpretation of **operative performance**, the effects are basically economical ones, but their effect on the performance of the whole company is indirect (Eltayeb et al. 2011; Dey & Cheffi 2012; Zhu et al. 2012). Operational performance elements mentioned most often

in literature are: improved product and service quality (Eltayeb et al. 2011; Dey & Cheffi 2012; Zhu et al. 2012); improved flexibility (Eltayeb et al. 2011); reduced inventory (Dey & Cheffi 2012; Zhu et al. 2012) and high capacity utilisation (Dey & Cheffi 2012; Zhu et al. 2012).

Besides environmental, economic and operational performance, Eltayeb et al. (2011) define a fourth category, called **intangible outcomes**, which include growing customer satisfaction and loyalty, employee satisfaction, growing brand value, enhanced publicity and marketing opportunities, and better acceptance by local communities.

MATERIALS AND METHODS

The empirical data used in this study consist of questionnaire responses from managers of Hungarian automotive OEMs. Three car manufacturers and one truck manufacturer, all operating in Hungary, were involved. This is 100% of the OEMs in the Hungarian car and truck manufacturing industry. The three car manufacturers are affiliates of global companies, while the truck manufacturer is owned by the Hungarian state and other shareholders.

The questionnaire involved four sections about different aspects of GSCM. The questions were prepared based on the literature. The aim of the **Motivation section** was to find and rank the factors that influence companies in applying GSCM. I have used the categories defined in Gábel (2014). In the **Green supply chain management section** I collected 27 GSCM methods mentioned in the literature, grouped by type (principle or SCM field of activity). The **Cooperation in supply chain section** inquires about the form and intensity of cooperation with buyer and supplier partners. The **Green supply chain performance section** explores the performance categories and indices measured by companies, as well as the expected and observed changes in performance. The language of the questionnaire was Hungarian.

RESULTS

Motivation

Figure 1 shows the explicit pressure experienced by the companies from different external sources. The strongest pressure comes from consumers, parent companies (in the case of affiliates) and national or EU regulations. Local regulations have lower relevance. Pressure from different NGOs has virtually no significance.

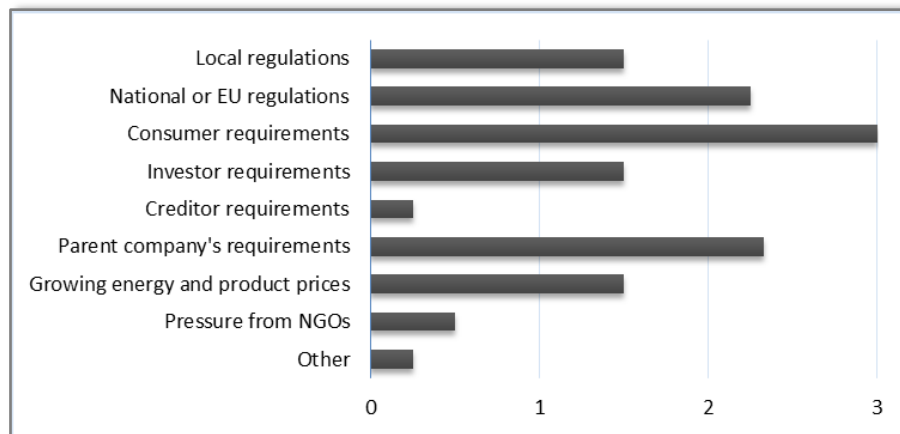


Figure 1 Strength of coercive motivation factors (0 no pressure, 1 slight pressure, 2 moderate pressure, 3 strong pressure)
Source: own research

Soft motivation factors were grouped as internal and external enablers and internal and external barriers, as is shown in Figure 2. The factors that were rated with

at least moderate significance by the OEMs are given in bold.

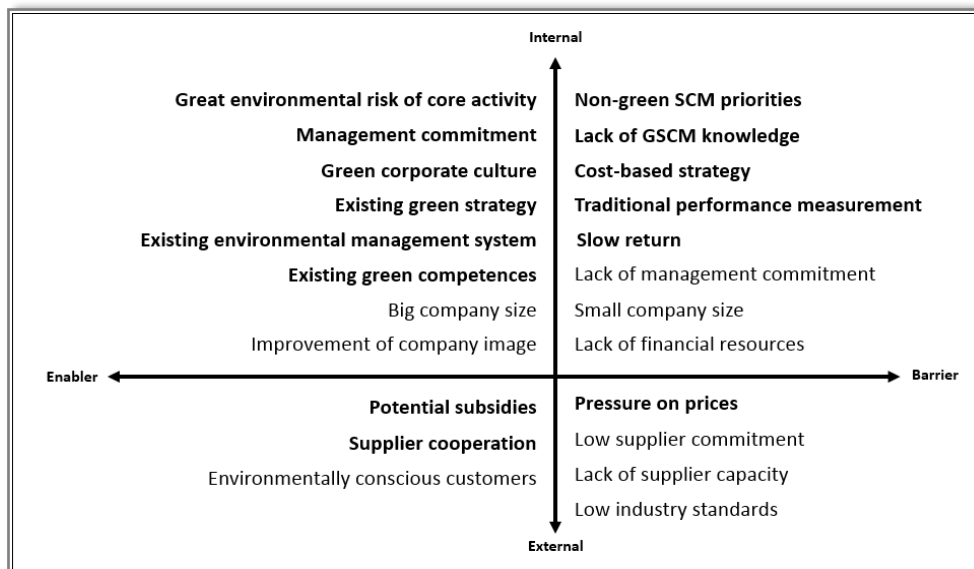


Figure 2 Soft motivation factors and their relevance for Hungarian OEMs
Source: own research based on Gábríel (2014)

The strongest group of factors for OEMs was the internal enablers, where 6 out of 8 factors were rated as being of at least moderate significance. The strongest motivators were the great environmental risk of core activity and management commitment. Most of the strong factors in this group (commitment, strategy, competences and culture) are due to the global parent company. These factors are only slightly significant for the Hungarian state-owned company. External enablers have weaker effects; the most important factor was potential subsidies for environmental development. Less than the half of the internal barriers mentioned in the literature turned out to be relevant for the sample companies. The strongest factors were other (non-green) SCM priorities and cost-

based strategy. Only 1 of 4 external barriers – pressure on prices – was rated as being more than moderately significant.

GSCM activities

Green design activities (design for reduced consumption of hazardous materials, for reuse and for resource efficiency) have great importance for OEMs, since they are responsible for the design of the end product of the supply chain. Green design methods are applied or being implemented by 75% of sample companies, as is shown in Figure 3.

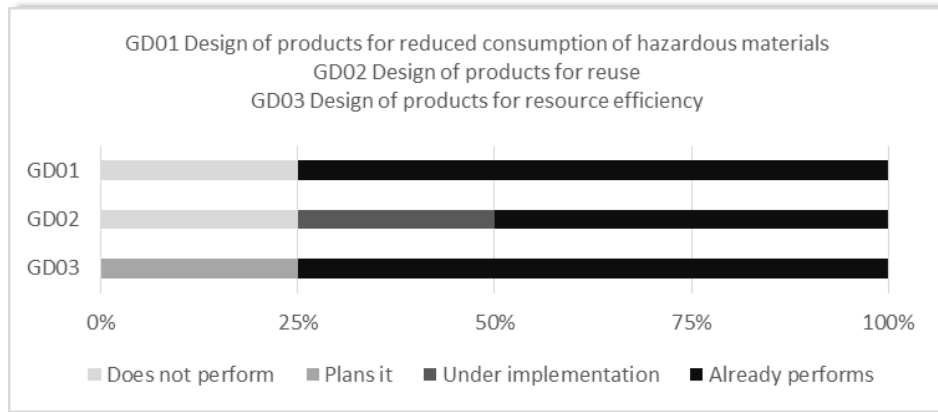


Figure 3 Green design methods applied by Hungarian OEMs

Source: own research

Green purchasing is the most important element of green SCM in the literature, regarding both the number of articles dealing with the topic and the number of techniques mentioned. Hungarian OEMs use a rich toolkit of green purchasing; all techniques mentioned in the literature are used by at least one company of the sample (see Figure 4).

The most popular group of techniques is setting different requirements for the supplier, with the aim of providing environmentally appropriate products and operation. All companies demand product testing reports and bills of materials from suppliers and provide them with design specifications. Demanding supplier

certifications or environmental management system, replacing materials with environmentally less harmful ones, setting environmental requirements for purchasing items and demanding product content labelling from suppliers are also popular techniques (3 out of 4 companies apply them).

The different methods of supplier development, such as supplier education in environmental topics, professional and financial support to the supplier and second tier supplier environmental evaluation are less frequently used methods (1 or 2 OEMs perform them), but most companies plan or are starting to implement them.

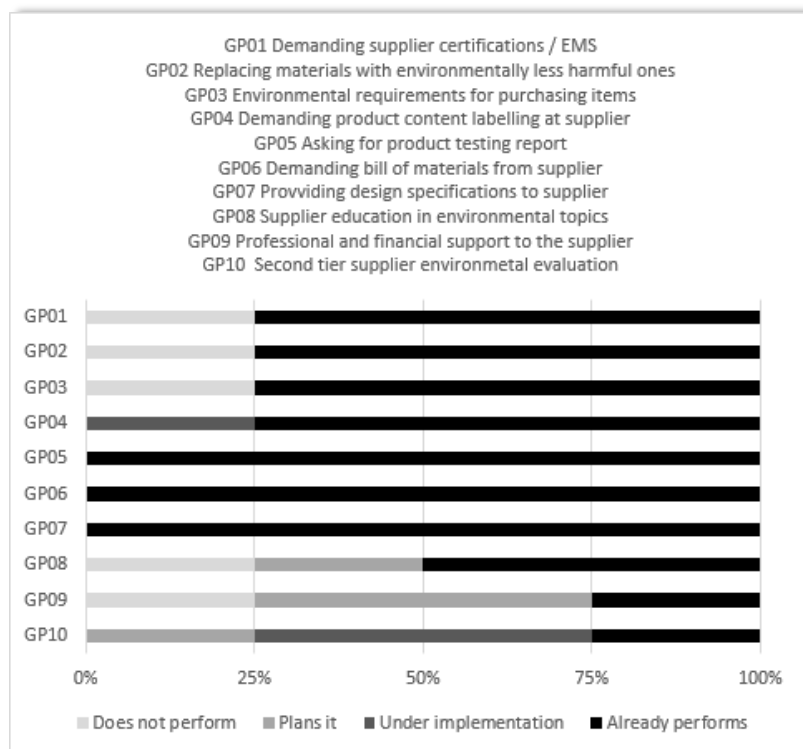


Figure 4 Green purchasing methods applied by Hungarian OEMs

Source: own research

Three methods of **green manufacturing** (decreasing resource utilisation, decreasing energy utilisation by energy-efficient technologies and hazardous substance control) are already implemented in 75% of the sample companies, all of which are affiliates of global

companies. The fourth method, integration of different forms of reuse into the manufacturing process is not yet applied but is planned by all four OEMs. The results are shown in Figure 5.

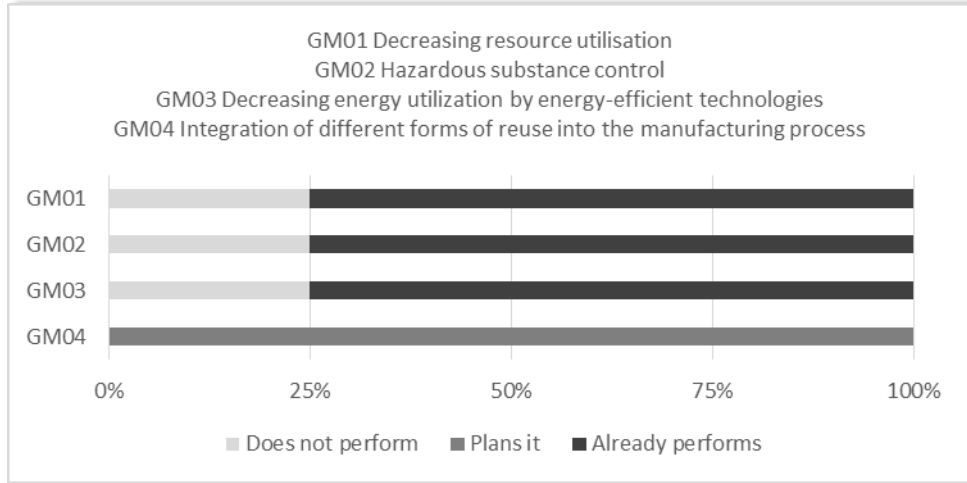


Figure 5 Green manufacturing methods applied by Hungarian OEMs
Source: own research

The implementation of **green distribution** methods shows a heterogenous picture (see Figure 6). Green logistics, including distribution in large batches and modal shift, is performed on a high level (applied or at

least planned by all companies), while green packaging is applied only by half of the companies. None of them performs or plans reverse logistics activities.

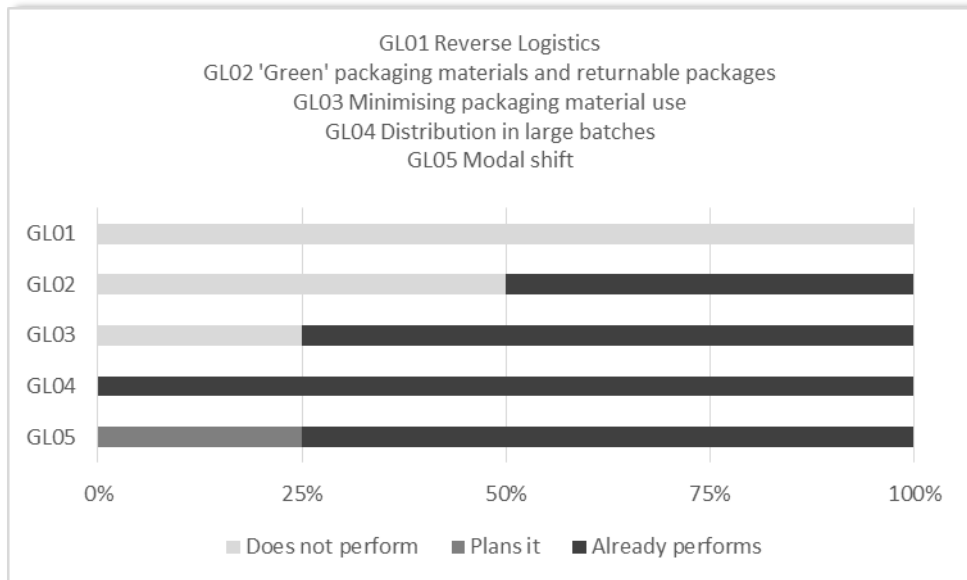


Figure 6 Green distribution methods applied by Hungarian OEMs
Source: own research

GSCM performance

Companies had to give weights to each performance category mentioned in the literature, where

the sum of weights had to be 100%. The results show that environmental performance is slightly less important for OEMs than economic and operative performance, while intangible outcomes are the lowest rated (see Figure 7).

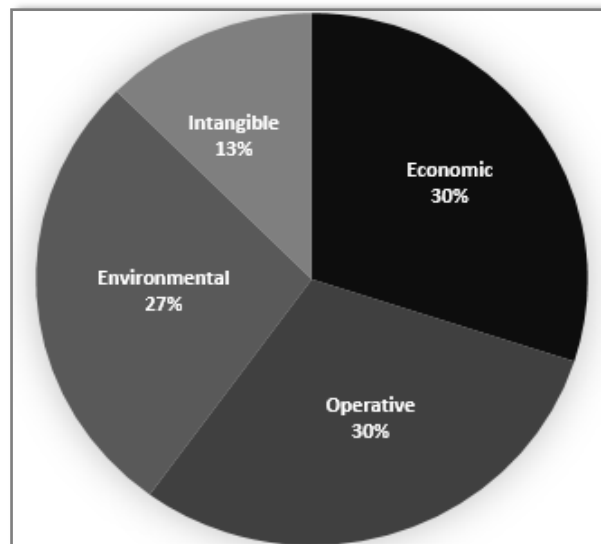


Figure 7 Relative importance of GSCM performance categories

Source: own research

Companies were asked to choose the three most important performance indicators in each performance category. Figure 8 shows the indicators that turned out to be the most emphasised and most intensively monitored ones. Out of **economic performance** indicators, reduction of direct materials cost and reduction of energy consumption cost are the most often mentioned ones. In **operative performance** the reduction of operational costs, reduced inventory and high capacity utilisation

were in the top three. The answers for **environmental performance** indicators were more heterogeneous: reduction of waste output and emission, reduction of material usage, reduction of energy consumption, reduction of usage of harmful materials and reduction of accidents and safety issues were mentioned by at least half of the companies. Growing customer satisfaction and loyalty, and growing brand value were considered the most important **intangible outcomes** by all companies.

