# Mises' Incomplete Theory of the Value of Money

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*SUMMARY*

*Ludwig von Mises introduced the concept of marginal utility into Austrian economics. He presented what he described as a complete theory of the value of money on the basis of the subjective theory of value and its peculiar doctrine of marginal utility. It is shown here that Mises' theory of value is unclear for at least three reasons. Mises states that his theory of money is based on Menger's theory of value, while in fact his theory refers to Jevons' rather than to Menger's. Secondly, the essence of Mises' theory contradicts his earlier assumption on the immeasurability of the use value of money. Thirdly, Mises' concept of continuity in the objective exchange value of money is not grounded in the subjective theory of value.*

*Keywords: theory of money value, subjective use value of money, objective exchange value of money, marginal utility, Menger, Jevons*

*Journal of Economic Literature (JEL) codes: B13, B31, D46, E14*

*DOI: http://dx.doi.org/10.18096/TMP.2017.01.01*

## INTRODUCTION

Ludwig von Mises belongs to the so-called Austrian school of economics. His scientific achievements are impressive and go beyond the accomplishments of that school. Although Mises dealt with the general theory of economics, the central focus of his interest was always *money*. Mises proved that resource allocations begin and end in the exchange of commodities – consequently all economic issues are related to the theory of money.

*The Theory of Money and Credit* (1912) is more than 100 years old, but it nonetheless contains theses that call into question the contemporary approach to money. Mises' theory of money value derives from that of Carl Menger, a founder of the Vienna school of economics. Although Mises' theory is rooted in Menger's, the author departs to a certain extent from its core. Mises introduced, among other things, the concept of the objective exchange value of money, and attributed to it a special significance in the process of money valuation. He showed that the subjective value of money is derived from the objective exchange value. 'While the utility of other goods depends on (…) conditions that do not belong to the category of economics at all but are partly of a technological and partly a psychological nature, the subjective value of money is conditioned by its objective exchange value, that is, by a characteristic that falls within the scope of economics' (Mises 1981, p. 118).

The primary goal of this article is to determine whether Mises remains a successor to the Mengerian subjective theory of value, or whether his theory of money value relies rather on Jevons' scientific rigor.

## ON THE (IM)MEASURABILITY OF THE SUBJECTIVE VALUE OF MONEY

A central element in Mises' theory of money value (1912) is the concept of objective exchange value. Subjective valuation of money is based on the assumption that money has a certain objective exchange value, i.e. the possibility of obtaining a certain quantity of other economic goods in exchange for a given quantity of money. 'If we wish to estimate the significance that a given sum of money has (...) we can do this only on the assumption that money possesses a given objective exchange value' (Mises 1981, p. 119). 'Both the subjective use value of money and its subjective exchange value are derived from its objective exchange value' (Mises 1981, p. 118).

This approach to the value of money may be viewed in certain respects as inconsistent with Menger's subjective theory of value. Let us start from the beginning, however,

namely by explaining the essence of the theory of commodity valuation and its reference to the medium of exchange.

In the second chapter of his book *Theory of Money and Credit* (1912) Mises argues that 'the notion of money as a measure of value is fallacious' (Mises 1981, p. 51). This conflicts with the fundamentals of Menger's theory of value. 'Every economic activity presupposes a comparison of values' (Mises 1981, p. 51). The process of valuing means ordering commodities according to their importance to each individual. Each person draws up a list of comparative values for a given point of time (Mises 1981, p. 52). The need for such a comparison is due to the circumstance that the process of valuation itself leads eventually to the exchange of commodities. Instead of stating that 'this commodity is worth so much' we can only say that 'the value of this commodity is greater than the value of that'. 'The subjective use value of a commodity is immeasurable. It is impracticable to ascribe a quantity (of values) to it' (Mises 1981, p. 58).

In *Theory of Money…* Mises refers to Carl Menger's contributions to the general theory of value. According to Menger, the notion of value belongs to the category of human judgment. A value is the importance we assign to a good because we are aware that the satisfaction of a need depends on command over the good in question[1]. The value that we attribute to a good derives from the importance of the need it satisfies[2]. It is the result of a *transfer* of the importance of the need onto the good that satisfies that need[3]. The magnitude of the value depends on the relative rank of the need satisfied by the good and on the quantity of good being available to a person[4]. The nature of value is subjective. It directs human economic choices, i.e. commodity exchange. Carl Menger showed that the origin of money as a medium of exchange refers to money as an economic good. Each exchange transaction is preceded by an act of valuation. When individuals exchange commodities, they reveal their individual value scales. If commodity *a* is exchanged for commodity *b* it is because the individuals involved assign opposite values to them. If commodity *a* is a loaf of bread, and commodity *b* is half a dozen eggs, then the first party to the transaction values the half-dozen eggs 'higher' than the loaf of bread, while the other values the loaf of bread higher than the half-dozen eggs. In other words, an individual will exchange a good or certain quantity of it as long as the goods acquired are more valuable than the goods given up. The exchange ratio is a result of their different importance to the individuals concerned.

Although Mises argued that the subjective estimates of individuals are the basis for the economic valuation of money, just as for other goods (Mises 1981, p. 117), he unexpectedly introduced into the theory of money value a concept of marginal utility, based on its objective exchange value. Mises assumed that a valuation of money is possible only on the assumption that money has a certain objective exchange value (Mises 1981, p. 130). 'Since there is no direct connection between money as such and any human want, an individual can obtain an idea of its utility and consequently of its value only by assuming a definite purchasing power' (Mises 1981, p. 130). As we can see, Mises does not apply universal rules governing the value of goods to the value of money. On the contrary, he states that the theory of money must take account of the fundamental difference between the principles that govern the value of money and those that govern the value of commodities. 'We need to undertake a different approach in the theoretical approach to the value of money and other commodities' (Mises 1981, p. 122). 'It is not the task of economics (...) to explain why corn is useful to man and valued by him. But it is the task of economics alone to explain the utility of money' (Mises 1981, p. 119). This line of argument leads Mises to conclusions that contradict earlier theses, firstly on the immeasurability of the subjective value of money, and secondly on the nature of value as a category of human judgement. In stating a link between the objective exchange value of money and subjective valuations of the medium of exchange, Mises introduced the concept of marginal utility as a measure of value. 'The subjective use value of money must be measured by the marginal utility of the goods for which the money can be exchanged' (Mises 1981, p. 130). All of this shows that Ludwig von Mises did indeed depart from the Mengerian concept of the process of valuation. This would appear to have had many far-reaching consequences.

[1] *(...) Es ist somit der Werth die Bedeutung, welche concrete Güter oder Güterquantitäten für uns dadurch erlangen, dass wer in der Befriedigung unserer Bedürfnisse von der Verfugung über dieselben abhängig zu sein bewusst sind (Menger 1871/2010, p. 78).*

[2] *Der Güterwerth ist in der Beziehung der Güter zu unseren Bedürfnissen begründet, nicht in den Gütern selbst (Menger 1871/2010, p. 85).*

[3] *Die Bedeutung, welche die Güter für uns haben, und welche wir Werth nennen, ist lediglich eine übertragene. Ursprünglich habe nur die Bedürfnisbefriedigungen für uns eine Bedeutung, (...), wir übertragen aber in logischer Consequenz diese Bedeutung auf jene Güter, von deren Verfügung wir in der Befriedigung dieser Bedürfnisse abhängig zu sein uns bewusst sind (Menger 1871/2010, p. 107).*

[4] *Die Grösse der Bedeutung, welche die verschiedenen concreten Bedürfnisbefriedigungen (die einzelnen Acte derselben, welche eben durch concrete Güter herbeigeführt werden können) für uns haben ist eine ungleiche und das Mass derselben liegt in dem Grade ihrer Wichtigkeit für die Aufrechterhaltung unseres Lebens und unserer Wohlfahrt. (...) Die Grösse der auf die Güter übertragenen Bedeutung unserer Bedürfnisbefriedigungen, das ist die Grösse des Werthes, ist somit gleichfalls eine verschiedene (...) (Menger 1871/2010, p. 107).*

## UTILITY AS A MEASURE OF MONEY VALUE

In *Theory of Money and Credit* (1912) Mises argued that 'the revolution in economics since 1870 had not provided a satisfactory solution to the theory of value problem' (Mises 1981, p. 137). Although Menger, as Mises argues, had initiated a deeper understanding of the nature and value of money, nobody had yet succeeded in solving 'the fundamental problem of the value of money'.

Mises assumed that the essence of money's utility derives from its objective exchange value. If an individual values money, he needs to assume that it has some purchasing power. The value of money is derived from the objective factor, namely money's purchasing power. We need to search for, as Mises writes, 'objective determinants of its subjective value' (Mises 1981, p. 119). Any investigation of subjective value demands prior investigation of this objective exchange value. 'There is no subjective value of money without objective exchange value' (Mises 1981, p. 119). 'The theory of the value of money leads us back through subjective exchange value to objective exchange value' (Mises 1981, p. 122). How does Mises eventually trace the objective determinants of the subjective exchange value of money? Mises assumes that the objective exchange value of money contains a historically continuous component. 'The past value of money is taken over by the present and transformed by it (…)' (Mises 1981, p. 133). 'Once an exchange ratio between money and commodities has been established in the market, it continues to exercise an influence beyond the period during which it was maintained; it provides the basis for the further valuation of money' (Mises 1981, p. 130). The money prices of today are linked to those of yesterday, and with those of tomorrow and beyond. In other words, the past objective exchange value of money has a certain significance for its present and future valuation. When searching for the objective determinants of subjective values of money, we will eventually reach a point in time where the object derives its exchange value from a value other than money. At this stage of his analysis, Mises is undoubtedly turning towards the approach proposed by Friedrich von Wieser, who attributed a special social and economic significance to the '*objective innere Tauchwert des Geldes'* (Taylor 1958). Although Wieser, as Mises noted, did not manage to develop a complete theory of money, '(…) it was Wieser who, by revealing the historical element in the purchasing power of money, laid the foundation for the further development of the subjective theory of the value of money' (Mises 1981, p. 139).