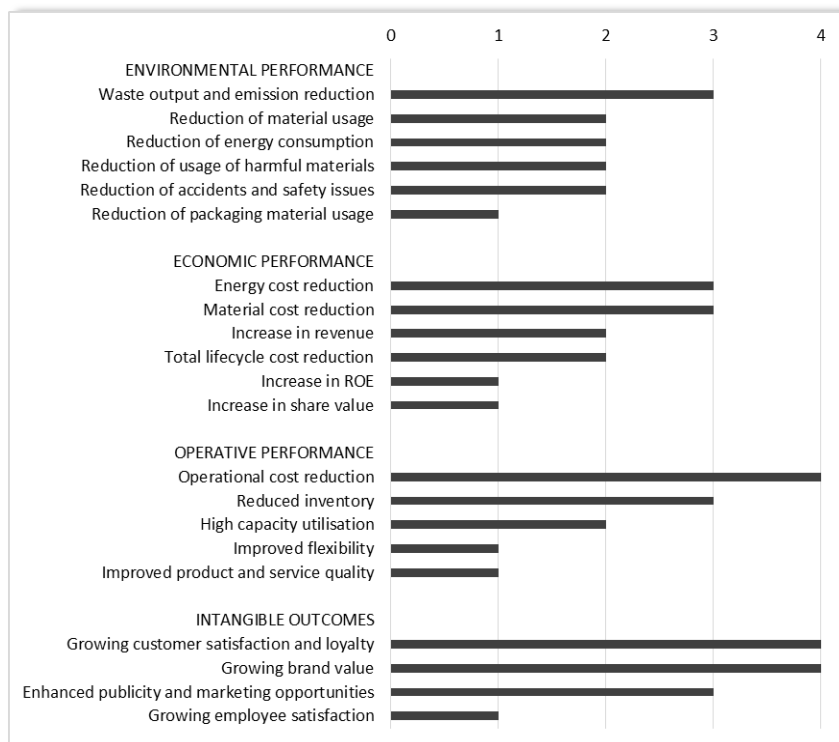


Figure 8 Performance indicators highlighted by OEMs (number of mentions as most important)

Source: own research

CONCLUSIONS

Automotive OEMs in Hungary face both regulatory and market pressures that motivate them to apply green methods in their supply chain processes. The fact that all Hungarian car manufacturers are affiliates of global automotive companies explains the strength of internal enablers, which are closely related to corporate strategy and corporate culture. The main barriers have economic reasons: high investment needs and cost pressure from consumers.

Since OEMs are responsible for product design, green design has the largest importance in this echelon of the supply chain. The results correspond with this assumption, as OEMs apply all green design methods. In the automotive industry OEMs control the supply chain. This explains the large number and great intensity of green procurement activities. Setting up requirements for suppliers are the most popular methods to ensure that OEMs can purchase environmentally proper materials and components. Supplier development is not common yet, but the answers suggest some movement in this direction. Unlike in traditional supply chain management,

automotive OEMs do not monitor the Tier 2 suppliers from an environmental aspect. Presumably this task is delegated to integrators (large Tier 1 suppliers); this assumption should be proved by further research. Green manufacturing and green logistics is part of the practices of nearly all companies, except for the forms of reuse and its logistics background.

Companies consider outcomes with an economic effect (economic and operative) the most important. Different types of cost reduction were chosen as most important performance indicators, which is in accordance with the intensive competition and price pressure in the industry. Regulatory pressure and growing consumer environmental awareness faced by the OEMs can explain the relatively high importance of environmental performance.

This research has limitations due to the small number of companies representing the OEM echelon of the supply chain in Hungary. The sample is not suitable for complex statistical testing. Further research can be done by comparing Hungarian results to other countries, and by extending the survey to other parts of the supply chain (Tier 1-4) or to OEMs in other branches of industry.

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The Real Reinvestment Rate Assumption as a Hidden Pitfall

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SUMMARY

The paper explores a few hidden problems of the reinvestment rate assumption. The automatism of net present value method creates and applies a very special reinvestment rate assumption. This assumption does not disturb the evaluation of investment projects with orthodox cash flow patterns. However, in the case of unorthodox cash flow patterns, automatism constructs a serious mistake in the calculations. In this case, the net present value provides wrong information about the economic efficiency. However, according to the general academic opinion, the net present value method is suitable for evaluation in the case of unorthodox cash flow patterns as well, as there can be only one net present value as opposed to the opportunity of several internal rates of return. The paper sets out to prove that this way of evaluation is wrong, and works out a solution based on the real economic basis.

Keywords: reinvestment rate assumption, net present value, internal rate of return, orthodox and unorthodox cash flow pattern, ranking, aggregate capital needs.

Journal of Economic Literature (JEL) codes: M21, G31, G32

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INTRODUCTION

The debate about the reinvestment rate assumption began in the 1950s (Solomon 1956; Renshaw 1957), and is still underway. This debate is essentially about whether the net present value method and the internal rate of return method may contain a kind of assumption concerning profitability of reinvestment of the annual yields. The essence of the disputed assumption is as follows: the two methods assume different rates of return concerning the reinvestment of annual yields (as long as the project lasts). According to this, the net present value method assumes the required rate of return, while the internal rate of return method takes the internal rate of return as the reinvestment rate.

The contested conception emerged as a kind of treatment of the ranking conflict which often occurs between the net present value (NPV) and the internal rate of return (IRR). The supporters of the described above reinvestment rate assumption concept ensure automatic priority to the NPV method by emphasizing that reinvestment according to the high IRR is hard enough. A typical example: "Projects can be ranked from highest to lowest IRR, with the highest being considered superior. The reinvestment rate assumption constitutes a drawback

of this approach, as it assumes that every time a cash inflow occurs it can be reinvested to earn the IRR for the remainder of the project's life. Sometimes this is an unrealistic assumption, especially for high-IRR projects." (Laux 2011:30)

The content band covered by the debate may be narrowed to some extent by the fact that only orthodox cash flow patterns are involved in the topic of ranking conflict (there is only one sign change in the cash flow line). In the case of unorthodox cash flow patterns, the IRR method is inadequate for project evaluation. Therefore in such cases the ranking conflict cannot even occur between the two methods.

The debate is slightly one-sided. One of the dominant groups does not argue and does not react to the opposing views, just repeats the validity of the reinvestment rate assumption as a well-known relationship. These views can be considered roughly uniform (and they are typical in the finance literature). The representatives of the significantly smaller group of those who partially or fully reject the reinvestment rate assumption try to prove that this assumption is wrong. They use different logical arguments as well as mathematical or exemplary evidence. Their methodical solutions are also varied (for example Dudley 1972;

Carlson et al. 1974; Keane 1979; Lohmann 1988; Johnston et al. 2002; Crean 2005; Rich and Rose 2014). A great number of studies on this topic have been published during these six decades. In these publications a number of unclear conditions, categories and phrases can be found. For instance, the reinvestment rate assumption itself is interpreted as either an explicit, implicit, or some kind of general assumption. The reinvestment amount is not always obvious, either. These amounts can mostly be interpretable as yields coming from a project in different years of its duration, more rarely as differences computed from yields of two examined projects. Sometimes the examined problem is not actually the reinvestment rate assumption, but the critical reinvestment rate (for example Alchian 1955; Dudley 1972; Meyer 1979). In the latter cases, references date back to Fisher (1930). Meyer's paper (1979) examines this question according to the system tools and categories of microeconomics.

Several authors point out their disapproval with the one-sided teaching of faulty doctrines. Among them, Johnston et al. (2002) call attention to the fact that a number of finance textbooks completely ignore scientific findings that disprove the reinvestment rate assumption of the two methods. Due to this, they urge reforms. In the introduction of their paper, Walker et al. (2011) give a detailed description of teaching completely controversial materials. Their research joins the study of Keef and Roush (2001), which draws the attention to the fact that finance textbooks use the reinvestment rate assumption higher proportion than textbooks in management accounting. The findings of their own research done a decade later show a similar direction. They make an important statement emphasizing the lack of consistency amongst disciplines: "Finance books fall at one end of the continuum with 64 percent using the assumption while the engineering economics books fall at the other end with just 20 percent using the assumption" (Walker et al. 2011:11-12).

Considering the given aim and content, the debate about this reinvestment rate assumption is unnecessary. The bottom line is that the problem of ranking conflict mistakenly occurred because the NPV method is inherently unsuitable for ranking. The differences in initial investments, durations and rapidity of capital returns may distort the comparability of net present values. (Today this problem is well known.) In the case of orthodox cash flow patterns a systematic and correct elimination of distorting factors leads to a special NPV rate, which is the difference between IRR and the required rate of return. This rate difference as an authentic NPV rate gives the same ranking list as the internal rate of return (assuming equal required rates of return). Therefore, in the case of an equal required rate of return, the ranking according to the correctly computed net present value rate and the ranking according to the internal rate of return cannot differ from each other. As two different and correct rankings cannot emerge, the

ranking conflict between these two methods cannot occur either. (This topic is shown in detail in Illés 2012a and 2014.) Note that the literature of business economics applies different methods for taking the risk into consideration, and thus the correction of required rate of return due to the project risk is not the one and only solution.

The topic of the reinvestment rate assumption is still an essential one, despite the fact that this question is not relevant to the original problem. This topic arises in other structures and contexts that are definitely different from those presented above. The present paper proves that the NPV method automatically creates a special kind of reinvestment rate assumption in all cases. This one is the real reinvestment rate assumption. In the case of evaluation of orthodox cash flow patterns, this assumption does not have any disturbing effects. However, in the case of unorthodox cash flow patterns, this automatism involves an error, which precludes the possibility of a correct application of the NPV method for project evaluation in this field. In the case of unorthodox cash flow patterns the automatism of the real reinvestment rate assumption come into being for the IRR method as well. The possibility of multiple internal rates of return markedly shows that this method is unsuitable for evaluation in this field. A brief description of the distorting mechanism may contribute to a better understanding of details.

The main objectives of this paper are:

1. to reveal the essence and effect mechanism of the real reinvestment rate assumption;
2. to present the automatic realization of this assumption on the basis of mathematical models and to explain the process with help of examples;
3. to present the misleading effects of the real rate assumption resulting from the automatism of the method in the case of unorthodox cash flow patterns, and
4. to look for possibilities for eliminating misleading effects.

RESEARCH METHODOLOGY

This paper examines the circumstances and the effect mechanism of the real reinvestment rate assumption under the conditions and methodological solutions listed below.

1. *The traditional concept of the NPV and the IRR methods:* The paper interprets and analyzes the content background of NPV and IRR methods in the classic sense. Among others, the paper uses the term 'capital' as a homogeneous sum in terms of ownership. Profit is interpreted as a pre-tax profit. The interpretation and analysis of methods are related exclusively to investment projects. The analysis of financial market projects does not fall within the scope of the research. The paper does not cover the analysis of further branches and

combinations of traditional methods. It does not consider inflation effects, either.

2. *Business economics approach and system of aspects:* In the literature, there are two different trends of the comprehension and analysis of the NPV and IRR methods. The business economics interprets and manages the database as well as the results of calculations according to the conditions in reality. Finance is inherently built on standard microeconomic foundations. This trend has a relatively high level of abstraction, and applies categories partially different from those used in real life. Furthermore, in finance the conditions of a number of respects differ from reality. Therefore, the paper is based on business economics foundations. Illés (2012b) reveals the main discrepancies occurring in the relevant topic between finance and business economics.

3. *The calculation logic follows the real process of management and after the close of this, returns to the discounting method:* The paper assumes that the management relations can be clarified moving forward in time according to the management process. (The planning and thinking of corporate executives works the same way) This is the only way in which the emergence and realization of return requirements as well as the process of the surplus profit formation can be seen through (Illés 2012/a, 2014). Therefore, the study uses a detour to substitute for the classical methods. In order to show the content tally with the classical methodology of project evaluation, after the systematic exploration of content relations, the analysis returns to the classical method. Discounting back to the start time makes the examination of the management process impossible.

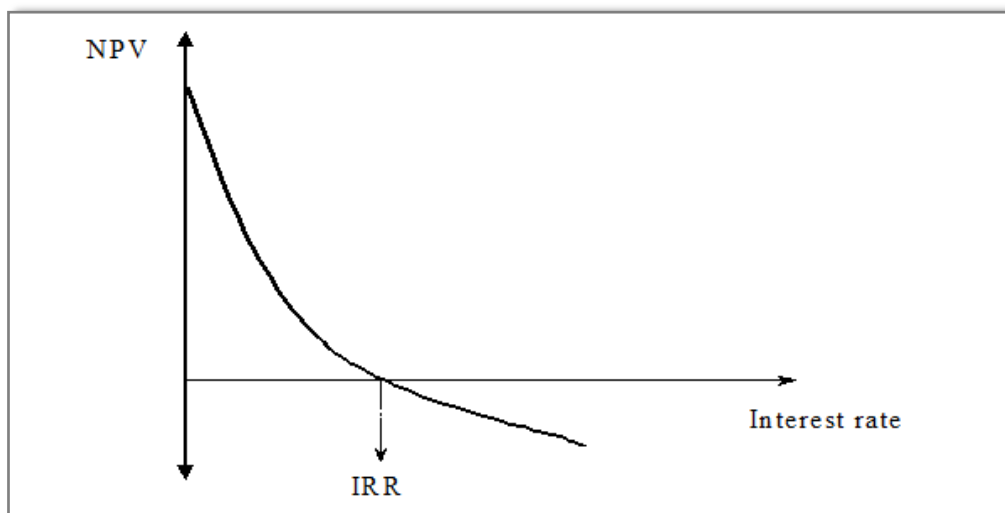
4. *Yield analysis according to the return structure:* Exploration and analysis of the return process can be solved by following the formation of internal structure of the yield. The yield is the difference between the annual revenues and annual expenditures. A positive amount of

yield is surplus revenue in terms of the project's financial needs. Therefore the yield exits from the project at the end of the given year. The conditions of further utilization of this usually do not affect the evaluation of the analyzed project. In the case of orthodox cash flow patterns, the content of the yield with a positive sign can consist of capital return and/or profit. In the NPV method, the profit part of the yield may consist of further two parts: profit according to the required rate of return and surplus profit. Until meeting the return requirements, the yield consists of profit according to the required rate of return and capital return. After the fulfillment of return requirements the content of the emerging yield is surplus profit. In the IRR method, the yield all along consists of capital return and profit according to the interest rate, there is no surplus profit. In this case, collation with the return requirements takes place after calculations.

ORTHODOX CASH FLOW PATTERNS, NET PRESENT VALUE

The importance of profit sum calculated at nominal value

The profit sum calculated at nominal value does not appear in the database of the NPV method. The significance of the nominal profit sum can be presented by the NPV curve, the general shape of which is well-known. This shape frequently appears in publications dealing with net present value. The curve shows what sum of net present value comes, with what interest rate (Figure 1.).



Source: Widely-used illustration

Figure 1 The sum of the net present value as a function of interest rate

Explanations related to the curve generally interpret only the surface. They point out that the higher the interest rate is, the lower the net present value becomes. The reduction first reaches the zero NPV, after that, because of the increase in interest rate the NPV becomes more and more negative. The interest rate, which results in the zero NPV, is the IRR itself. (This is well known.) Deeper explanations about the curve are not known.

However, there are quite significant connections in the content background of Figure 1. First of all the fact should be emphasized that this curve may be used only for profitable projects with orthodox cash flow patterns, for two reasons. First, the basic condition of a monotonic decrease is orthodox cash flow patterns. Second, the curve starts from a positive value range, and for that, the project should be profitable. With zero interest rate, the NPV quantifies the nominal value of the profit occurring during the whole duration of the project. (After the substitution of zero interest rate to the general formula, the NPV turns out to be the difference of the amount of all annual revenues and the amount of all annual expenditures calculated at nominal value.) *The content of the net present value related to the zero interest rate also makes it clear that the nominal profit occurring during the whole duration of the project can only serve to cover the profit requirements.* The maximum amount of profit requirement that can be covered is equal to the nominal profit generated during the project duration (for further details see Illés 2014).

The source of the net present value is the remaining surplus profit, which is the difference between the profit calculated at nominal value and profit requirement according to the required rate of return. The present value of this difference depends on the date of emergence and the required rate of return. In the case of investment projects with orthodox cash flow patterns the net present value shows the sum of the surplus profit above the required profit (or lack of it), discounted for the present date (Illés (2012a) proves this mathematically).

Content of the real reinvestment rate assumption

According to the logic of time going forward, firstly the capital and profit requirements should be recovered. These items gradually quit the project and calculations, according to their return. (The method does not charge farther return requirements for these items.) The yields generated after the fulfillment of return requirements are the surplus profit. *These sums also leave the project; however, they remain in the calculations. The NPV method focuses on the enumeration of sums interpreted in this paper as surplus profit.*

In the course of calculations according to the logic of moving forward, surplus profits must be increased by the interest rate by the end of the period to the possibility of summation. The interest income occurring this way is not real, rather technical item, which support the

possibility of summation of surplus profits emerging at different times. As a consequence, there will be a surplus profit higher than the nominal value at the end of the given period. *In the course of discounting back to the zero point of time, false interest income disappears from the calculations. However, the yield rate assumption does not disappear.*

The required rate of return has a role in discounting the surplus profits, despite the fact that the surplus profit also quits in the year of emerging, and furthermore the surplus profit cannot be regarded as the organic part of the project. The discounting mechanism related to the surplus profit automatically assumes that the profitability of this surplus will be equal to the required rate of return according to the project. This way the reinvestment rate assumption will prevail, but only regarding the surplus profit appearing above the profit as to the required rate of return. It is important to emphasize that *the assumption concerns only the surplus profit and it concerns neither the total yield, nor the yield part for capital return, nor the yield part for return on profit requirement.* (The content band of the real assumption is significantly narrower than that in the literature.)