Let us pause at this point to analyse the essence of Mises' theory of value. Mises himself claimed that he had managed to present a complete theory of the value of money on the basis of the subjective theory of value and its peculiar doctrine of marginal utility (Mises 1981, p. 136). By introducing the concept of utility into the theory of money value, i.e. by assuming that the starting point of money valuations is its objective exchange value, Mises aligned himself with the school that associated the term utility with value. He followed the concept of utility within the subjective theory of value introduced by Jevons and Walras. Jevons referred the economic question of a commodity's value to its utility. 'Value depends on the utility' – he wrote in *Theory of Political Economy* (1871). Utility is an abstract quality of a commodity which serves human purposes. It is, as Jevons put it, the intensity of the effect produced upon the consumer[5]. Utility must be considered as measured by, or even as actually identical with, the addition made to a person's happiness (Jevons 1931, p. 45). A similar understanding of utility can be found in earlier works, including those of J.S. Mill (1806–1873), J.B. Say (1767–1832) and E.B. de Condillac (1715–1780)[6]. Ludwig von Mises followed the approach to value understood as the benefit that a good provides – that is, as a property of the good. 'If we wish to estimate the significance that a given sum of money has, in view of the known dependence upon it of a certain satisfaction, we do this only on the assumption that money possesses a given objective exchange value' (Mises 1981, p. 119). Mises attributed to money, as a medium of exchange, the concept of utility.

It needs to be pointed out that the concept of utility as a measure of value seems inconsistent with Menger's theory of value. In the latter theory there is a significant difference between the notions of utility and value. The value of a good is related to its economic character (its relative scarcity) and the importance of the good in the process of satisfaction of a person's need. For Menger the concept of utility ends in the *commodity attribute.*

[5] *Utility may be treated as a quantity of two dimensions, one dimension consisting in the quantity of the commodity, and the other in the intensity of the effect produced upon the consumer (Jevons 1871/1931, p. 47).*

[6] *Mill (1848) argued that utility is an inherent property of a good which serves the satisfaction of human need (Zawadzki 1949). In Say's treatise (1814) utility is a quality of a good that makes it desirable for each person (Zawadzki 1949). Condillac (1776) demonstrated that value is based on utility, on the need that is satisfied by a commodity or on the benefit ("behoof") that a good provides (Zawadzki 1949).*

A good is useful if it satisfies human needs[7]. A non-economic good is useful, i.e. able to satisfy human needs, but does not have value. Utility is in fact a non-economic term. It does not refer to the theory of value, but belongs to the theory of good. Since we face scarcity, we rank goods according to their importance in the satisfaction of needs; that is to say, we attach *value* to the commodities exchanged in the marketplace. We exchange goods directly or indirectly, always giving up goods that are less valued than those accepted. Money as a medium of exchange follows these rules just like other goods.

As we can see, Mises employed a notion of utility not in Menger's but in Jevons' sense. By introducing the objective exchange value of money, Mises turned to marginal utility as a measure of value[8]. Mises assumed that, since money does not meet human needs (as other goods do), we cannot assign value to it as we do to other goods. 'When explaining the value of commodities, the economist can and must be content to take subjective use value for granted and leave investigation of its origins to the psychologist (...)' (Mises 1981, p. 118). It is immaterial whether or not the commodity also has exchange value, but for money to have use value, the existence of exchange value is essential.

## DISCUSSION

As we have shown, money as a means of exchange was considered by Mises not to be subject to the rules of valuation introduced by Menger. In making this exception, Mises introduced at least three unsolvable problems.

Firstly, he did not explain how the subjective value of money is derived from its objective exchange value. Mises stated that the past objective value of money is linked to its present and future valuations. The subjective value of money is conditioned by its given objective exchange value. Both theses fail to explain the nature of the subjective exchange value of money. When searching for 'objective determinants of money's subjective value' we do not recognise any factor or process which results in the magnitude of its utility.

Secondly, by introducing into Austrian economics the concept of marginal utility, Mises was essentially following a blind alley. He assumed that the subjective use value of money is measured by the marginal utility of the goods for which the money can be exchanged. This contradicts his earlier statement on the immeasurability of the subjective exchange value of money. 'So long as the subjective value of money is accepted, this question of measurement cannot arise' (Mises 1981, p. 51). 'Acts of valuation are not susceptible to any kind of measurement' (Mises 1981, p. 52).

The process of measuring requires the use of an objective means of measurement, namely a unit 'fixed in time and space' – a tool which is constant and material; for example we measure lengths of fabric in metres or body weight in kilogrammes. In valuing goods we do not measure the value of goods by money – neither do we measure the value of money by goods. Value – as Menger was the first to note – belongs to the category of human judgment. It cannot be measured or quantified. It is of qualitative character. Neither Commodity *a* nor Commodity *b* is a measure of the value of the good exchanged. 'In a market, exchange will continue until it is no longer possible for the reciprocal surrender of commodities by any individuals to result in their each acquiring commodities that stand higher on their value scales than those surrendered' (Mises 1981, p. 53).