In this case the reinvestment rate assumption exclusively enforced for the surplus profit does not cause any inconvenience. (The intended proper content can be reached by the average reinvestment rate on the market.)

Presentation of content relationship based on model editing

At the beginning of modeling it is required to determine the formula according to which – as long as the invested capital and its required profit return – the annual yield is appropriated for the return requirement. Except for the last year of the pay-off period, the emerging yield consists of two content elements: capital return and the profit according to the required rate of return. Formula (1) describes the calculating process of this. According to the calculation, firstly the profit requirement is extracted from the sum of the given year's yield. The remainder sum is the current year's capital return. This sum decreases the next year's tied-up capital. Further details are given in Illés 2014. [Formula (1) could be mathematically simplified, but then the formation of the structure itself cannot be seen.]

$$(E_{t-1} i + E_{t-1}) - H_t = E_t \quad | \quad H_t < E_{t-1}(1+i); 0 < t < z \quad (1)$$

where:

H_t = the yields (that is, the difference of revenues and expenditures) in year t , where the value of H_t is always positive for years $0 < t \leq n$ by the terms of orthodox cash flow pattern and the initial investment occurring at the zero point of time,

E_t = the not-returned part of capital at the end of year t ,

i = required rate of return,

t = serial number of years,

z = number of years of the pay-off period (including the last commenced year).

As the second step is required to make up a formula, showing the economic content of yield generated in the final year of payoff period. Economic content of this yield consists of three elements: profit return according to required rate of return, capital return and surplus profit. On this basis formula (2) describes the calculation of surplus profit concerning the final year of the pay-off period.

$$H_z - (E_{z-1} i + E_{z-1}) = \Delta H_z \quad | \quad H_z > E_{z-1} (1+i) > 0 \quad (2)$$

where ΔH_z = sum of the surplus profit in the last commenced year of pay-off period.

The yield occurring in the years after the return totally consists of surplus profit. The description of its quantification begins by making formula for the calculation of the annual amounts.

The surplus profit at the end of the first year after the pay-off period:

$$H_{z+1} + \Delta H_z (1+i)$$

The summed surplus profit at the end of the second year after the pay-off period:

$$H_{z+2} + [H_{z+1} + \Delta H_z (1+i)] (1+i)$$

The summed surplus profit at the end of the third year after the pay-off period:

$$H_{z+3} + H_{z+2} + [H_{z+1} + \Delta H_z (1+i)] (1+i) (1+i)$$

Considering the third year's formula, the sum of all of the annual surplus profits charged with the interest rate can be calculated by the end of the duration as follows (3):

$$FV\Delta M = \sum_{j=1}^s H_{z+j} (1+i)^{s-j} + \Delta H_z (1+i)^s \quad (3)$$

where:

$FV\Delta M$ = the sum of the surplus profit charged with interest rate at the end of the duration,

j = the ordinal number of the years of the operating period after the pay-off,

s = the number of years of the operating period after the pay-off ($s = n - z$).

Formula (3) contains some false interest rate income. The false interest income falls out during discounting. Surplus profits will be discounted from the year of their occurrence. The present value of the discounted and summed surplus profits is the net present value itself. As for the applied resolution, it realizes according to formula (4).

$$NPV = \left[\sum_{j=1}^s H_{z+j} (1+i)^{s-j} + \Delta H_z (1+i)^s \right] \frac{1}{(1+i)^n} \quad (4)$$

where n = duration of the project ($z + s$).

After simplification [using ($n = s + z$)] there will be a clear formula, according to which the net present value can be reached by discounting and assuming the surplus profits according to the date of occurrence:

$$NPV = \sum_{j=1}^s \frac{H_{z+j}}{(1+i)^{z+j}} + \frac{\Delta H_z}{(1+i)^z} \quad (5)$$

(A non-structure-follower proof of this content is included in Illés (2012a).)

Starting from the classical version of the NPV inscription it cannot be seen that only surplus profits remain among the really discounted items. The above formulas prove that the automatic reinvestment rate assumption can occur only concerning them.

Illustration and explanation with a simple example

Example: The cash flow pattern of Project A in order of commencement years:

units -300, +200, +150, +50, +20

Table 1 shows the formation of the return process according to the yield structure.

Table 1
The return process of Project A at 10 percent required rate of return

Measurement unit: unit

Year	At the beginning of the year	The yield structure at the end of the year			Balance
		Profit requirement/ false interest income	Capital return	Surplus profit	
1	-300	30	170	-	-300 + 170 = -130
2	-130	13	130	7	-130 + 137 = +7
3	+7	0.7*	-	50	+7 + 0.7 + 50 = +57.7
4	+57.7	5.8*	-	20	57.7 + 5.8 + 20 = +83.5
Net present value: $83.5 \times 0.68301 = 57.0$					

*false interest income

According to the conventional calculation method the net present value of Project A is as follows:

$$NPV_{A,10\%} = -300 + 200 \times 0.90909 + 150 \times 0.82645 + 50 \times 0.75131 + 20 \times 0.68301 = 57.0$$

In the false interest income column of *Table 1*, units 0.7 and 5.8 marked by an asterisk (*) do not represent the real yield. The two items are functioning as technical factors ensuring the additivity of surplus profits emerging at different times. It is obvious that both of them disappear during discounting.

According to formula (5) the net present value can be defined as the sum of discounted surplus profits. Amounts of surplus profits emerging in certain years can be seen in column 5, *Table 1*. The calculation is as follows:

$$NPV_{A,10\%} = 7 \times 0.82645 + 50 \times 0.75131 + 20 \times 0.68301 = 57.0$$

ORTHODOX CASH FLOW PATTERNS, INTERNAL RATE OF RETURN

As it well known (and can be seen in *Figure 1*), the IRR is an interest rate in terms of which the NPV is zero. According to this as timing and as much profit is generated which exactly results in the profitability, according to the internal rate of return. (This sameness principle gives the essence of the IRR method.) Thus, technically there is no surplus profit (no lack, either). This also means that the calculation mechanism of the IRR method does not create any reinvestment rate assumption in the case of orthodox cash flow patterns.

Illustration and Explanation with an Example

Example: the cash flow row of Project B in order to the serial number of years is as follows:

units -240, +100, +100, +100

The internal rate of return is 12%. *Table 2* shows the formation of the structure of the yields.

Table 2
The content structure of the yields of Project B at 12 percent interest rate

Measurement unit: unit

Year	Capital to be returned at the beginning of the year	The structure of 100 units annual yield		Capital still to be returned at the end of the year
		For profit requirements	For capital return	
1	240	29	71	- 240 + 71 = - 169
2	169	20	80	- 169 + 80 = - 89
3	89	11	89	- 89 + 89 = 0

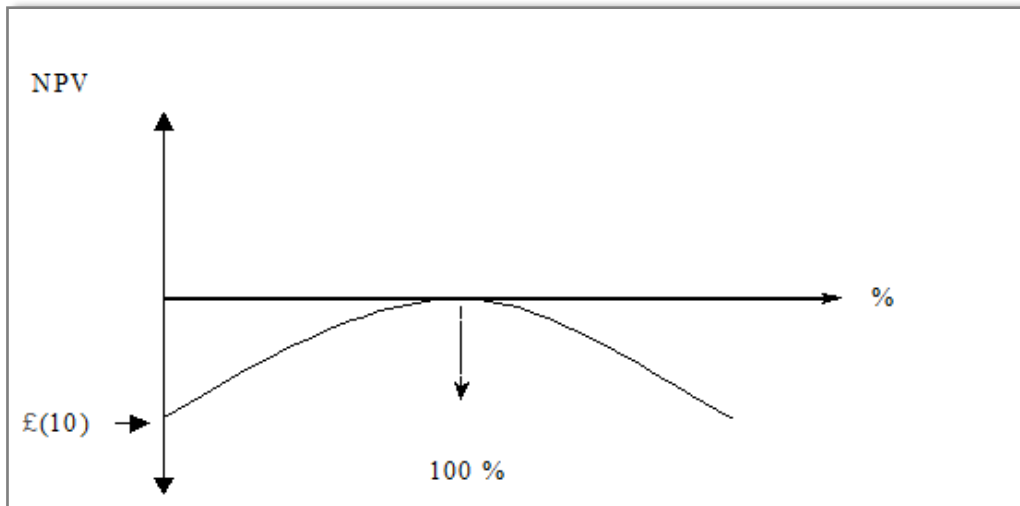
Computational materials in *Table 2* present as well that in the case of the IRR method there is no surplus or lack of profit compared to the amount created according to the interest rate (in case of orthodox cash flow pattern). The calculation mechanism does not show any reinvestment rate assumption.

INVESTMENT PROJECTS WITH UNORTHODOX CASH FLOW PATTERNS

A wide variety of unorthodox cash flow patterns can be imagined. Usually the number of sign changes has

the greatest importance. Furthermore, the relative size of the initial investment, the occurrence of yearly yields and their sum, and the time of changing signs also create different specialties.

Keane quotes Mao's (1969) example with a figure in which – despite the change in two signs – only one IRR can be realized, and there is not any interest rate that would result in a positive net present value (Keane 1975: 16-17). The annual yields of the mentioned example are as follows: -£10, +£40, -£40. (The project has a loss according to its nominal value. That is why the net present value curve in *Figure 2* starts at -£10.)

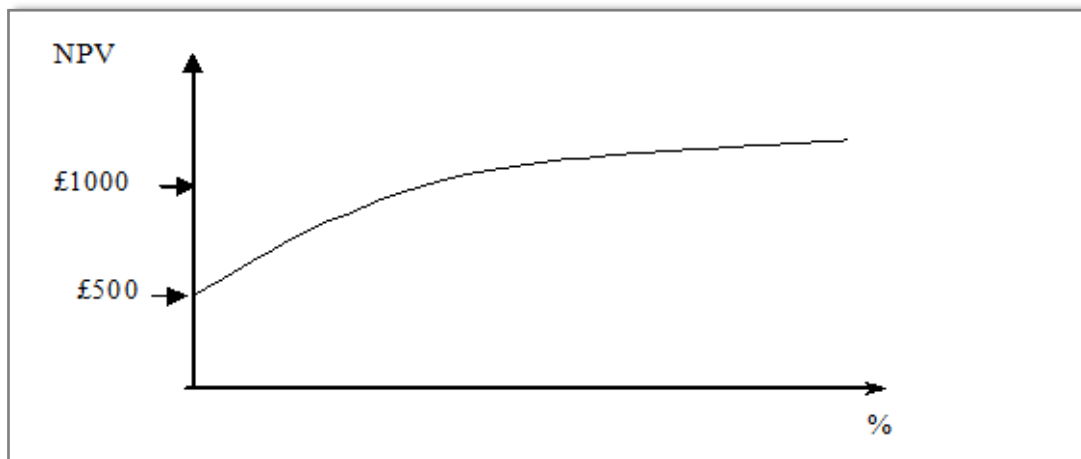


Source: cited in Keane (1975:17)

Figure 2 The curve of Mao's net present value example

In addition, Keane (1975:18) uses an example demonstrating a project possibility that has an always positive NPV curve, and where there is no internal rate of return. In his example the cash flow line is as follows: +£1000, -£3000, +£2500. The pattern is rather peculiar. At the moment of the beginning (that is, the zero point)

an income surplus of £1000 quits the project, then a year later an expenditure surplus of £3000 occurs, which is then followed by an income surplus of £2500. The profit calculated at nominal value is £500. (That is why the curve in Figure 3 starts at £500.)



Source: Keane (1975:18)

Figure 3 The curve of Keane's special net present value example

Another example with a similar structure can be found in the book written by Arnold and Hope (1990:258): +£1000, -£2000, +£2000. The result is $r = \sqrt{-1}$ calculated by the authors as an internal rate of return.

In Van Horne and Wachowicz (2008:342-343) there is an example where – despite the double sign change – there is only one internal rate of return. The cash flow line is as follows: +\$1000; -\$1400; +\$100. In

addition, there is another example with three sign changes and three internal rates of return. (Cash flows are: -\$1000; +\$6000; -\$11000; +\$6000. The internal rates of return: 0, 100 and 200 percent.) A wide choice of extreme examples can be selected from publications focusing on the topic of multiple internal rates of return (e.g. Schafrick 2003).

In the majority of the accessible publications there are examples concerning unorthodox cash flow patterns, where initial investment is relatively low and a very high

income surplus occurs at the end of the first year as compared to the initial investment, then the second year also finishes with a similarly high expenditure surplus. In

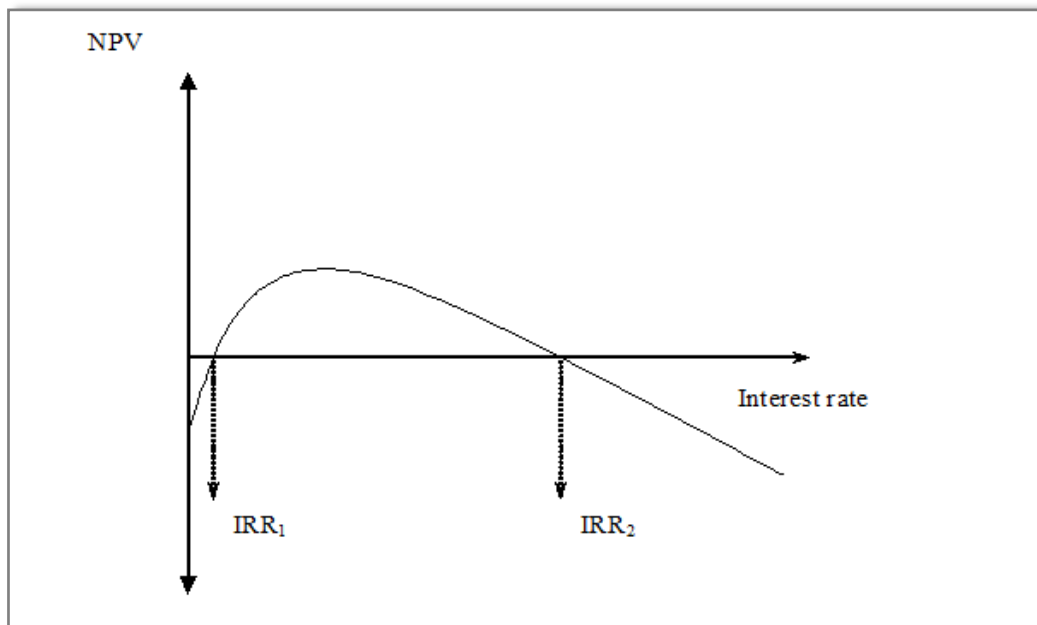
these examples, the cash flow row has two internal rates of return. Some examples are given in Table 3.

Table 3
Published examples of unorthodox cash flow patterns with double internal rate of return

Source	Unit	Year			IRR, percent
		0	1	2	
Solomon (1956: 128)	\$	- 1,600	+ 10,000	- 10,000	25 and 400
Brealey & Myers (1988: 80)	\$	- 4,000	+ 25,000	- 25,000	25 and 400
Arnold & Hope (1990: 258)	£	- 2,000	+ 5,100	- 3,150	5 and 50
Plath & Kennedy (1994: 82)	-	- 16	+ 100	- 100	25 and 400
Firer & Gilbert (2004: 43)	-	- 1,600	+ 10,000	- 10,000	25 and 400
Van Horne & Wachowicz (2008: 341)	\$	- 1,600	+ 10,000	- 10,000	25 and 400
Bierman & Smidt (2012:93)	\$	-100	+310	-220	10 and 100

Below, the content of the main relations is revealed for this type of cash flow pattern. (The relatively low initial investment and this sum with its required profit can return in the first year of the project period, but a high sum of expenditure surplus occurs at the end of the period.) Certainly, the hidden context can be revealed as to other example types however, such complexity would spoil the transparency of the models. With the knowledge basis of the essence of these models, logically, the main problems of other unorthodox cash flow pattern models can become transparent.

In the case of unorthodox cash flow patterns the NPV calculated with zero interest rate also quantifies the nominal profit sum emerging along the total duration of the project. Each of the examples listed in Table 3 is calculated at loss-making nominal value. All of the net present value curves start from the negative range of values, and cross the x axis twice (*Figure 4*). All of the possible net present values are positive in the section between the two internal rates of return. Each interest rate outside this section leads to a negative net present value.



Sources: Brealey & Myers (1988:81); Firer & Gilbert (2004:43); Van Horne & Wachowicz (2008:342) and so on.

Figure 4 Net present value curve of the examples shown in Table 3

If any of the projects in Table 3 wishes to achieve profitability of at least zero net present value (according to the required rate of return), the loss should be settled from some kind of sum, in addition, the project should

generate the profit according to the interest rate, but this is impossible in the terms of the database.

The riddle of net present value of projects with unorthodox cash flow patterns

One important question is how the positive net present value occurs in the interest rate band between the two internal rates of return in the case of the studied example types. These projects are loss-making. How can the loss and the required profit return, moreover how can some surplus profit emerge, creating a positive net present value? Where do these sums come from? (The yields of the quitting sums are related to other projects' result and are not applicable here.)

The problem can obviously be rooted in the cash flow with the negative sign emerging in the final year of the project. In the examined example types the initial investment and its profit requirements return in the first year. However, the surplus yield is not the surplus profit, but a temporary surplus profit, the amount of which is not even enough to cover the final year's negative cash flow. According to the calculation mechanism the temporary surplus profit can also have interest income. In reality this is only false income. Despite this fact, the automatism of the method utilizes them (partially or totally) in financing the negative cash flow.

The sum of the temporary surplus profit quitting the project can logically be included as a return element of the later expenditure, but the interest income related to it cannot. (The interest income will mean a chance for another project, providing the yields of reinvested temporary surplus profit.)

The false interest income does not disappear at rediscounting. In the case of orthodox cash flow patterns, its disappearance is implemented during the discounting process of the surplus profit. In this connection the key factor of the disappearance of the false interest income is the discounting of surplus profit. However, in the case of the studied unorthodox cash flow patterns there is no surplus profit, only temporary surplus profit, which is totally used for partially covering the sum of the negative cash flow at the end of the period. For this reason the

temporary surplus profits cannot be discounted and their false interest incomes cannot disappear.

According to the mechanism of the method the false interest income of temporary surplus profit is able to cover the real losses caused by the project and meet the profit requirements according to the interest rate, and even surplus profit can emerge.

The most important point of the problem is as follows: the calculation mechanism of the net present value method handles the false interest income of temporary surplus profit as real money. The method uses the false income to cover the loss and profit requirements. In the x axis section between internal rates of return there is an unused part of the false interest income. Discounting the unused part of the false interest income leads to a positive sum of net present value. The net present value emerging this way is false as well. The false yield cannot become real yield, not even by discounting. (In reality, all of the net present values of the studied unorthodox cash flow patterns are false.)

In the case of studied unorthodox cash flow patterns the reinvestment rate assumption is the real problem during the formation of the false interest income as well as the discounting of the false surpluses.

Using the model analysis

The model analysis also refers to the cash flow pattern type in Table 3. Conditions for this model:

- the cash flow pattern starts with a negative sum at the zero point of time,
- the cash flow pattern changes its sign twice, the first change is by the end of the first year, and the second one takes place during the final year of project period,
- the total profit sum according to nominal value is negative, that is the project makes losses.

Keeping in mind the above-mentioned features, the false surplus profit can be estimated as follows [where (6) is the corrected version of formula (3)]:

$$FV\Delta M_f = \sum_{j_f=1}^{s_f-1} H_{z_f+j_f} (1+i)^{s_f-j_f} + \Delta H_{z_f} (1+i)^{s_f} - H_n \quad \left| \quad \sum_{t=1}^n B_t < \sum_{t=0}^n K_t; \quad i > 0 \right. \quad (6)$$

$FV\Delta M_f$ = false surplus profit at the end of the project period.

z_f = the number of return years of the initial investment and its profit requirements (including the last commenced year).

ΔH_{z_f} = temporary surplus profit appearing in the year of the return of the initial investment and its profit requirements.

$H_{z_f+j_f}$ = the yearly occurring temporary surplus profit after the z_f year.

j_f = the serial number of years of duration after the return of initial investment and its profit requirements ($j_f = t - z_f$).

s_f = the number of years of the period following the return of initial investment and its profit requirements ($s_f = n - z_f$).

B_t = revenues in year t ($t=1 \dots n$).

K_t = expenditures in year t ($t=0 \dots n$).

t = serial number of years (in the s_f time section: $t = z_f + j_f$).

n = duration of the project ($n = z_f + s_f$).

As a corrected version of formula (4), the calculation of the false net present value is as follows:

$$NPV_f = \left[\sum_{j_f=1}^{s_f-1} H_{z_f+j_f} (1+i)^{s_f-j_f} + \Delta H_{z_f} (1+i)^{s_f} - H_n \right] \frac{1}{(1+i)^n} \quad \left| \sum_{t=1}^n B_t < \sum_{t=0}^n K_t ; i > 0 \right. \quad (7)$$

NPV_f = false net present value.

After reduction:

$$NPV_f = \sum_{j_f=1}^{s_f-1} \frac{H_{z_f+j_f}}{(1+i)^{z_f+j_f}} + \frac{\Delta H_{z_f}}{(1+i)^{z_f}} - \frac{H_n}{(1+i)^n} \quad \left| \sum_{t=1}^n B_t < \sum_{t=0}^n K_t ; i > 0 \right. \quad (8)$$

Formula (6) demonstrates that the net present value method handles the temporary surplus profit and its non-existent interest income as homogeneous payback elements. Formula (8) shows that in this case the net present value is not the sum of the discounted surplus profits. (A project with losses cannot produce surplus profit.)

Illustrative examples and explanations

The structure of the data of the example to be shown is similar to that of the examples in *Table 3*. The annual yields of Project C are as follows: units -100, +625, -625. The two internal rates of return are 25 and 400%. Thus, at each interest rate between 15 and 400 percent, the net present value has a positive sum and in the case of interest rates which fall out of this band, a negative net present value appears. The yield structure at interest rates of 15 and 27% is presented in *Table 4*.

Table 4

The content structure of the yields of Project C at 15 and at 27 percent interest rate

Measurement unit: unit

Percent	The structure of 625 units at the end of 1st year			Surplus profit/deficit calculated for the end of 2nd year			NPV
	For capital returns	For interest	Temporary surplus profit	Carried over	False interest income	At end of 2nd year	
15%	100	15	510	510	76.5*	586.5-625= -38.5	-29.1
27%	100	27	498	498	134.5*	632.5-625= 7.5	4.6

*The false interest income: $510 \times 0.15 = 76.5$ and $498 \times 0.27 = 134.5$

According to the conventional calculation method the two net present values are calculated as follows:

$$NPV_{C15\%} = -100 + 625 \times 0.86957 - 625 \times 0.75614 = -100 + 543.5 - 472.6 = -29.1$$

$$NPV_{C27\%} = -100 + 625 \times 0.78740 - 625 \times 0.62000 = -100 + 492.1 - 387.5 = 4.6$$

According to formula (7), discounting of the temporary surplus profit and the final year's negative cash flow also leads to the same net present value:

$$NPV_{C15\%} = 510 \times 0.86957 - 625 \times 0.75614 = -29.1$$

$$NPV_{C27\%} = 498 \times 0.78740 - 625 \times 0.62000 = 4.6$$

The data of *Table 4* show that the main content problem is the utilization of false interest income. This mechanism can be realized at both positive and negative net present value. In the reality, at the end of the first year the whole yield of 625 units quits the project. As a part of this the temporary surplus profits also quit. (If they will reinvest, their yield will be among the results of another project.) In the line of the 15% interest rate the temporary surplus profit is 510 units. Its false interest income is 76.5 units. The sum of these two items is not enough to cover the expenditure of 625 units at the end of the year. Contrary to this, the false interest income of 134.5 units at 27% together with the 498-unit temporary surplus profit is enough to meet the return requirement according

to the method, and even surplus profit remains. Due to the false surplus profit's discounting the false net present value is 4.6 units.

Unorthodox cash flow patterns and internal rate of return

In the case of unorthodox cash flow patterns the main point of the problem with the IRR method is the same as that explored above. The only difference is that in this case there is no surplus false interest income, nor

lack of it. Here the false interest income is in two parts. The first part is as much as needed to eliminate the loss and the second part is equal to the sum of the internal rates of return. (The net present value calculated with an internal rate is always zero.)

The two false internal rates of return formulated by false interest income support the view that these rates do not have a sensible economic content, and they do not give any useful information. *Table 5* presents the yield structure behind two internal interest rates of Project C.

Table 5
The content structure of the yields for Project C at 25 and 400 percent interest rate

Measurement unit: unit

Percent	The structure of 625 units at the end of the 1st year			The false total return at the end of the 2nd year		
	For capital returns	For interest	Temporary surplus	Carried over	False interest income	The covering of 625 units expenditure
25%	100	25	500	500	125*	625-625 = 0
400%	100	400	125	125	500*	625-625 = 0

*The calculation of false interest income: $500 \times 0.25 = 125$ and $125 \times 4 = 500$

In the given structure the false interest incomes of 125 and 500 units are not generated by the project. At the rate of 25% the false interest income covers the 100-unit loss and the 25 units that are needed for interest at that rate. At 400%, the 500 units cover the 100-unit loss, and the 400 units needed for interest ($125 = 100 + 25$ and $500 = 100 + 400$).

THE HIDDEN PITFALL AND THE POSSIBILITIES OF AVOIDANCE

It is well known that investment projects with unorthodox cash flow patterns have only one net present value. To this end, the literature suggests applying the net present value method during the evaluation of projects. This paper uses two citations to show the nature of suggestions. Arnold & Hope (1990:259) say, "In view of the technical difficulties associated with IRR, it is always preferable to use NPV to evaluate projects with unorthodox cash flows." Bierman & Smidt express an even more explicit view when they say, "In this case a simple calculation of the net present value of the investment at the appropriate rate of discount would have provided the correct answer and would have bypassed the problem of multiple internal rates of return" (Bierman & Smidt 2012:95).

It is beyond doubt that in contrast to the unmanageable information content of multiple internal rates of return, the net value calculations provide only one type of final result for unorthodox cash flow patterns. However, this sort of net present value uses non-existent

interest income and for this reason lacks a meaningful economic content. It is playing with numbers that determines whether the net present value will be negative or positive.

If a company based on a positive net present value decides to invest in the implementation of a loss-making project, it creates a loss resource, which may be extremely disadvantageous. This is the main point of the hidden pitfall of the real reinvestment rate assumption.

Focused and targeted analyses are required to determine whether there are any counterbalancing forces that may make the losses generated by a specific project worth undertaking. In order to evaluate a project, a method is to be used that properly fits the context of management and results in providing information with appropriate content. In this case there are two main methodological solutions. They are as follows:

- Examination of a project combination based on the internal rate of return and aggregate capital needs.
- In some cases the yield line can be divided into sections by orthodox cash flow sections, for instance according to reconstruction or overhaul system of fixed assets (in such cases the evaluation can be solved as usual).

Examination of project combinations based on the internal rate of return and aggregate capital needs

If the company has a project possibility with orthodox cash flow patterns which is combined with the examined unorthodox one, and the combined project's

cash flow patterns still remain orthodox, it is sensible to examine the two projects together as a project combination. It is very important to note that only the IRR method can be effective for comparison. The NPV and its traditionally derived indexes are not suitable for comparing projects.

First, the IRR of the project with orthodox cash flow patterns and its aggregate capital needs should be quantified, and then those of the project combination. The term “aggregate capital needs” is a new business economics category. It means the capital sum that is used for the whole duration of the project. Its measurement unit is one unit of tied-up capital for one year. (Details of calculations are available in Illés 2014). As decision-making information, it needs to be made clear how the internal rate of return and the aggregate capital needs of the project and those of the project combination relate to each other. The economic impact of the unorthodox cash

flow patterns is favorable if the indexes of the project combination are better than those of the project with orthodox cash flow patterns that functions as part of the project combination. Further analysis also may be necessary.

An example and explanations

Using Project C described above, we can combine it with Project D to form a C & D project combination, as shown in the following example. The cash flow row of Project D is as follows: units -500, +200, +625. The total profit sum on the nominal value is 325 units; the internal rate of return is 33.6%. The results of basic calculation are given in Table 6.

Table 6
Internal rate of return and the aggregate capital needs of Project D and the project- combination

Measurement unit: unit

Project	Cash flow row	Total profit in nominal value	Aggregate capital needs	IRR %
C	-100, +625, -625	-100	not interpreted	25; 400
D	-500, +200, +625	325	$500 + (500 - 32^*) = 968$	33.6
C & D combination	-600, +825, ±0	225	600	37.5

* $200 - 500 \times 0.336 = -32$

According to the data in Table 6 the internal rate of return of the project combination is 3.9 percentage points higher than that of Project D. This is a favorable impact. However, the higher profitability relates to a significantly lower capital sum. (Higher profitability with a lower profit sum can only occur if the related aggregate capital needs are also lower.) The aggregate capital needs of the project combination became lower because the very high yield of Project C in the first year led to a substantial capital return.

In the given case the decision makers should decide which is more favorable for the company: 33.6 percent profitability for the capital of 968 units, or 37.5 percent for the capital of 600 units. The identification and analysis of the critical profitability rate of difference of the aggregate capital needs can improve the chance of making a good decision.

The 33.6 percent profitability of the D project can be considered excellent. The critical profitability of the aggregate capital needs difference is 27%. That is, the 368 units to be invested in another project and its 27% profitability should be achieved, which together with the project combination would reach the results ensured by the D project itself. (The control calculation is as follows:

$$\frac{0.27 \times 368 + 0.375 \times 600}{968} = 0.335$$

The theoretical background of this calculation is given in Illés 2015.) It is not very likely that the difference of 368 units of the aggregate capital needs can

be invested at the rather high profitability of 27%. The critical rate of profitability of the aggregate capital needs difference can be lower if combined with a project with lower profitability (assuming that among the projects to be implemented there are also such projects).

The method of project combination analysis has a series of simplification possibilities (an example of a simplified version is in Illés 2007).

SUMMARY

The nearly six-decade debate about the reinvestment rate assumption is in connection with the ranking conflict between the net present value and the internal rate of return. Nevertheless, a correct ranking conflict will not appear. The reason is that the NPV method is inherently unsuitable for ranking. In the case of orthodox cash flow patterns the elimination of distorting factors of comparability leads to a net present value rate, which is the difference between the internal rate of return and the required rate of return. For an equal required rate of return, the two rankings will be identical. In the case of unorthodox cash flow patterns the internal rate of return cannot generate ranking, so the ranking conflict cannot appear at this point, either. Without a real ranking conflict the long-term debate is rootless, therefore the reinvestment rate assumption coming from it does not have any sense.

However, considering the real content impact of the methods, the question of whether some kind of reinvestment rate assumption is realized by calculation automatism is important. On the basis of the yield structure formation analysis, this paper proves logically and mathematically that a special reinvestment rate assumption exists. In the case of NPV this assumption concerns only the surplus profit, and applies the required rate of return as reinvestment rate assumption. In the case of orthodox cash flow patterns, this assumption does not disturb the evaluation of investment projects.

For orthodox cash flow patterns the IRR method does not apply any reinvestment rate assumption. The IRR covers the whole profit sum and there is no surplus profit. Accordingly, the automatic reinvestment rate assumption cannot be realized.

However, in the case of unorthodox cash flow patterns the content relations strongly differ from the orthodox one. The study constructs a model for examinations. The model is based on the wide range of types in unorthodox cash flow patterns that frequently occur in the literature. Its characteristics: the initial investment is relatively low; a very high income surplus occurs at the end of the first year, then the final year finishes with a very high expenditure surplus. Furthermore, this examined type of cash flow pattern is loss-making and has two internal rates of return.

In this model the NPV and the IRR methods are of similar character as far as the yield assumption is concerned. Automatic yield assumption plays an important role in both methods. The NPV method realizes the yield assumption according to the required rate of return, while the IRR method does so according to

the internal rate of return. In the examined type of projects there are no surplus profits because of the loss, only temporary surplus profits. With the automatism of the two methods the temporary surplus profits generate interest income, but these are false (non-existing sums). Both methods handle the false interest income as real money, and they use these false sums for covering the losses and meeting profit requirements, too. In the case of IRR method the false interest income apparently covers the losses and the profit is needed according to the interest rate. In the case of positive NPV the false interest income is able to cover the real losses, meet the profit requirements, and the unused false interest income can even emerge as a surplus profit. Discounting of this false surplus profit leads to the false NPV. The false interest income of temporary surplus profit results in net present values and internal rates of return with false content.

If a company decides to invest in the implementation of a loss-making project with a positive NPV this may be extremely disadvantageous. If there is no profit, the profitability expectancy cannot be realized. On implementing the loss-making project the losses of the project become real. In this case the NPV is misleading. This is the main point of the hidden pitfall of the real reinvestment rate assumption.

One reasonable step is to examine the question if there is a situation when it is worth taking up a project with losses. The analysis can go into two main directions. One of them is the examination of project as a part of a project combination with an orthodox cash flow pattern. The other one is dividing the yield line into sections by orthodox cash flow sections, if possible.

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Analysis of Sectoral Features in Hungarian Accredited Innovation Clusters

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SUMMARY

This paper discusses how sectoral characteristics are reflected in the operation of Hungarian accredited innovation clusters. The purpose of this paper is to analyse how sectoral bonding affects the mission of the clusters as well as their innovation and market goals, the membership criteria of the management and the motivation of the members and their cooperation. The study uses a literature review and in-depth interviews to identify the interrelations and the differences between networks and clusters, and to observe several sectoral features in the Hungarian accredited innovation clusters.

Keywords: cooperation; innovation cluster; networks

Journal of Economic Literature (JEL) codes: O32

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INTRODUCTION

Clusters are undergoing a kind of an economic organisational transformation as a response to the challenges of globalisation. While clustering evolved in an organic way in the developed Western countries, in Hungary it was started by the state, governed from above, typically in the more developed regions of the country. The long-term cluster development concept began in 2007 with the introduction of a multi-stage cluster development model (Mag 2012).

In both international and Hungarian practice different types of clusters became common. According to their orientation, one can differentiate between regional (Todtling & Trippel 2005) and industrial (Enright 1996) clusters. In our research we focused on the latter. We sought answers to how sectoral characteristics are reflected in the operation of accredited innovation clusters. We wanted to know how sectoral bonding affects the mission of the clusters as well as their innovation and market goals, the membership criteria of the management and the motivation of the members and their cooperation. The process of clustering is determined by the presence of cross-sectoral clusters, and thus in our study we touch upon these as well.