Thirdly, the concept of the marginal utility of money assumes the existence of price. According to Mises, it is subjective valuations that are the basis for money prices. So prices are on the one hand a result of the valuation process, and on the other its cause. Although the prices in question are not the same ones, the category of price cannot be explained in terms of itself. In this context, the historical element of continuity in the objective exchange value of money, employed by Mises as proof of the commodity origin of money, also becomes unclear. It appears to depict a functional dependency, which is a category of descriptive rather than causal character.

And last but not least, if we take Mises' view that 'the subjective use-value of money (…) is nothing but the anticipated use-value of things that are to be bought with it' (Mises 1981, p. 130), then we will inevitably accept the assumption of the *objective theory of value* on the *reciprocal surrender of equivalent goods.* Its primary implication is that exchange transactions are preceded by measurements of the quantity of value contained in each of the objects that are to be exchanged. And money as a medium of exchange is a measure of value (!).

[7] *Nützlichkeit ist die Tauglichkeit eines Dinges, der Befriedigung menschlicher Bedürfnisse zu dienen und demnach (und zwar die erkannte Nützlichkeit) eine allgemeine Vorraussetzung der Güterqualität. Auch nicht ökonomische Güter sind nützlich, indem dieselben zur Befriedigung unserer Bedürfnisse ebenso wohl tauglich sind, als die ökonomischen, und diese Tauglichkeit muss auch bei ihnen eine von den Menschen erkannte sein, sonst könnten sie überhaupt nicht die Güterqualität erlagen. Was aber nicht ökonomisches Gut von einem solchen unterscheidet, welches in dem den ökonomischen Charakter begründenden Quantitätenverhältnisse steht, das ist der Umstand, dass nicht von der Verfügung über concrete Quantitäten des erstern, wohl aber von einer solchen über concrete Quantitäten des letztern die Befriedigung menschlicher Bedürfnisse abhängig ist, und somit die ersteren wohl Nützlichkeit, nur die letzteren aber neben ihrer Nützlichkeit auch jene Bedeutung für uns haben, die wir Werth nennen (Menger 1871/2010, p. 84).*

[8] *'Money utility is the possibility of obtaining a certain quantity of other economic goods in exchange for a given quantity of money. (...) money has no utility other than that arising from the possibility of obtaining other goods in exchange for it' (Mises 1912/1981, p. 118).*

In his later book *Human Action: A Treatise on Economics* (1949) Ludwig von Mises basically sustains the theses introduced in *Theory of Money and Credit* (1912). However, the theory of the value of money was presented there slightly differently[9].

The numerous references to *the quantity theory of money* appearing in Chapter XVII, titled *Indirect Exchange,* indicate that as far as money theory is concerned, the 1949 work may be regarded as a supplementation of the analysis first put forward by Mises in 1912. Mises argued, referring among others to the ideas of Menger, that 'the theory of money was and is always the theory of indirect exchange and of the media of exchange' (Mises 1949, p. 395). From that assumption he derived two important premises. First, money as a medium of exchange is an economic good – it is rare and there is a demand for it. Second, the subject matter of the theory of indirect exchange is the study of exchange ratios between the medium of exchange on the one hand and goods and services on the other hand.

In *Human Action* … (1949) Mises used the so-called praxeological method, which, in Mises' words, 'traces all phenomena back to actions of the individuals' (Mises 1949, p. 403). He argued that when analysing monetary phenomena we need to take as a point of departure the value judgments of the people concerned. The method applied by Mises led him to two important conclusions. First, '(…) the appraisement of money is to be explained in the same way as the appraisement of all other goods: by the demand on the part of those who are eager to acquire a definite quantity of it' (Mises 1949, p. 400). Second, '(…) it would still be faulty to explain the purchasing power – the price – of the monetary unit on the basis of its services' (Mises 1949, p. 396). (…) It is always demand that influences the price structure, not the objective value in use (Mises 1949, p. 397). Having in mind Mises' theory from 1912, one can see that these statements contradict the theses presented there. In spite of this, Mises does not revise his theory. Instead, he returns to his *regression theorem,* arguing that 'the demand for a medium of exchange (…) depends on its value in exchange' (Mises 1949, p. 405).

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[9] *A great part of the theory of the value of money in Human Action: A Treatise on Economics (1949) was first presented by L. von Mises in Nationalökonomie: Theorie des Handelns und Wirtschaftens (1940).*

# Changing Trends in ICT Use - A Generation Y Analysis

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*SUMMARY*

*The development in recent years of Information and Communication Technology (ICT) tools and equipment is notable. The question arises whether user behaviour follows technical progress. Statistics prove that the spread of the Internet in Hungary, especially the Mobile Internet, follows the EU trend. At the same time, the changes in equipment use are less spectacular. The paper analyses the data of a survey conducted among the business students of the University of Miskolc in 2012 and in 2015 related to the order of preference for some ICT tools. Empirical results confirm that changes in the utilisation of ICT tools are much slower than the appearance of new tools and solutions in the market; due to the increasing popularity of smartphones, the possibility of utilising them both in higher education and at work should be considered.*

*Keywords: ICT tools, preference analysis, digital competence*
*Journal of Economic Literature (JEL) codes: D79, L86*
*DOI: http://dx.doi.org/10.18096/TMP.2017.01.02*

## INTRODUCTION

Research activities in field of Information and Communication Technology (ICT) possibilities may serve several purposes. Expanding trade flow or establishing new software developments are obvious scopes, but also social aspects of the utilisation have an increasing importance. Consideration of user skills and intention to use ICT tools must have a similar priority in order to achieve evolution.