Beyond enhancing the innovative and market efficiency of its members, innovation clusters can also serve broader, community purposes. Well-functioning clusters may contribute to the development of an entire region or industry (Urbanciková 2011), or can play a major role – through cooperation with universities,

research institutes – in the formulation of knowledge centres, in implementing novel directions of development, in boosting innovative sectors, in increasing employment, in connecting SME sector to the economic circulation, or even in strengthening responsible corporate behaviour. As a combined effect of all they can promote the improvement of the macro-economy.

INTERRELATIONS AND DIFFERENCES OBSERVED BETWEEN NETWORKS AND CLUSTERS

Business networking gave way to the transformation of the organisation of the economy as a response to the challenges of globalisation. In the changed environment companies need to pay attention not only to their internal environment; they can only exploit their local competitive advantage if they are embedded in business networks (Håkansson & Snehota 1995). It is no different in the case of certain sectors or regions, either.

Although one can find different approaches regarding the terminological distinction of networks and clusters (Ford et al. 1986; Cooke, 2001; Lengyel 2002), there is a consensus about the fact that the foundation stone of both concepts is the relationship system and the

cooperation between the parties. With the formulation of clusters the development of network cooperation has come to a further stage. Formations were created that are nowadays considered as basic units of global competition (Döry & Rechnitzer 2000; Guinet 2001; Europe INNOVA 2008; Örfjan 2009).

In Western Europe and in the developed market economies cluster-oriented innovation has been preferred since the early 1990s. The European Cluster Memorandum (Europe INNOVA 2008) especially highlights the role of clusters in global competition in terms of efficiency and effectiveness of innovation activities. Clusters create a favourable environment and organisational framework for

- the formulation of new ideas, projects via cooperation,
- shortening the way from idea generation to market introduction,
- achieving cooperation ("coopetition") between competing companies,
- making small and medium-sized enterprises able to enjoy the benefits of new business and collaboration opportunities (Europe INNOVA 2008).

In accordance with these, the Memorandum emphasises that in modern competition all clusters are compelled to become innovation clusters.

Innovation clusters are network formations that build on knowledge networks and collaborative innovation systems. Their expansion and consolidation has a favourable effect regarding open innovations that are founded on broad knowledge bases, as well as regarding the conversion of R&D achievements into market success, or the market orientation of innovations. The distinctive characteristics of clusters compared to networks are reviewed based on these criteria.

Flexibility, openness, and open flow of information

While networks are rather closed, relatively stable organisations based on common business goals, clusters are open, more flexible forms of cooperation that are expansive in a variety of directions and have a collective vision (Lengyel 2002). Clusters host an institutionalised open flow of information and knowledge sharing (Grosz 2005; Sölvell 2009;).

Resulting from the above characteristics, clusters provide an ideal framework for network management of innovation processes, opening innovations. Open innovation is rooted in the revelation that all companies – regardless of its internal efficiency – need to be able to have deep and extensive relationships with external knowledge networks and communities (Chesbrough 2003). The benefits can be approached from two sides:

- accelerating internal innovation processes by purposefully utilising the inflow and outflow of knowledge,

- market expansion through extending the network of relationships, a better insight into the market and competition and finding mutual interests.

Clusters create platforms that encourage their members to share their information and ideas with each other and to combine their competences and resources. The "cluster product" of an innovation project is created as a result of common knowledge. Members can learn from one another, while they can also exert a pulling force on each other. They are propelled into continuous renewal through the development of relationships, and they can commit in long-term cooperation.

From the aspect of open innovation it is especially favourable that in clusters cooperation is not restricted to business organisations. Extensive interactions and close cooperation can be established among business organisations, universities and research centres, bridging organisations that provide technological or consulting services and other parties (foundations, chambers, governing institutions, business support agencies, etc.) A wide network platform (Guinet 2001) brings the various professional competencies together, provides a broad view of the whole innovation value chain, and connects the fields of science, technological development, manufacturing and marketing. Therefore, while networks are mainly characterised by codified (explicit) knowledge, clusters furnish a wide space to the utilisation of hidden (tacit) knowledge (Cooke 2001).

Through cluster connections and with the help of the supportive mediation of the management organisation it is easier to gain access to market information, to have a broader view of the market and a better understanding of the competition. The conversion of R&D results into market successes can be promoted by joint market actions, by market acquisition via the utilisation of the relationship networks of each other, or even by the creation of an 'internal' market consisting of purchasing transactions among cluster members. The market introduction of products and services created by the members can be accelerated due to the promotional or communication platform and relationship network of clusters. All of these processes promote the combining of consumer value and technological developments, the market orientation of innovations.

The chance of rivalry

In business networks rivalry rarely occurs, whereas in the case of clusters competitors might be included among members. This makes establishing a climate of trust difficult, and thus requires more attention from the management. However, members can seek for joint solutions to common problems and exchange their experience. Small and large enterprises in the same field can realise mutual benefits through sharing innovative ideas and providing the relationship network that is necessary for market penetration (Szabo et al. 2013). An additional benefit can be cost reduction and improved

bargaining power available via joint procurement. If competitors cover a wide user area, then even despite rivalry market expansion opportunities may arise.

Cluster management organisation as a node

Networks do not have a central node, which means that if one element is “removed” from the net, it will not make the entire system inoperable (Barabási 2003). The same cannot be stated about clusters, as a cluster management organisation itself is the node that connects the members and provides supportive background for cooperation.

The cluster management organisation provides a formal, comprehensive, coordinative framework for its members, and at the same time as the catalyst facilitates their collaboration, networking efforts, coordinates intentions and opportunities of cooperation, utilizes synergies. It plays an important role in the development of effective information chains, in the creation of a climate of trust, and at last but not at least in the exploration of (tender) opportunities. Simultaneously, it fulfils a bridging role between the entire cluster, its membership and the external parties as well. Since the composition and number of the members – being open organisations – can continuously change, the mediating role of the manager organisation is significant from the aspect of promoting the integration of new members and from the aspect of building relationships with the old players.

Freeriders

In clusters “freeriders” can appear as well, who can profit from cluster membership as a result of synergistic effects, or even agglomeration benefits, without actively participating in the joint work or in projects (Roncz 2007). Inactive members usually expect the management to “force grant applications on them” or to contact them to offer them opportunities. In most cases they name their excessive workload as the cause of their passivity, but the cause might also be that there is no project opportunity to which their specific know-how could be linked (this is especially characteristic of the IT sector).

The presence of such members exerts a “pull back” effect on the entire cluster, since the effectiveness of clusters are measured along with indicators such as the number of joint projects or the proportion of participants in completed funded projects. For this reason it is important that the cluster management organisation should demonstrate sufficient activity in exploring funded project opportunities as the basis for joint work, and should have a generative force, thereby it can motivate members. During the development of clusters the membership goes through a continuous cleansing. If

“freeriders” fail to be activated, they may be sieved out, while new players may enrol.

Achieving goals for the benefit of the community

Clusters may serve broader goals beyond the promotion of innovation and market efficiency of the members. They can have a decisive role in the development of a region, in the creation of knowledge centres, in the implementation of novel development trends, in boosting innovative sectors, in increasing employment, or even in the strengthening of responsible corporate behaviour (clusters operating in the environmental industry). As a result of all these factors, their role in the development of macro-economy is significant. It should be highlighted that clusters represent a favourable ground for connecting the SME sector to economic circulation. As a consequence, it is not enough for cluster management to concentrate their efforts on internal issues, but they also need to keep in mind the effects on the development of the whole region and the industry.

THE PURPOSE OF THE RESEARCH AND THE INTRODUCTION OF THE SAMPLE

In our qualitative research – in line with EU directives – the focus was on accredited innovation clusters.

The basic objective of innovation clusters is to promote the development and market introduction of knowledge-intensive products as a result of joint research and development. Cooperation from a market aspect enhances the improvement of the domestic and international competitiveness of cluster members and the extension of their market outcomes. From a research and development aspect cooperation can contribute to the improvement of the ratio of applied research and to an increase in the number of patents. Hungarian experts on the topic emphasise that the boosting of the employment of researchers with significant results (Dobronyi et al. 2012) is an important aspect. Innovation clusters are highly region-dependent. Plenty of research has proved that the regions where intensive cluster activity can be observed are considered as leading areas in innovation, too (Weisz, 2008; Mag Zrt, 2012; Horváth et al. 2013).

In our research we sought answers to questions like to what extent sectoral characteristics are reflected by the operation of clusters, what kind of innovation and market advantages can be gained by the membership and how it is enhanced by the management organisation – especially information flow and communication –, what the levels of cooperation are, and by what specific characteristics the clusterisation process in Hungary can be described.

The targets of our research were innovative clusters and their affiliates that were awarded or renewed the accreditation title of innovation clusters during the course of our research (the accreditation process is supervised by the MAG Zrt Cluster Development Office). The Cluster Development Office evaluates the received applications by the following main criterias: employment, SME status, export orientation, cooperation and innovation (due to lack of space we are not discussing these criterias in our article).

The period of data recording lasted from July 2011 to May 2014, during which time 21 innovation clusters had been accredited.

The sectoral distribution of domestic innovation clusters shows the dominance of the IT sector and the health industry. ICT-oriented innovation clusters are the most popular. This can be traced back to the "trendiness" of this industry, the rapid diffusion of innovations, and the volatility and diversity of the market. In addition,

Hungarian-owned companies also have a strong presence in these two areas; among start-ups and SMEs this sector is a particularly trendy area. The health care industry has a strong track record of innovation, and among the involved companies regaining lost market positions acts as a significant motivation, and also a cohesive force.

In the first phase of our research, we managed to contact 19 accredited innovation cluster management boards, which provided an access rate of 90.48 per cent. In the second phase we conducted in-depth interviews with cluster members. We were able to contact 40 accredited innovation cluster member companies in this way.

The industrial breakdown of our sample was the following (Figure 1): 33% of the clusters contacted operated in the IT sector, 28% in health industry and 11% in the plastics and packaging industries respectively.

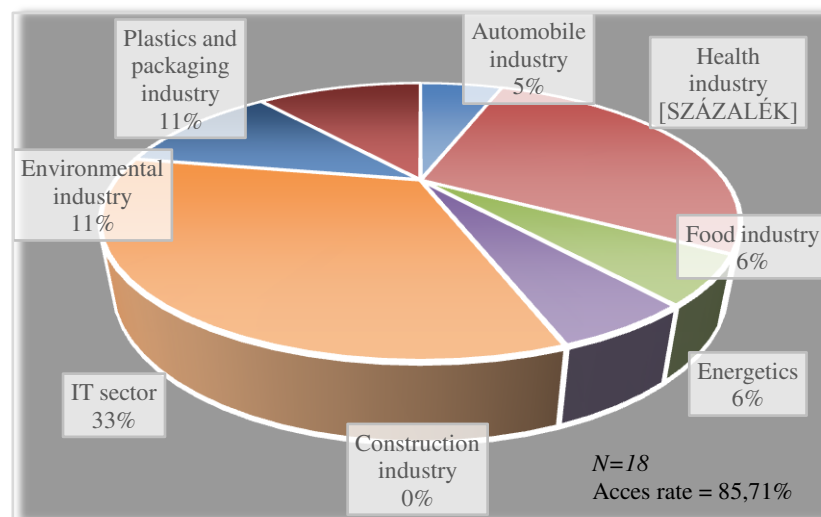


Figure 1 Industrial breakdown

PRESENTATION OF RESULTS AND DISCUSSION

The sectoral features are expressed in the vision of the clusters, membership criteria, the applied collaborative solutions and forms. The innovative features and market aspirations of cluster members also show a strong correlation with the sectoral characteristics, and the aims that motivate the entry, the expectations of innovation and market advantages of the membership and the cluster management can be derived from it as well. Examples are presented below.

Medical sector

In the medical field the principal objective of cluster formulation is to increase market opportunities

for the Hungarian companies involved in this industry, which has a long-standing tradition. With the dismemberment of the former large enterprises in this sector, development teams were forced to transform into small companies. Due to the emergence of multinational competitors, and nowadays mainly due to imports, micro, small and medium-sized businesses are almost completely excluded from the internal market. It is unfortunate, because an innovative product structure based on professional competence would allow the coverage of the entire demand structure. Cluster organisation offers an opportunity for the joint action of these domestic companies.

As a consequence, the most important advantage expected by the members is market acquisition by joint action. This partly means export market purposes and partly the exploration of gaps in the domestic market, finding supply opportunities in which the flexibility advantage rooted in smaller company size could be

exploited. Foreign-owned large enterprises competing in the Hungarian market are not interested in the production of tailor-made instruments. Consequently, it is an important sectoral feature that multinational companies are not allowed to join the clusters.

Member companies are characterised by technological and product innovations alike. Innovations are strongly market-oriented, their users respond to needs, in many cases individual needs. It is also an innovation feature to specialise in a given field (e.g. infant medicine). Small companies solely trading in the domestic market represent a significant proportion of the members. These companies are not able to enter the international markets on their own resources, whereas in the domestic market they are in close, professional contact with their users. Thus, access to market information is not a factor of inhibition in innovation, and the market introduction of new development outcomes does not require intensive marketing support, either. However, the presence of non-Hungarian manufacturers' products that provide solutions to the same problems represents a tough competitive challenge.

In this sector funded projects play a significant role, and companies with strong financial status test themselves on the international scene as well. In terms of innovation, the monitoring of international competitors bears decisive importance, but useful sources are foreign trade fairs and the brochures of foreign manufacturers, the monitoring of new solutions of medical technology found on the Internet, and also the exploration of domestic manufacturing facilities. This is related to the fact that in this field a relatively small number of patents are submitted, and it is not common to buy international patents either.

The development of governmental affairs and the improvement of the position of the entire sector plays a pivotal role in the positioning of the clusters on the international scene.

IT Sector

In the IT sector fast development can be seen in terms of the market and technology, making it challenging to forecast changes. Strong business volatility makes it especially important to find good partners, to form synergies, to get acquainted with the ideas of each other and to implement collaboration in a broad platform.

It is possible to find a wide variety of innovative solutions in the clusters operating in this field: development of new products and services and research and development in technology are common. The range of consumer fields is also wide: telecommunications, advertising and service technology, customer service, education, controlling, finance, business, management information systems, etc. Due to extremely rapid technological changes, great emphasis is put on monitoring international trends. In certain segments (e.g.

the field of education, advertising technology) the implementation of new innovative solutions is severely hindered by the price sensitivity of the domestic market and the immaturity of innovation. This provides an important motivation in patenting, ensuring opportunities for market implementation. This research area is represented by relatively significant numbers in clusters, and it is not uncommon that the academic research relationships of the members are built by the time of joining a cluster.

In clusters emerging in the field of IT, market pull and technology push innovations are equally present. Innovations establish on-offer solutions for existing problems, supposing intensive customer relations, frequently for fulfilling individual requirements. On the other hand, companies that create new markets or give rise to new trends (e.g. in customer service) with their development are also represented. It was cluster membership that helped a number of companies to realise that they had not incorporated market aspects into their technology development until that time. Therefore, in this sector the role of cluster membership in shaping attitude is significant.

IT clusters are characterised by the presence of competitors, which places a major responsibility on management to develop a collaborative atmosphere. In such clusters it may happen that the communication of the members with each other develops more slowly than with cluster management, and it can be more problematic to mobilise inactive members. For this reason management organisations that are successful in this field pay great attention to informal communications solutions that help members in establishing relationships.

Clusters in the IT sector show a varied picture concerning the size of companies, and motivations for entry into the innovation cluster as well as the advantages expected by the members are fairly diverse.

Small firms are attracted to the clusters by market considerations, hoping to launch their innovative products on foreign markets, for which the market relationship networks of large corporate members provide a beneficial opportunity. Small businesses, which thanks to their innovative solutions have been able to achieve a market leader position in certain segments beside large enterprises, are also represented. For large enterprises the most important benefit is that they can access innovative solutions that can be incorporated into their portfolio. It is a general feature that member companies can purchase products and services from each other, which also has a market expansion effect. The presence of start-up companies in a relatively large number among members is a sectoral characteristic. For them, access to resources, a well-developed information system and the incubating role of cluster management are particularly important.

In the case of highly innovative companies with a firm market, membership is crucial to promote their innovation processes. The 'critical audience' of a cluster provides useful feedback, it can introduce its research and

development results and it can also test them through connections. The management can enhance this via different solutions: high-tech tests or laboratories, presentations, or ideas for mutual discussion in forums organised by the management.

For less innovative companies membership is advantageous in terms of increasing their innovation capability – primarily through joint projects. With the involvement of financial, relationship and intellectual capital they have the opportunity to generate technologies or products which could not be created independently in the absence of cluster connections.

It can be regarded as a general advantage in the sector that, since they cover similar fields of technology and markets, they have common problems and they can cooperate in seeking solutions to them. Partly this is the reason why certain companies are members of several sectoral clusters.

Among the accredited innovation clusters operating in the IT field differences in levels of development are still rather pronounced. Side by side one can find relatively young organisations as well as those that show outstanding performance and possess substantial experience. Differences can be well measured by both the attitude of the members and the expertise of the management. They are also expressed by how successful it was to create an atmosphere of trust among the members, to what extent cluster management fulfils the role of a catalyst, how the cluster management communicates common successes outside of the cluster, whether there is a well-constructed image of the cluster, and whether steps are taken towards building a common brand.

Plastic Processing Industry

Clusters related to the plastic processing industry show a variety of forms. Both horizontal and vertical organisations can be found, on a regional basis, for the purpose of conjoining companies in a given area that are involved in similar industrial activities, or organised on a market basis, to strengthen collaboration between companies involved in complementary activities.

In the innovative activity of the members of the clusters of this sector technology, machinery and tool improvements, the development of new products and upgrading existing products all play a role. Recycling is a significant driving force for innovation; from the point of view of cluster structure a new development trend can be attributed, namely the introduction of biodegradable plastics, the development of technologies and the promotion of their application. Within the related cluster a project team consisting of several collaborating companies were able to obtain an EU grant for the development of biodegradable materials, the successful implementation of which induced further corporate innovations in conjunction with the applicability of

biodegradable plastics in the printing industry and in the packaging sector.

An important aspect of commercially organised, packing profile cluster organisations is the improvement of the market position of its members. As a result, competitors and non-Hungarian companies are not welcome among the members, since competition in the domestic market is very strong, especially price-wise. The benefits expected by members are mostly marketing-related: greater insight into the market, a better understanding of the opportunities in terms of either potential customers or suppliers, sharing information and experience facilitating it, and building relationships. The lack of competition fosters an atmosphere of trust and strengthens the personal nature of relationships in the partnership. However, as a consequence of the concept of no competitors the hands of the members are bound to some extent, as they cannot start any competing in activities.

Since the members are not competitors, market benefits can be realised from a number of directions. On the one hand in the relation of external customers they are able to complement each other's bids, which can both exert market expansion effects, and can serve tactical and strategic market goals. In case customers order from more than one cluster member it has advantages from the logistics point of view. (Centralized sales have no real chance because of the different technical competencies). On the other hand, the membership also creates an internal market, since the members are users of each other's products. Internal trade allows them to replace their former suppliers with each other. As small enterprises operating in this field are the suppliers of multinational companies, it is also a marketing advantage of cluster membership that it implies a sign of quality to customers. A good atmosphere of trust and greater market insight encourage knowledge sharing, and thereby have a generating effect on innovation.

Cross-sectoral cluster organisation

In addition to clusters featured by the specific sectoral characteristics there are some which are characterised by their cross-sectoral nature. One example is the linkage of the plastics, packaging and printing industries. In addition to cross-sectoral networking and individual development efforts, the aims of such organisations are the creation of common development concepts, the coordination of technological and manufacturing overlaps and, in certain cases, the better exploitation of automotive supply opportunities as a key target. A consequence of the regional character is building close cooperation with local knowledge centers as well (University of Szeged, College of Kecskemét, which became the centre of the education of mechanical engineers in the region of the Southern Great Plains).

Other examples of cross-sectoral cluster organisation can be found in the field of environmental

protection. In highly knowledge-oriented, deliberately heterogeneous clusters it is an important aspect that partners should be able to complement each other, and not regard each other as internal competitors. Their inhomogeneous nature and extensive partnership is explicitly favourable to the flow of information and knowledge and promotes building relationships, and very strong synergies can be utilised. With the participation of groups of companies, academic institutions and municipalities, a complex response can be offered to environmental problems. The membership structure is heterogeneous in terms of the size of enterprises, too. For example large enterprises are mostly involved in technology and product development, on the other side for small firms the communications/marketing support received from the cluster is also a major advantage. It is an important innovation aspect to create competences in the field of environmental protection, whose main direction is the so-called eco-cycle competence. One part of this is technological processes and the other is the management of the innovation chain. Small and large companies collaborate in development projects. Small companies can bring ideas, products and technology, while large companies promote market introduction through their relationship network.

A similar vertical-chain based cluster organisation has been formulated with a wider profile covering the quality of life, food, and pharmaceuticals, where again the complementation of the activities and portfolio of each other is emphasised. Such complete vertical-chain organisations have a strong innovation generating effect, since collaborations offer insight into other fields and disciplines (e.g. from the aspect of animal feed an insight into crop production, into the food-related human (medical) field, or into food processing). Profiles based on each other represent mutual benefits. Adaptation of a technological solution used in a related discipline (e.g. use of human test methods in animal husbandry) can generate new innovative projects. Food manufacturers have the opportunity to have products tested by a different member company, with an academic background, through university partners. In addition to the innovative aspects it is a marketing advantage that the relationship network of food companies at the end of the chain can contribute to market introduction innovation results. Once represented organisations cover the entire value chain (from animal feed through crop production, animal husbandry, food manufacturing, and pre-clinic testing to food firms) then the main aspect is interrelatedness, hence live relationships and substantial internal traffic are generated, and this counteracts the appearance of “free-riders”.

As has already been mentioned in connection with the comparison with networks, innovation clusters can serve broader goals besides improving the effectiveness and market position of the members. In the fields presented above examples of such goals are the regaining of lost position in the medical sector; the promotion of the

economic development of a region; the improvement of the competitiveness of enterprises (e.g. the Southern Great Plains cluster organisation), with regional development purposes, the commercialisation of synergies found in the university and the business sectors (e.g. the establishment of a regional IT centre); the embracing of new directions of development (biodegradable plastics); the implementation of new competences (eco-competence); and the improvement of the quality of life by the collaboration of environmental-minded economic and regional development goals and related areas (health industry, pharmaceuticals).

Open innovation is not yet understood

The positive impact of collaborations generated by cluster relations cannot be questioned in terms of open innovation, and Hungarian practice is no exception to this, either. During the interviews, however, it became clear that the conscious use of open innovation solutions is in its infancy, even in accredited domestic innovation clusters.

The conscious use of open innovation is indeed far from a quick process. It requires new ways of thinking and possibly different business management policies from companies, from the cluster management, and the application of solutions that ensure the organic integration of external intellectual capital and user needs and feedback into the innovation processes. This is not only a matter of deciding to do it, it also requires the development and availability of proper environmental conditions and of infrastructure and equipment. There is reason to be optimistic since one can find some good practices, including the T-City living lab in the field of ITC in the city of Szolnok, in which cluster members have the opportunity to test their new products and solutions prior to market launch.

If the open innovation efforts intensify through the cooperation networks of clusters for the better exploitation of economic value stored in shared intellectual property, it may be a propelling force for the increase of competitiveness of not only the members, but the whole economy as well.

CONCLUSION

In our study, we touched upon the main differences between networks and clusters. We found that innovation clusters create favourable conditions for the conversion of R&D results into market successes and for the development of market orientation of innovations. In addition, it can be mentioned as a significant difference compared to networks that clusters provide more flexible forms of cooperation with an open, collective vision expanding in several directions, in which an open flow of information and knowledge sharing takes place. A further

significant difference is that clusters have a central node which is formed by the cluster management organisation.

Our research focuses on three main industries, the medical, IT and plastics processing industry. It can be said that the basic aim of the cluster organisation in the medical field is to increase the market potential of the domestic corporations operating in this sector with a long-standing tradition. As a consequence, the most important advantage that members expect is market acquisition via joint action, which is partly an export market goal and partly the reacquisition of niches in the domestic market. One of the most important sectoral features is that multinational companies are excluded from cluster membership.

One of the features of clusters operating in the IT field is that competitors may appear among their members, resulting in a higher workload for the cluster management organisation. Clusters involved in this industry show a varied picture regarding the size of companies as well, and it is typical of their sector that start-up companies make up a relatively large proportion of the membership.

In clusters involved in plastics processing industry it can be observed that both horizontal and vertical

organisations are present, the most important aim of which is to embrace companies with similar industrial activities in the region. Competitors and foreign-owned companies are usually excluded from membership as competition is very strong in the domestic market. It can be considered to be a sectoral feature that members do not only appear in a given region, but they also create an internal market that allows them to replace former suppliers with one another.

In our research, we also examined cross-sectoral cluster organisations, whose aims – in addition to independent innovation efforts – are to create joint innovation concepts and to coordinate technology and manufacturing overlaps; during the interviews we also examined how consciously they apply open innovation solutions. We found that even in the accredited domestic innovation clusters open innovation is in its infancy.

Of course, additional quantitative research is needed to support the survey and interview results presented in this study with numerical data. Our future plans include the investigation of correlations that we explored during our qualitative research focusing on a specific industry.

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Factors Affecting the Amount of Time Required to Prepare Investment Decisions in Hungarian Processing Industries

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SUMMARY

The present study addresses factors that influence the amount of time required to prepare investment decisions in Hungarian processing industries based on the findings of a survey conducted among Hungarian manufacturing companies in 2012. The aim of this study is to investigate the amount of time companies spent on preparing high-volume investment decisions and to find out whether equity ratios or company size have any impact on the length of decision preparation. The survey revealed that companies spent several months on making investment-related decisions. The findings also showed that small companies spent less time on pre-investment activities than large companies.

Keywords: capital budgeting; investment decisions; economic decision-preparation process.

Journal of Economic Literature (JEL) codes: M21

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INTRODUCTION

A comprehensive review of the available academic literature sheds light on the dual character of the literature addressing the decision-preparation processes of corporate investments. Although numerous studies have investigated these processes (Barta 1986, Butler et al. 1993, Northcott 1998, Vargha 2011, Fekete and Husti 2005), none of them have addressed the length of investment decision-preparation processes and other issues related to this.

There seems to be a general agreement among economists that investment preparation is an extremely complex and complicated process. Taking into consideration the findings of national and international studies, we established a model illustrating economic decisionpreparation of investments. This model includes only activities related to economic aspects of investment preparation and neglects its technical aspects. Before any decision-preparation activities start, there should be a need for investment. First, a situation analysis is performed and investment variations of economically viable investments are ranked in the final stage of decision-preparation activities. Decisions on whether an investment can be implemented do not belong to decision-preparation processes. Figure 1 illustrates the

model of economic preparation of investment decisions elaborated by the author of the present study.

This model clearly shows that the preparation of investment decisions is a complex process which encompasses a relatively great number of activities, so preparation is assumed to take a long time. Numerous scholars share this point of view. For example, Barta (1986) in the introduction to his book *Preparation of Investments Decisions* indicates that decision preparation occurs both in time and space. According to Vargha, there is a one-way relationship between the volume of investment (measured in costs) – stochastically – and the complexity of decisions, planning, preparation, and the required work and time (Vargha 2001). The complex and complicated character of investment preparation processes allows us to assume that it takes weeks or even months to prepare a high standard professional decision on investments of large volumes.

Sheoran in his article published in 2015 also emphasises that the preparation and implementation of sound investment decisions takes weeks or even months because of their nature. He ranks investment decisions among the most critical types of managerial decisions since they produce a favourable or unfavourable impact in the longer run, which affects the subsequence performance of companies (Sheoran 2015).

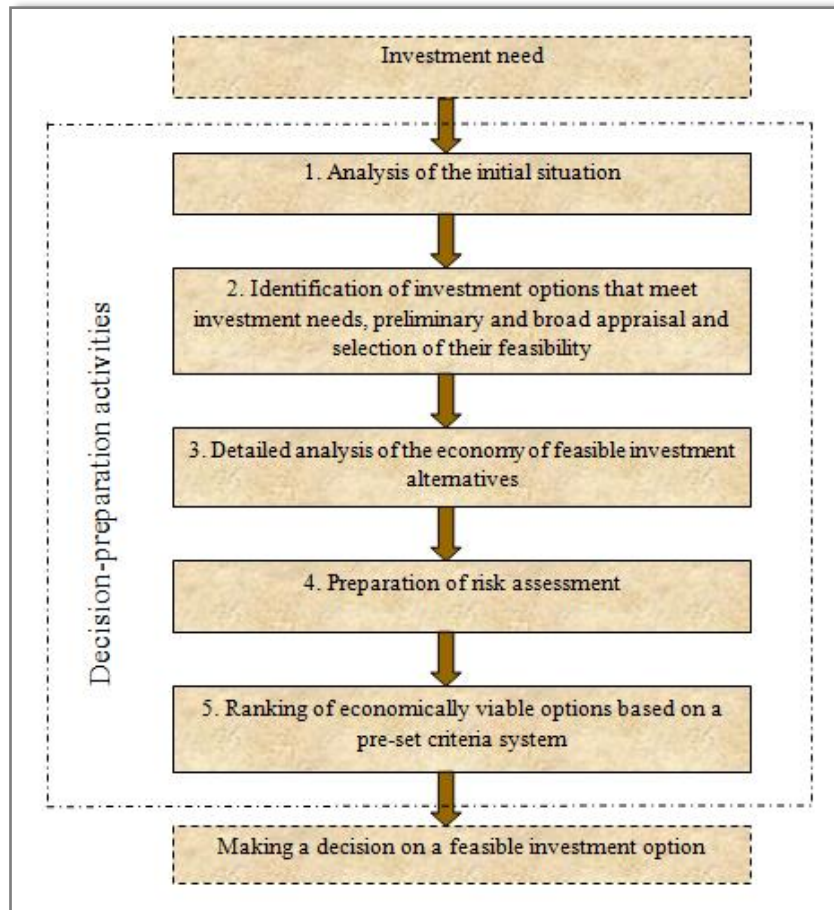


Figure 1 Model of economic preparation of investment decisions
Source: own elaboration

Since most activities related to economic decision-preparation processes are built on each other and cannot be performed in parallel, the amount of time required for preparing investment decisions also increases. While investment decisions are being prepared, it may be appropriate to take into consideration alternatives and options, which increases the amount of information required to make decisions. Consequently, information gathering, processing and selection may take a long time, which also results in an increase in the time spent on preparing investment decisions.

In companies owned by foreigners, experts and specialists working for parent companies are often involved in decision-preparation processes. (This is confirmed by the questionnaire-based survey conducted by me. In the sample 14 out of 18 companies with a majority of foreign ownership involved employee(s) of parent companies in decision preparation processes). This, in turn, is likely to increase the time spent on decision preparation.

Contrary to large companies, smaller-sized companies lack a pool of competent and well-qualified experts and are more likely to simplify the entire preparation process. There are two ways of doing this: (1) omit one or more stages of the whole process or (2) do not perform activities in as much detail as their larger

counterparts. The findings of a research study conducted in New Zealand confirm this assumption and suggest that New Zealand businesses tend to extremely simplify investment economic calculations. Vos & Vos (2000) carried out research into investment decisions of small New Zealand companies. They mailed 3446 companies five-page questionnaires and received 238 responses. The managers of 41% of the responding companies 'always' and 26% of them 'only' rely on their intuitions when they have to decide whether or not to invest in a project. In the sample 42% of the managers use an intuitive method to calculate interest rates. The simplification of particular activities in decision preparations has raised an interesting question: namely, whether the preparation of investment decisions in small businesses takes a shorter time than in large enterprises. Less time required to prepare investment decisions could also be explained by a lower capital investment and the less complex nature of projects than in the case of larger companies.

The present study attempts to find answers to the question of whether company size, ownership structure (majority foreign or national ownership), number of participants involved in decision-making processes and their professional education or degrees (economists, engineers, etc.) have any impact on the amount of time required to make an investment decision.

RESEARCH METHODOLOGY

Within the framework of a research study encompassing a broad field, we investigated the preparation of investment decisions and time constraints. A questionnaire was conducted among processing companies operating in Hungary. The companies were selected from the Cég-Kód-Tár (Company Code Register) database of the fourth quarter of 2010. The selection criterion for sampling was the annual net sales revenues. The processing companies operating in Hungary were classified into four groups to comply with Section 3 (1-6), Act XXXIV of 2004 on Small and Medium-sized Enterprises:

1. Group 1: companies with revenues under HUF 600 million (micro enterprises);
2. Group 2: companies with revenues between HUF 601 million and 3 billion 3,000 million (small-sized enterprises);
3. Group 3: companies with revenues between HUF 3 billion and 15 billion (medium-sized enterprises);
4. Group 4: companies with revenues over HUF 15 billion (large enterprises).

Considering that the abovementioned law sets out the limits in euros, euro was converted into forints in calculations. At the time when the analyses were performed, the exchange rate between HUF and EUR was at 300 HUF/EUR. That was the reason why the net revenue limits referred to in the Act were multiplied by 300 and limits indicated in the grouping were obtained.

In order to eliminate the limitations of a simple random sampling method (the sample completeness and reliability can be improved by increasing the sample size), stratified *random sampling was used. Within the groups classified by net sales revenues, companies were assigned to one stratum complying with the size of the stratum. Simple random sampling was applied within each stratum. Consequently, the sample composition reflects the composition of the population by stratum.*

The survey was conducted in summer of 2012. All companies received the questionnaires either by standard

post (500 companies) or electronically (1000 companies) with a link participants had to click on in order to download the questionnaire. Altogether 76 companies completed questionnaires that could be evaluated, which amounts to a response rate of 5.1%. This rate seems low but surveys conducted on similar topics show a similar rate of responses. For example, in 2002 Brounen, Jong and Koedijk surveyed companies in four European countries (Great Britain, the Netherlands, Germany and France) with a response rate of 5% (Brounen et al., 2004). In our sample there were managers who refused to complete the questionnaire when they received it and informed us of this on the phone. They explained their decisions by two reasons: (1) any information on corporate investments constitutes a business secret and (2) the company has not made any major investments in the past 5-6 years.

The data in the completed questionnaires were summarised in Excel spreadsheet software and the software package WinSTAT was used for performing statistical analyses. Simple descriptive statistical methods (partition coefficient, group mean, etc.) and comparative statistical analyses (correlation coefficient, Chi-squared indicator, discriminant analysis, variance analysis) were performed.