Nowadays ICT tools extend throughout our work and lives, including news reading, keeping in contact with relatives or friends, job searching, placing orders, etc. Computers or even mobile phones are essential during the mentioned activities. Higher education, among other sectors, is interwoven with ICT solutions: e-administration, e-learning systems and materials, video conferences and emails are common. However, the availability of the technology by itself is not enough for achieving a breakthrough. It is necessary to develop ICT systems, the learning content supply and the personal level of knowledge and competences in a coordinated manner.

Generational theory (Coupland 1991; Strauss & Howe 1991) offers a professional background for explaining typical ICT user profiles and behavioural patterns. Attitudes to information technology (IT) and ICT significantly determine differences between the characteristics of the latest generations. This is especially true in case of the related labour market research (see Szlávicz & Szretykó 2013; Törőcsik 2015). Studies dealing with Generations X, Y, Z and Alpha designate different years of birth of the persons belonging to each group. This is due to the local characteristics of social and economic structures. A major issue is that Hungarian diffusion of personal computers was delayed compared to Western Europe or the USA. In Hungary, people born between 1982 and 1995 are classified as Generation Y (Pais 2013).

The aim of the present study is to analyse some aspects of the changes of ICT usage among higher education students belonging to the late representatives of the Generation Y. Changes in the preferred data storage tools and computer type are representative indicators of the topic.

The paper summarises the general trend and the results of a pilot survey including the business students of the University of Miskolc.

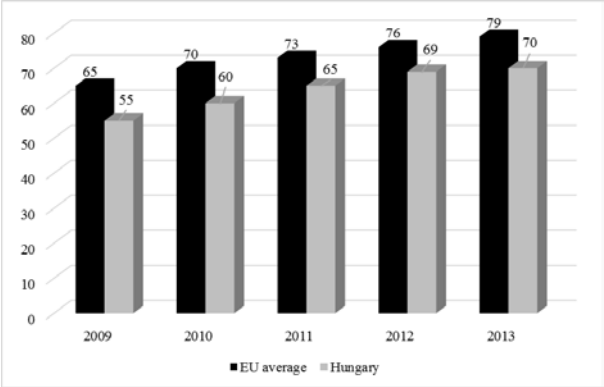
## USE OF ICT TOOLS

### *General Trends in Household Use*

Regular reports of the Hungarian Central Statistical Office (KSH) in the field prove a clear improvement in

computer usage among households (KSH 2016). 76% of the population were effective (active) computer users in 2015, i.e. they used a computer at least once in a three-month period. While the indicator is lower than the EU average (83%), a continuous increase can be observed in comparison with the previous years. 56.8% of the households had a desktop computer in 2009 and this ratio had barely changed to 2013 (58.3%). Nevertheless, the share of portable computers has been growing steadily; the ratio has changed from 21% to 41.6% in the period.

Using ICT tools is usually associated with using the Internet. The growing number of households with Internet access is a positive tendency. Hungary lags behind the EU average, but the headway is visible (Figure 1).




Source: KSH, 2016

*Figure 1. Household internet access in Hungary and the EU (data in %)*

The KSH report on telecommunications, Internet and TV services (KSH 2016) pointed out that there were 8.7 million Internet subscriptions in Hungary in the 3rd quarter of 2015, which is 35.9% higher than in the same period of 2013. Wired internet bandwidth has begun to grow dynamically; 75% were over 2 Mbit/s, 49% over 10 Mbit/s and 14% over 100 Mbit/s in 2016. The ratio of the latter category exactly doubled from the same period of the previous year. Development of data traffic on wired Internet is remarkable. The traffic was about 383 thousand Terabytes, which means a 34% increase over one year. Expansion has accelerated, which is proved by the fact that the value of the indicator was 39 thousand Terabytes in 2014 fourth quarter and 14.4 thousand Terabytes in 2010 fourth quarter based on data from KSH (2015).

Furthermore, Internet subscriptions included 5.9 million Mobile Internet subscriptions. The growing popularity of mobile use is also reflected in the fact that four-fifths of conversations were carried out using mobile phones.

Sending and receiving e-mails were the most popular computer activities in 2015. 93% of the 16 to 74-year old population within the group of effective Internet users reported using e-mail. There was an increasing ratio of users who made Internet phone calls (from 37.2% in 2013 to 54.7% in 2015) as well as participation in social networks (from 77.8% in 2013 to 83.4% in 2015). Browsing Wikipedia also became more popular (changing from 40.4% in 2013 to 59.8% in 2015).