FACTORS INFLUENCING THE LENGTH OF TIME NEEDED TO PREPARE INVESTMENT DECISIONS

The results of the questionnaire survey indicated that it generally took national processing companies several months to prepare investment decisions: 1-2 months for 29% of the respondents, 3-6 months for one quarter of companies, and one fifth of respondents claimed that the amount of time spent on decision preparation greatly varied. (Figure 2 shows the responses to the question.)

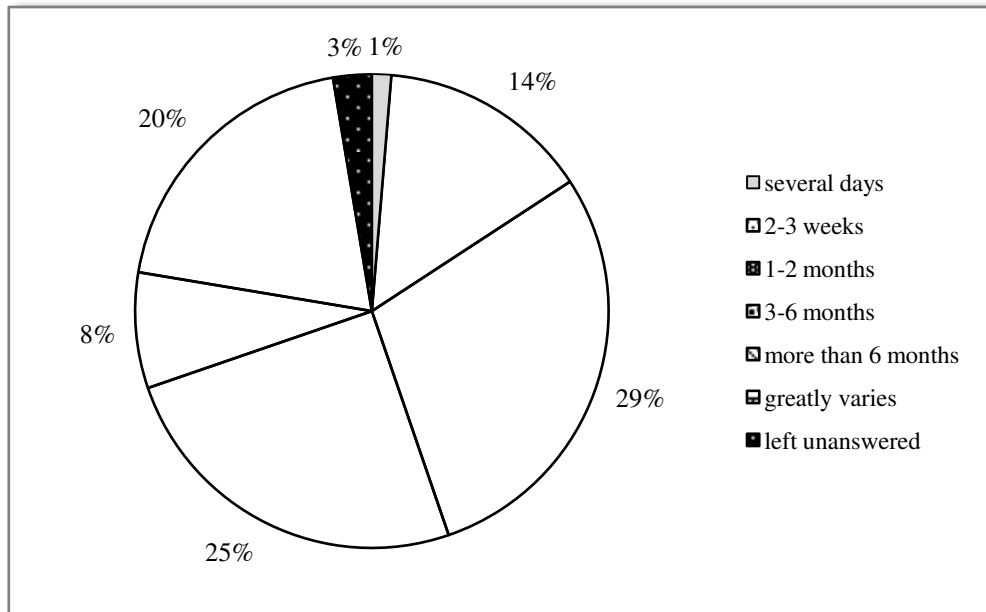


Figure 2 Length of the decision-preparation process in processing companies

Source: own elaboration

The present study also investigated the factors influencing the amount of time spent on decision preparation. Simple and comparative statistical methods were used for analysing the relationships between the length of decision preparation processes and company size, ownership structure, number of participants in decision-making processes and their professional qualifications.

As for the company size, micro-enterprises spent little time, generally 1-2 months or only 2-3 weeks, on preparing investment decisions. It took small and

medium-sized companies 1-2 or 3-6 months to make investment decisions. Since the four large companies responding provided four different answers, no meaningful conclusions can be made regarding the amount of time they require to prepare investment decisions. Table 1 illustrates the distribution of responses to this question. (When the results were evaluated, we took into account the fact that a relatively high proportion of companies invested a greatly varied amount of time in preparing investment decisions).

Table 1
The time required to prepare investment decisions by company size

Duration of decision-preparation activities	Company category by sales revenue				Employee number		
	Micro-companies	Small companies	Medium-sized companies	Large companies	0-49 employees	50-249 employees	250 or over employees
Several days	0%	3%	0%	0%	3%	0%	0%
2-3 weeks	25%	10%	6%	25%	20%	9%	17%
1-2 months	38%	34%	19%	0%	23%	34%	33%
3-6 months	8%	31%	38%	25%	13%	41%	17%
More than 6 months	8%	3%	13%	25%	13%	0%	17%
Greatly varies	21%	17%	25%	25%	27%	16%	17%

Source: own elaboration

In order to identify the relationship between company size and the time required to prepare investment decisions, discriminative analyses and a Chi-squared test were performed. The discriminative analysis provided 10.96%, which means that the company size – being an independent variable of under 11% – provides an

explanation to the group the company belongs to based on the length of the decision preparation process. This proportion is very low. In the case of the Chi-squared indicator, the significance level well exceeds the expected 5% value, which suggests that there is no relationship between the size of companies and the time required to

prepare decisions. The Cramer's V indicator amounted to 0.263.

The number of workers employed by companies was also taken into consideration in the conducted analyses. Companies employing less than 50 employees invested the least time, generally 2-3 weeks or 1-2 months in decision preparation. Companies having 50-249 people spent 1-2 months or 3-6 months on preparing investment decisions. It took companies with 250 or more employees 1-2 months to prepare investment decisions (see Table 1). The significance level of the Chi-squared test accounted to 0%, which means that there exists a relationship between the number of employees and the time required to prepare decisions. The Cramer's V indicator also proved the assumption about the existence of a relationship between the two variables. The Chi-squared test of 0.495 indicates a moderately strong relationship between them.

As for the responses related to the proportion of ownership, the results show that the greatest proportion

of companies (35%) with majority national ownership invested 1-2 months in decision-preparation processes. Almost half of the companies (47%) with majority foreign ownership spent 3-6 months on decision preparation. It is worth noting that none of the companies with majority foreign ownership spent 2-3 weeks on decision preparation whereas 22% of nationally-owned companies invested 2-3 weeks in preparing investment decisions (see Table 2). The responses indicate that it takes processing companies with majority foreign ownership more time to prepare investment decisions than nationally-owned companies. The significance level of 0% of the Chi-squared test indicates the existence of a relationship, which was proved by Cramer's V indicator. Its value of 0.767 means that the relationship between the ownership structure and the time required to prepare investment decisions is fairly strong.

Table 2

The time required to prepare investment decisions by the proportion of ownership, number of involved people and professional qualifications

Duration of decision-preparation activities	Proportion of ownership		Number of people involved in preparing investment decisions			Professional qualification of people involved in preparing investment decisions		
	With national majority	With foreign majority	1-3 employees	4-5 employees	More than 6 employees	Mostly engineers	Mostly economists	Mostly other qualification
Several days	2%	0%	0%	0%	5%	2%	0%	0%
2-3 weeks	22%	0%	23%	12%	5%	14%	25%	10%
1-2 months	35%	24%	30%	28%	32%	26%	38%	30%
3-6 months	22%	47%	13%	40%	26%	26%	13%	30%
More than 6 months	8%	12%	3%	8%	16%	7%	13%	10%
Greatly varies	12%	18%	30%	12%	16%	26%	13%	20%

Source: own elaboration

As for the distribution of responses related to the number of people involved in preparing investment decisions, it appears that companies where less than three people were involved in preparing investment decisions spent 2-3 weeks or 1-2 months on this process. (However, the proportion of those where the duration of the preparation process greatly varied is also high.) Companies where more than four people participated in preparing investment decisions invested 1-2 months or even 3-6 months in decision preparation. (Table 2 also illustrates the distribution of answers to this question). One of the possible reasons for this may be that decision-preparation teams consisting of fewer people have fewer 'discussion forums' and debates throughout the investment preparation process. In the case of the Chi-squared indicator, the significance level amounted to

20%, which significantly exceeds the reference value of 5%. This suggests that there is no relationship between the number of people involved in preparing investment decisions and the required time to prepare investment decisions. However, the Cramer's V indicator accounted to 0.344, which indicates a moderate relationship. The obtained results show some contradictions and it is therefore not possible to state definitely that there is a relationship between the two variables.

Finally, the distribution of answers to the question by professions was analysed. The results showed that decision-preparation teams made up of employees with engineering degrees and 'mostly other qualifications' required 1-2 months or 3-6 months to prepare investment decisions, whereas teams consisting of mostly employees with degrees in economics spent only 2-3 weeks or 1-2

months on preparing investment decisions (see the distribution of responses in Table 2). The Chi-squared test was also carried out. The significance level turned out to be very high, which indicated that there was no relationship between the two variables. The Cramer's V indicator accounted to 0.279, which showed a weak relationship. Hence, presumably the low qualification of decision makers has no effect on the time required to prepare decisions.

CONCLUSIONS

The entire process of economic preparation of investment decisions (apart from some stages) has not been investigated extensively and adequately yet. Although numerous studies have dealt with the preparation of investment decisions from behavioural and decision-making aspects, no study has so far examined the economic preparation process of investment decisions. (Presumably this has not happened yet). There are some studies in business management literature dealing with main steps of investment activities, but they fail to detail the activities and the processes implemented in practice. From the considerations above we assume that it takes several months to prepare investment decisions in corporate practices, which are affected by a number of factors such as company size, ownership structure and number and qualification of people involved in preparing investment decisions. In order to justify our assumptions we used the results of a questionnaire survey conducted previously.

Sometimes company managers have to make important decisions about investments that will determine the future of their companies. Investment decisions determine how much room for manoeuvre corporate management will have in the coming years or even decades. This is why it is extremely important to choose appropriate methods that enable them to prepare investment decisions thoroughly and duly.

The findings of the performed analyses confirm our assumption that companies spend several months on

preparing investment decisions: the majority of the investigated processing companies invest 1-2 months or even 3-6 months in preparing investment decisions. The present study also investigated the factors affecting decision-preparation processes. The results of international empirical research studies indicate that small-sized companies simplify decision-preparation processes. Taking into consideration this fact, we assumed that small-sized companies operating in Hungary would spend little time on preparing investment decisions. The performed statistical analyses show that medium-sized and large companies invest more time in preparing investment decisions than micro- and small-sized companies. Consequently, the results proved our assumptions.

Companies owned by foreigners involve experts working for parent companies in decision-preparation processes, which increases the amount of time spent on preparing investment decisions. The study also addressed this issue. Both the distribution of the responses and the performed statistical analyses suggest that companies owned by Hungarians spent less time on preparing investment decisions than companies owned by foreigners.

The more employees are involved in preparing investment decisions, the more 'discussion forums' are likely to be held in the investment preparation process, which would increase the amount of time required for preparing investment decisions. This study used statistical analyses to investigate this issue. The performed statistical analyses showed contradictory results. (The Chi-squared test indicated no relationship, whereas the Cramer's V indicator showed moderately strong relationship between the two variables). It is therefore not possible to state that the more employees are involved in preparing investment decisions, the more time is required to prepare investment decisions. The professional qualification of employees involved in decision preparation is not likely to influence the time required to prepare investment decisions.

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The Effect of Dynamic Relationship Capabilities on B2B Loyalty

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SUMMARY

The focal issue of our study is to model the adaptation capability of enterprises from a relational point of view in the South Great Plain Region of Hungary. Our main question is how enterprises can modify their relational behaviour in B2B markets to ensure the success of their relationships. We use the resource based view from a dynamic aspect. To operationalise the investigation problem we use the dynamic relational capability framework. In the study we investigate the perceived values of dynamic relational capability and the effect of relational capability on the perceived relationship success.

Keywords: dynamic relational capability, relationship success, B2B loyalty

Journal of Economic Literature (JEL) codes: M15IT, M31

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INTRODUCTION

The management of inter-organisational collaboration is still a key issue even in today's networked economy. This is particularly the case when the success of an organisation not only depends on its internal efficiency and productivity, but rather on the success of those network(s) within which the organisation operates. This study is aimed at finding out how the embedded patterns of reconfiguration in relationship behaviour influence the success of collaboration between organisations. The success of relationships can be illustrated on several dimensions. In the different models, these dimensions appear in various correlations, but there are only a few models where the role of dynamic relationship capabilities are examined in the view of the quality of the relationship and there are even fewer theoretical approaches that examine the coherence between dynamic relationship capabilities and inter-organisational loyalty. In the approach of this study, dynamic relationship capability refers to a process during which organisations are able and willing to demonstrate permanent flexible behaviour and reconfigure their actions and behaviour in order to meet the expectations of their partners. Reconfiguration propensity that appears on the various levels of dynamic relationship capabilities also represents a continued development of relationship capabilities.

DYNAMIC RELATIONSHIP CAPABILITIES

The phenomenon of relationship capability, or network capability (as it is termed) is inherently linked to the concept of dynamic capabilities. Relationship capabilities can be understood as all those routines, processes and patterns of action that allow an organisation to formulate its relationship with external partners, optimise its relationship portfolio and allocate its resources among its partner relationships (Gemünden et al. 1997; Ritter 1999; Ritter et al. 2002; Mitrega et al. 2012). Äyväri & Möller (2008) have comprehensively studied the concepts related to relationship capabilities (categorising them as networking capabilities) and described these capabilities as multi-dimensional phenomena. The authors identified three very specific levels of relationship capabilities: the organisational aspect, the relationship aspect and the network aspect. For the research carried out in this study, a vantage point from the organisational level has been chosen. This study focuses on how organisations, in order to enhance the success of their collaboration, are able to reconfigure all of the routines, processes and patterns of action that are available for them to manage and execute their collaborative activities.

The capability to reconfigure the management of collaboration has been approached in the literature from several levels and in various ways. A study conducted by Roseira et al. (2013) reflects on the features of dynamic

relationship capabilities that are to be found on a strategic level. By taking a dominantly Industrial Marketing and Purchasing Group (IMP) interaction approach into consideration, their study emphasises the integration of relationship strategy, interactions, network pictures and organisational positioning. The authors highlight that any reconfigurations that may take place in the relationship strategy initiated by an organisation are determined just as much by the organisation's ability to reconfigure its network picture (sensation and comprehension of network characteristics) as by any reconfiguration that may take place in the given situation. Reinhartz et al. (2004) studied relationship management reconfiguration capability from a Customer Relationship Management (CRM) process perspective. The authors concluded that in connection with the composition and modification of relationship processes, there are three distinctive characteristics to think about. Firstly, there are organisational and industry-specific characteristics and the ability to manage the reconfiguration of these given characteristics. Secondly, in line with relationship process modifications, the authors highlight the importance of relationship life-cycle evaluation. Finally, the authors underline the management of the diverse distribution of relationship value, which is heterogeneous between the partners over time. A longitudinal approach to dynamic relationship capabilities is linked to the processes, the particular relationship management methods and the interpersonal level of collaboration. The longitudinal assessment of dynamic relationship capabilities highlight all those capabilities that are vital when collaborations are launched, expanded and closed (Mitrega et al. 2012; Havila & Medlin 2012; Ritter and Geersbro 2010, 2011). Studies conducted in this field illustrate that a number of factors considerably influence how successful collaboration management is achieved, such as the assessment of partners, the launch of collaboration processes, information sharing, communication, the management of mutual decision-making, the sharing of risks and benefits, knowledge sharing, the management of interpersonal relationships, the management of differences in relationships, the recognition of unwanted partners, the existence of routines that guide the closure of relationships, and the motivation levels of individuals to initiate reconfiguration activities related to how they associate with their partners.

For the study of dynamic relationship capabilities, it is worth reviewing the conclusions of Johnsen and Ford (2006). The authors claim that the level of reconfiguration capabilities that an organisation may achieve is determined by the following factors combined: personal interactions, technological change, organisational structure/process and cultural dynamism. These factors are closely intertwined.

THE SUCCESS OF COLLABORATIONS

The judgement whether a relationship is successful or not depends on several factors. Should the partners decide that a relationship has positive benefits, the partners usually make efforts to engage in a long-term collaboration (Costabile 2000; Järvelin 2001; Rauyruen & Miller 2007; Kong 2008; Čater & Čater 2010).

To bring to light the most important factors found in inter-organisational relationships, studies dominantly focus on factors such as the perceived quality of products or services, satisfaction, trust, commitment (Morgan & Hunt 1994; Ganesan 1994) and fairness (Kahneman et al. 1986; Jambulingham et al. 2011), but few studies examine whether there is loyalty on the B2B markets, and if there is, what the nature of loyalty is in that particular business context (Costabile 2000; Hennig-Thurau 2002; Rauyruen & Miller 2007; Čater & Čater 2010; Haghighi et al. 2013). At the same time, this is an important issue, as numerous studies have shown that the mutual loyalty that businesses express towards each other may also be an appropriate measuring tool for the success of collaborations (Hetsi 2007).

In the literature, inter-organisational loyalty appears in three categories: behavioural, attitudinal and complex loyalty. Behavioural loyalty is defined as the partner's intention to repurchase and perform cross-buying (Dick & Basu 1994; Hennig & Thurau 2004), i.e., behavioural loyalty is seen as an intention: the willingness of a partner to renew existing contracts and sign new ones. Attitudinal loyalty is a higher level of loyalty: the partner is also emotionally and psychologically engaged, trusts the relationship and is committed to an organisation (Garbarino & Johnson 1999; Fullerton 2005). The complex form of loyalty is a combination of behavioural and attitudinal loyalty where re-purchasing and cross-buying activities are tied to an emotional attachment (Oliver 1999; Costabile 2000; Rauyruen & Miller 2007).