### *General Trends in Company Use*

Sasvári (2012a, 2012b) analyses the use of ICT tools on the corporate level. According to his results based on an international survey, the level of utilisation is diverse, especially with regard to company size. Small- and medium-sized companies were lagging in using information systems (Sasvári & Wolf 2014). Of course, this does not entail the total neglect of IT services and ICT tools, but the depth and scope of utilisation is fairly questionable. More than four-fifths of the corporations in the sample (Sasvári, 2012b) have a web page in 2010 and they used Internet for advertising products and services. 60% of micro- and small companies have had a product or service advertised on the Internet. Moreover, e-banking was taken advantage of by 80% of micro and 85% of small companies.

KSH (2014, 2016) results confirm Sasvári's findings. 91% of the companies used the Internet in 2013, and 27% of them had broadband Mobile Internet access. However, there are areas for improvement, including:

- low utilisation of cloud computing: only 26.2% of large companies (over 250 employees) took advantage of any cloud-based services (the national average ratio is 11.6%),
- corporate web pages focused on product and service information; on-line ordering was available in every fourth to fifth case, however every third company managed its purchasing also this way,
- an enterprise resource planning system was installed by 70.5% of large companies but by only 37% of medium-sized (50-249 employees) and 12.1% of small firms (less than 50 employees) (KSH 2016).

Statistics clearly confirm that the small companies utilise ICT at a lower level than large ones. In my opinion, the reason for this is not mainly the availability of the tools or even the financial possibilities. A large company can define a number of repeatable processes, which are manageable by IT systems, while a smaller company more rarely encounters with equally repetitive challenges. In these cases, individual treatment of the problem with marginal support of ICT can be more appropriate in several ways, including the costs. However, this means that personal IT competencies have fundamental importance in solving the problems.

## RESEARCH SAMPLE AND METHOD

### *Research Goals and Limitations*

Relevant literature and related statistics verify a dynamic expansion of ICT tools. Technological development may lead to changing user behaviour, as well

as there being also an opposite effect. I believe that the investigation of changes in preferences related to ICT tools can contribute to establishing more effective development action. I started a survey in 2012 in order to explore the ICT competencies and attitudes of higher education students. The results allow us to designate new ways of educational methodology in practice, while the information is also valuable for the labour market.

Empirical results in this paper highlight the data storage tools and types of computer preferred by the respondents. Results in this paper are based on the business students of the University of Miskolc. Although the sample is not representative and generalisation of the statements is not available, its findings can be utilised.

## *Research Sample Characteristics*

The data collection periods of the present analysis were in 2012 (n=437) and in 2015 (n=294). Some data of the sample are summarised in Table 1.

*Table 1*
*Research sample data*

| | **2012** | **2015** |
|---|---|---|
| Female | 62.5% | 53.4% |
| Male | 37.5% | 46.6% |
| Full-time student | 66.1% | 85.0% |
| Part-time student | 33.9% | 15.0% |
| Weekday time spent with computer (average) | 4.79 hours | 4.81 hours |
| Weekend time spent with computer (average) | 4.01 hours | 5.03 hours |

Source: own edition

The time spent with computer activities per day was quite much in each year (Table 2). Checking the data by gender, in case of male respondents there are higher values but the differences are statistically not significant. Average weekday time spent with computer activities was higher in the group of part-time students but the weekend time was higher in the group of full-time student (some ANOVA results show (*) significant differences).

*Table 2*
*Time spent with computer work by sub-samples*

| | | Weekday (hours) | ANOVA F | ANOVA Sig. | Weekend (hours) | ANOVA F | ANOVA Sig. |
|---|---|---|---|---|---|---|---|
| 2012 | Female | 4.85 | .286 | .593 | 3.81 | 3.949 | .048* |
| | Male | 4.64 | | | 4.31 | | |
| 2015 | Female | 4.74 | .120 | .729 | 4.76 | 2.032 | .155 |
| | Male | 4.88 | | | 5.34 | | |
| 2012 | Full-time | 3.91 | 47.857 | .000* | 4.49 | 33.986 | .000* |
| | Part-time | 6.50 | | | 3.05 | | |
| 2015 | Full-time | 4.52 | 11.541 | .001* | 5.17 | 2.643 | .105 |
| | Part-time | 6.45 | | | 4.27 | | |

Source: own edition

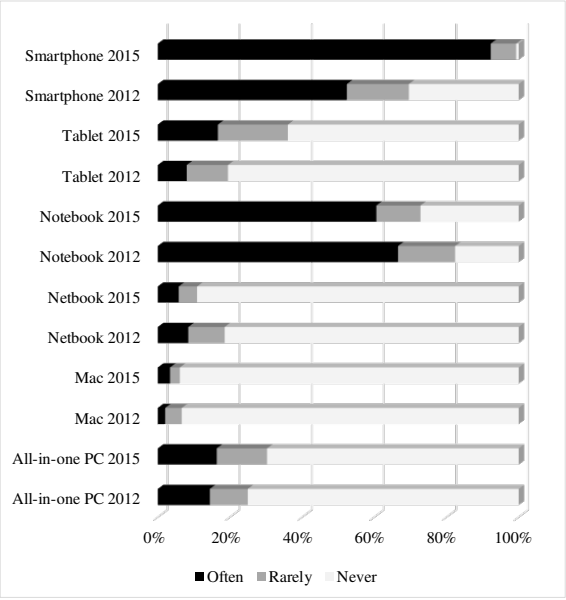



*Figure 2. Frequency of ICT tools (%)*

Figure 2 compares the use of some tools in the two periods. Beside the overall state of users' preferences there are some notable results:

- netbooks have not had a significant share and their popularity is fading,
- notebooks are preferred but the ratio of both frequent and occasional users decreased slightly,
- popularity of tablets has increased, but prevalence was only 16.6% in 2015,
- use of smartphones show dominant progress; the smartphone has become the ultimate tool of access to ICT.