A MODEL DEVELOPMENT PROCESS— A RESEARCH-BASED APPROACH

As a starting point in the research of the impact of dynamic relationship capabilities on relationship success, this study has taken a multidimensional approach of dynamic relationship capabilities. The preliminary model framework for the investigation, is adopted from the research results of Sanches (2004), who employed the theory of organisations as open systems to distinguish between five different levels of dynamic capabilities. The second field to review at the beginning of this study was the universal process-based approach of Pavlou & El Sawy (2011). The authors, in order to put organisational

dynamics into practice in specific areas, identified a framework of the following four capability components: sensing capabilities – the ability to spot and interpret change; learning capabilities – the ability to add new knowledge to existing information, distribute new information and be aware of how new information is to be applied; integrating capabilities – the ability to integrate new information into existing operations and combine the new knowledge with already existing intelligence; and finally coordination capabilities – the ability to manage the allocation of resources and the division of labour following a reconfigured operational model, i.e. the organisation is made capable of assimilating a reconfigured pattern as a permanent component of its operations.

The conclusions of the model development process are summarised as follows. Dynamic relationship capabilities are best approached from three directions. As illustrated in Table 1, dynamic relationship capabilities have strategic, process and coordination dimensions. The strategic flexibility level of dynamic relationship capabilities describes the extent to which an organisation is able to consider alternative relationship strategies and implement the strategic changes into its existing relationship system (Ravald & Grönroos 1996; Anderson & Narus 1999; Storbacka 1997; Ford et al. 1998; Walter et al. 2001; Möller & Törrönen 2003; Ulaga 2003; Johnsen & Ford 2006; Möller 2006; Roseira et al. 2013).

Table 1
A model for the evaluation of dynamic relationship performance

	Strategic flexibility level of dynamic relationship capabilities	Process flexibility level of dynamic relationship capabilities	Coordination flexibility level of dynamic relationship capabilities
Sensing Capability	Sensation of relationship interactions	Longitudinal sensation of relationship portfolio	Sensation capability of the demands of partners and related units
Evaluation Capability	Evaluation of relationship investments and relationship value	Evaluation of relationship life cycle	Capability of evaluating the satisfaction level of partners inside and outside the organisation
Learning Capability	Capability of reconfiguring network picture and perceived position	Capability of developing new processes to launch, expand and terminate relationships	Capability of learning best practices from inside and outside the organisation
Integrating Capability	Capability of reconfiguring strategy	Capability of adapting workflow management solutions; capability of reconfiguring processes related directly to relationship management	Capability of reconfiguring relationship management tasks

Source: devised by the authors

The process flexibility level of dynamic relationship capabilities encompasses the capability of a long-term perception and evaluation of the relationship life-cycle i.e. the perception of a need to launch, expand or terminate collaboration activities, and in support of the latter, this level also includes the capability to foster new processes and reconfigure existing relationship processes (Dwyer et al. 1987; Ritter & Geersbro 2010, 2011; Havila & Medlin 2012; Mitrega et al. 2012). The coordination level of dynamic relationship capabilities encompasses the capability to understand the intentions of those partners who show interest in relationship management and the capability to employ methods that

bring about those reconfigurations that help meet the expectations of the partners (Håkansson & Snehota 1995; Ford et al. 1998; Menon et al. 2005; Ivens & Pardo 2007; Schurr et al. 2008).

Next in this research, based on the previous studies conducted by Roseira et al. (2013), Mitrega et al. (2012) and Havila & Medlin (2012), it has been assumed that a complex approach to the levels of dynamic relationship capabilities exerts a beneficial influence on the perception of successful collaborations. Taking both behavioural and attitudinal loyalty into consideration, the perception of successful collaborations has been

embraced through the complex idea of inter-organisational loyalty.

Table 2
Researched characteristics of complex loyalty

	Definition
Loyalty (attitudinal)	The partner has emotional and psychological affection, has trust in the relationship and is committed to the organisation.
Loyalty (behavioural)	The partner has an intention to repurchase and engage in cross-buying.

Source: devised by the authors

STUDY METHODOLOGY

As a first step for the operationalisation procedure of the research question, this study used the model for dynamic relationship capabilities illustrated in Table 1. The enquiry has been aimed at finding out whether on each level of dynamic relationship capabilities it is possible to embrace specific descriptive factors and whether these factors influence the perceived success of inter-organisational collaborations, in this case: loyalty. In order to investigate these topics, a quantitative questionnaire survey was carried out between 1 July 2014 and 31 August 2014 with the participation of Southern Great Plain businesses in Hungary that have at least two employees. Respondents were to mark their experience using a 6 point Likert scale.

From the above-mentioned questionnaire data, with the assistance of the Hungarian Central Statistics Office (HCSO), the authors have taken a representative random sample of the target group. The distribution of the questionnaires was done electronically, again with the involvement of the workforce at the HCSO. The participants had two weeks to complete the questionnaires; the financial decision makers of the business were requested to fill in the electronic document. A total of 605 businesses returned the questionnaire, which is equal to a 10% response rate.

During the analysis of the responses, the measurement reliability of both the individual levels of dynamic relationship capabilities and the relationship success was tested with calculations based on Cronbach's alpha value with an acceptable value set at 0.6. Exploratory factor analysis was used to study the levels of dynamic relationship capabilities and the behaviour of inter-organisational loyalty. The analysis aimed to reveal whether the variables that are measured at each capability level and for each loyalty dimensions indeed describe the same fact. During the analysis, a 60% information

maintenance level has been considered as the minimally acceptable level, i.e. the outcome of the investigation has only been accepted if the variables derived from the calculations of the factor analysis maintained at least 60% of the information content of the original variables. Finally, due to the confirmatory nature of the study, Partial Least Squares (PLS) path analysis method has been made use of to test the impact of dynamic relationship capability levels on perceived relationship success (Kazár 2014).

RESEARCH OUTCOMES

During the course of the current study, the reconfiguration capabilities affecting the relationship systems at the organisations have been evaluated from three perspectives – in line with the research model presented in Table 1 – and inter-organisational complex loyalty has been evaluated from two perspectives – in line with Table 2.

As a first step in the analysis, the reliability of the applied measurement model was tested. The test was performed with the Cronbach's alpha calculation technique: the Cronbach's alpha value was 0.874 for the questions linked to the strategic flexibility level of dynamic relationship capabilities, 0.892 for the questions linked to the process flexibility level and 0.891 for the questions linked to coordination flexibility. Each of these values corresponded with the acceptance limit that had been set in the conditions framework. The test of measurement reliability was concluded with the appraisal of complex loyalty. The Cronbach's alpha value of the questions linked to complex loyalty was 0.665, which also corresponded with the acceptance limit set in the conditions framework.

In the next phase of the model evaluation procedure, exploratory factor analysis was used to determine whether the defined variables can indeed be described by the previously presupposed factors.

The examination of dynamic relationship capabilities began by identifying the factor for strategic flexibility. As a first step, it was tested whether the sensation of relationship interactions, the evaluation of relationship investments and relationship value, the capability of reconfiguring the network picture and the perceived position and the capability of reconfiguring strategy to a relationship-based model can be described by one single factor (a primary component). The performed factor analysis yielded the following result: by maintaining 73% of the information content of the original variables, the above-mentioned variables are described by one factor (KMO: 0.804; Bartlett test Sig: 0.000).

Table 3

Maintained information content during the evaluation of the factor describing the strategic flexibility of collaborations

Maintained information content						
Component	Eigenvalues			Sum of the squares of loading variables		
	Total	Variance percentage	Cumulative percentage	Total	Variance percentage	Cumulative percentage
1	2.905	72.632	72.632	2.905	72.632	72.632
2	0.538	13.448	86.080			
3	0.362	9.054	95.134			
4	0.195	4.866	100.000			

Source: devised by the authors

Table 4

Results derived from the exploratory factor analysis performed on components emerging during evaluation of the strategic flexibility of collaborations

Co-movement of components describing the strategic flexibility of collaborations	
	Component
	Strategic flexibility of collaborations
Evaluation of relationship investments and relationship value	0.915
Capability of changing network picture and perceived position	0.883
Perception of relationship interactions	0.849
Reconfiguring strategy to fit a relationship-based model	0.754

Source: devised by the authors

The exploration of dynamic relationship capabilities continued with the analysis of the process flexibility factor. It was tested whether the variables linked to the longitudinal sensation of relationship portfolio, the evaluation of relationship life cycle, the capability of developing new processes to launch, expand and terminate relationships and the capability of adapting workflow management solutions with the capability of

reconfiguring processes related directly to relationship management can be described by one single factor (a primary component). The factor analysis yielded the following result: by maintaining 70% of the information content of the original variables, one factor describes the above-mentioned variables (KMO: 0.804; Bartlett test Sig: 0.000).

Table 5

Maintained information content during the evaluation of the factor describing the process flexibility of collaborations

Maintained information						
Component	Eigenvalues			Sum of the squares of loading variables		
	Total	Variance percentage	Cumulative percentage	Total	Variance percentage	Cumulative percentage
1	3.513	70.262	70.262	3.513	70.262	70.262
2	0.627	12.548	82.811			
3	0.389	7.776	90.587			
4	0.260	5.210	95.797			
5	0.210	4.203	100.000			

Source: devised by the authors

Table 6

Results derived from the exploratory factor analysis performed on the components that emerged during the evaluation of the process flexibility of collaborations

Co-movement of components describing the process flexibility of collaborations	
	Component
	Process flexibility of collaborations
Evaluation of relationship life cycle	0.878
Capability of adapting workflow management solutions	0.870
Capability of developing new processes to launch, expand and terminate relationships	0.853
Capability of reconfiguring processes related directly to relationship management	0.843
Longitudinal sensation of relationship portfolio	0.739

Source: devised by the authors

The exploration of the levels of dynamic relationship capabilities ended with the test of coordination flexibility. It was examined whether the sensation capability of the demands of partners and related units, capability of evaluating the satisfaction level of partners inside and outside the organisation, capability of learning best practices from inside and outside the organisation, capability of reconfiguring

relationship management tasks and the capability to involve an intermediary can be described by one single factor. The factor analysis yielded the following result: by maintaining 76% of the information content of the original variables, one factor describes the above-mentioned variables in this case as well (KMO: 0.804; Bartlett test Sig: 0.000).

Table 7

Maintained information content during the evaluation of the factor describing the coordination flexibility of collaborations

Preserved information content						
Component	Eigenvalues			Sum of the squares of loading variables		
	Total	Variance percentage	Cumulative percentage	Total	Variance percentage	Cumulative percentage
1	3.024	75.595	75.595	3.024	75.595	75.595
2	0.544	13.588	89.183			
3	0.287	7.185	96.368			
4	0.145	3.632	100.000			

Source: devised by the authors

Table 8

Results derived from the exploratory factor analysis performed on the components that emerged during the evaluation of the coordination flexibility of collaborations

Co-movement of components describing the strategic flexibility of collaborations	
	Component
	Coordination flexibility of collaborations
Capability of evaluating the satisfaction level of partners inside and outside the organisation	0.902
Sensation capability of the demands of partners and related units	0.886
Capability of reconfiguring relationship management tasks and the capability to involve an intermediary	0.851
Capability of learning best practices from inside and outside the organisation	0.838

Source: devised by the authors

Following the evaluation of dynamic relationship capability factors, components of complex loyalty that operationalise successful collaborations were identified. As a starting point, it was examined whether the values that are looked at during the evaluation of complex loyalty as a target variable may be described by one constructed variable (factor). However, as illustrated in Table 9, it is evident that in this case the complex loyalty factor would only maintain 51% of the information

content of the originally examined variables, which is below the values set in the conditions framework.

In line with a statistically correct way of maintaining information, there are two factors for the description of complex loyalty (attitudinal loyalty and behavioural loyalty factors, as illustrated in Table 10). These factors offer 73% information maintenance (KMO: 0.663; Bartlett body Sig: 0,000).

Table 9
Maintained information content during the evaluation of the factor describing the loyalty of collaborations

Maintained information content						
Component	Eigenvalues			Sum of the squares of loading variables		
	Total	Variance percentage	Cumulative percentage	Total	Variance percentage	Cumulative percentage
1	2.041	51.017	51.017	2.041	51.017	51.017
2	0.865	21.614	72.632			
3	0.661	16.524	89.155			
4	0.434	10.845	100.000			

Source: devised by the authors

Table 10
Results derived from the exploratory factor analysis performed on the components that emerged during the evaluation of the strategic flexibility of collaborations

Co-movement of components describing the strategic flexibility of collaborations		
	Component	
	Loyalty (behavioural)	Loyalty (attitudinal)
In the future, we are planning to purchase from some other product/service categories of our partners.	0.919	
We are willing to continue to purchase repeatedly from the products of our partners.	0.772	
We usually recommend our partners to other parties		0.797
Although other partners of ours may offer slightly more favourable price conditions, we stay with our partners.		0.796

Source: devised by the authors

These results call the readers' attention to the fact that behavioural, attitudinal and complex descriptions of loyalty should be reinterpreted in the field of B2B relationships. In the final phase of data evaluation, the correlation between the modelled factors of dynamic relationship capabilities and the factors of behavioural and attitudinal loyalty was determined. For this process, the PLS path analysis method has been used, the results of which are summarised in Figure 1. From these results two profound correlations become clear:

- Firstly, there is a correlation between the examined levels of dynamic relationship capabilities: the degree of coordination flexibility determines the degree of process flexibility by up to 44% and

process flexibility explains the level of strategic flexibility by up to 61%;

- Secondly, the degree of dynamic relationship capabilities influences the level of organisational loyalty, and with that, the success of collaborations. Each level of dynamic relationship capabilities defines behavioural loyalty by 11.6% and attitudinal loyalty by 15.7%. It is to be noted that while coordination, process and strategic flexibility affect behavioural loyalty to a more or less similar degree, there is no such balance in the case of attitudinal loyalty. In the latter case, the strongest effect was exerted by coordination flexibility, while strategic flexibility bears no effect on attitudinal loyalty.

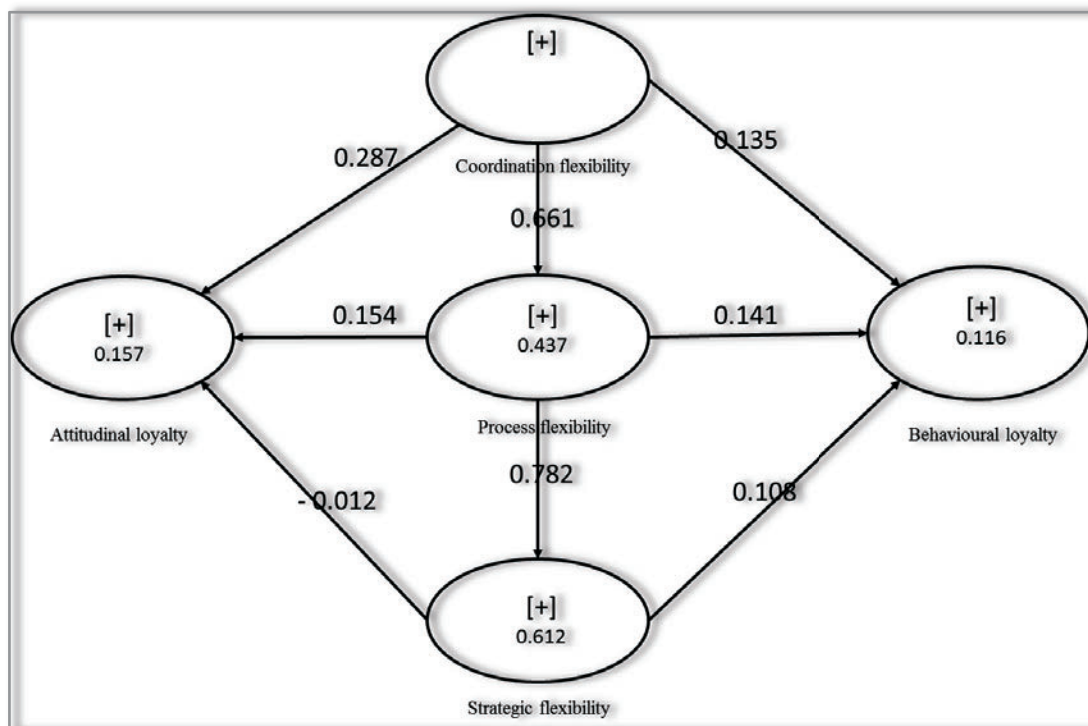


Figure 1 The relationship between dynamic relationship capabilities and relationship success

Source: devised by the authors

SUMMARY

The research presented in this study has realized two goals: firstly, it has made an attempt to measure the complex phenomenon of dynamic relationship capabilities; secondly, it has examined the relationship between dynamic relationship capabilities and collaboration success. The results indicate that dynamic relationship capabilities can be described along the applied three levels (strategic, coordination and process flexibility of collaborations) and that the set of tools that organisations develop in line with these three levels also influences the degree of flexibility that may be achieved at a one-stage-higher level. The indicated results also demonstrate the fact that dynamic relationship capabilities influence loyalty perceived during collaborations, which is regarded as a distinctive property of all successful collaborations.

On the other hand, the results of the research raise a number of questions as well. It is yet unclear how

dynamic relationship capabilities become influential to relationship loyalty.

Further research questions may be the following:

- How do dynamic relationship capabilities affect the static relationship capabilities of organisations?
- What impact do dynamic relationship capabilities have on the performance of collaborations?
- How do dynamic relationship capabilities influence two very important loyalty- defining characteristics: trust and commitment?

Although the research results raise many questions, they point out the phenomenon of dynamic relationship capabilities as a phenomenon that can be embraced by organisational management and, with the assistance of which it is possible to manage the dynamics of inter-organisational interaction and the development of a set of responses for businesses.

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