# METHODS

The online survey was prepared for preference analysis. The respondents were asked to mark the more preferred item pairwise. In case of data storage tools the items (for 6 comparisons) are as follows:

- memory card,
- external HDD,
- USB flach memory
- on-line (cloud) data storage.

Items related to the computer type (for 10 comparisons) are as follows:

- tablet
- netbook
- notebook
- smartphone
- desktop PC

Kendall (1970) proved the mathematical basis of pairwise comparison and introduced indicators for evaluating the quality of the preference orders. Kindler and Papp (1978) collected some applications for describing the preference orders on interval scale, including the Guilford transformation. One step of the Analytic Hierarchy Process (AHP) by Saaty (1980) offers a solution presenting the preference orders on a ratio scale, which allows the direct comparison of the results between various sub-samples. The results in this paper include:

- preference frequencies of the items, preference orders and ratio of weights,
- calculating the personal level of consistency (K) in the order of the factors ($0 \leq K \leq 1$, where 0 is the complete absence of consistency and 1 is the complete consistency; the latter means that the respondent has a clear list of preferences),
- group level consensus by Kendall's coefficient of concordance for pairwise comparison ($\nu$) (Kendall, 1970), including the cases $K \geq 0.75$.

The maximum level of Kendall's coefficient of concordance is 1, while the minimum is not fixed, it depends on the number of cases (m): $\nu_{even} = -1/(m-1)$ and $\nu_{odd} = -1/m$ (Kindler & Papp, 1978:49). In order to ensure the comparison, I calculate a corrected coefficient of consensus as:

$$\nu_{corr.\ i} = 100 * \frac{\nu_i - \nu_{min}}{1 - \nu_{min}} \qquad (1)$$

The calculation of the significance (u) test is based on occurrences and possible sum of values below the main diagonal in the aggregated preference matrix, i.e. the number of non-preferred incidences. The details of the procedure can be found in Kindler and Papp (1978:187). In case of high u values ($u > 1.65$) the result is statistically significant.

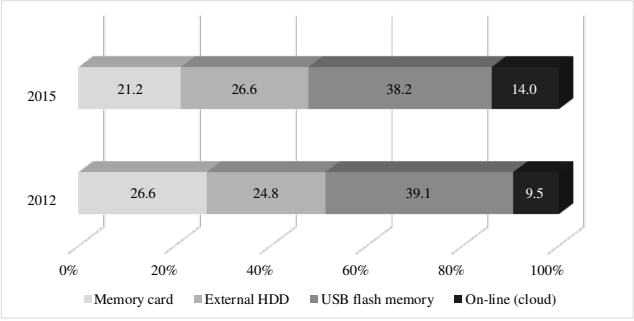
A step of the AHP method by Saaty (1980) determines the weights of items based on the eigenvector assigned to the highest real eigenvalue of a pairwise comparison result matrix. These weights are comparable between sub-samples after normalisation. Rapcsák (2007) shows that there is only one non-zero eigenvalue if the matrix is prepared as in (2).

$$\begin{bmatrix} 1 & \frac{w_1}{w_2} & \dots & \frac{w_1}{w_n} \\ \frac{w_2}{w_1} & 1 & \dots & \dots \\ \dots & \dots & 1 & \dots \\ \frac{w_n}{w_1} & \dots & \dots & 1 \end{bmatrix} \qquad (2)$$

# RESULTS

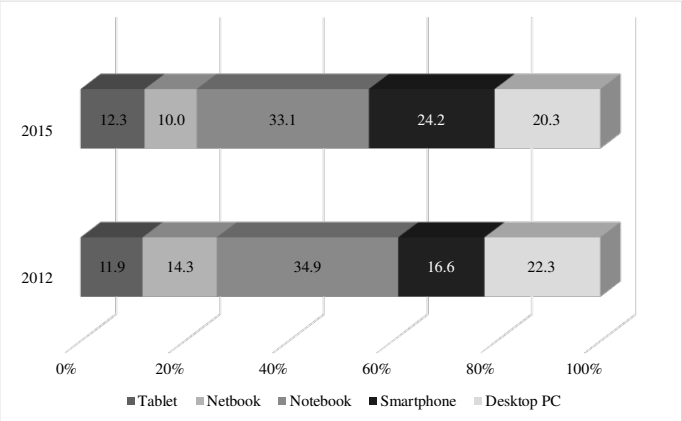
## *Preference Order*

The preferred data storage methods were USB flash memory and on-line solutions (cloud storage) the less one in 2012. The order is similar in 2015, but the ratio of the marking show a changing structure. The relevancy of memory cards decreased; and the popularity of on-line data storage expanded (Figure 3). Notebook computers were the preferred computer type considered by the respondents in both years. Netbooks and desktop PCs became less popular, and tablets and smartphone were appreciated, although the increase in the share of tablets was not really noticeable (Figure 4).




Source: own edition

*Figure 3. Preferences about data storage tools (data in %)*




Source: own edition

*Figure 4. Preferences about useful computer types (data in %)*

*Table 3*
*Results of preference order calculations*

| **Data storage** | | **Type of computer** | |
|---|---|---|---|
| **2012** | **2015** | **2012** | **2015** |
| 1. USB flash memory (53.9) | 1. USB flash memory (52.3) | 1. Notebook (68.0) | 1. Notebook (54.1) |
| 2. Memory card (21.1) | 2. External HDD (22.5) | 2. Desktop PC (13.3) | 2. Smartphone (20.7) |
| 3. External HDD (18.9) | 3. Memory card (15.4) | 3. Smartphone (7.9) | 3. Desktop PC 14.0) |
| 4. On-line (cloud) (6.0) | 4. On-line (cloud) (9.7) | 4. Netbook (5.5) | 4. Tablet (6.4) |
| | | 5. Tablet (5.3) | 5. Netbook (4.8) |

Source: own edition

The preference orders and ratio of weights (presented on a 0-100 scale) are summarised in Table 3.

## LEVEL OF CONSISTENCY AND CONSENSUS

Reliability of a preference order can be questionable. The personal level of consistency allows us to evaluate whether a respondent has a clear preference order. 91.9% of the respondents in 2012 and 94.9% in 2015 had a clear preference order (K=1) about the data storage tools.

The list of useful computer type included more items that allows more category levels in calculating consistency (K), but also in this case the ratio of respondents with a clear preference order (K=1) was high. The survey results were 82.6% in 2012 and 79.9% in 2015. Moreover, the ratio of cases K>0.75 was 91.1% in 2012 and 91.5% in 2015.

It is interesting to check whether the gender or full-time/part-time status could have a group forming effect on the consistency. The Chi-square test of cross tabulation does not show any significant effect. Both grouping factors have a significant effect in case of the useful computer type. Responses of female respondents and full-time students show lower levels of consistency.

The group level of consensus is determined for cases K>0.75. Tables 4 and 5 summarise the results of some sub-samples (n shows the number of responses in the sub-sample). Each result is significant.

*Table 4*
*Group level consensus on data storage tools*

| Data storage | | n | v | $v_{corr}$ (%) | $d_f$ | u |
|---|---|---|---|---|---|---|
| Total sample | 2012 | 402 | .294 | 29.57 | 6.045 | 34.531 |
| | 2015 | 279 | .208 | 21.11 | 6.065 | 23.350 |
| Female | 2012 | 253 | .303 | 30.53 | 6.072 | 27.229 |
| | 2015 | 148 | .233 | 23.85 | 6.124 | 17.368 |
| Male | 2012 | 149 | .297 | 30.20 | 6.123 | 20.044 |
| | 2015 | 131 | .195 | 20.11 | 6.140 | 14.563 |
| Full-time | 2012 | 266 | .282 | 28.45 | 6.068 | 26.916 |
| | 2015 | 238 | .208 | 21.11 | 6.076 | 21.321 |
| Part-time | 2012 | 136 | .319 | 32.38 | 6.135 | 19.804 |
| | 2015 | 41 | .221 | 23.97 | 6.469 | 7.704 |

Source: own edition

*Table 5*
*Group level consensus on the preferred type of computers*

| Type of computer | | n | v | $v_{corr}$ | $d_f$ | u |
|---|---|---|---|---|---|---|
| Total sample | 2012 | 398 | .291 | 29.28 | 10.076 | 44.026 |
| | 2015 | 269 | .305 | 30.77 | 10.11 | 36.454 |
| Female | 2012 | 239 | .273 | 27.62 | 10.127 | 32.102 |
| | 2015 | 143 | .320 | 32.46 | 10.214 | 26.279 |
| Male | 2012 | 159 | .341 | 34.48 | 10.192 | 28.927 |
| | 2015 | 126 | .312 | 31.71 | 10.243 | 24.082 |
| Full-time | 2012 | 259 | .285 | 28.73 | 10.117 | 34.343 |
| | 2015 | 127 | .316 | 32.18 | 10.241 | 24.407 |
| Part-time | 2012 | 139 | .309 | 31.36 | 10.220 | 25.337 |
| | 2015 | 142 | .311 | 31.61 | 10.215 | 25.768 |

Source: own edition

# DISCUSSION

## *Comparing the General Trends and Survey Results*

IT and ICT appears in both personal and corporate everyday activities. Technological novelties are difficult to follow; physical product life nowadays is perceptibly longer than the new product versions on the market. Statistics show a huge and dynamic evolution of ICT tools and possibilities in the 2010s, including changes in user behaviour. The availability of Internet access has become general and its utilisation is now essential in personal and business contacts. However, the level of utilisation is diverse. Although the business administration of large companies widely depends on ICT, smaller ones enjoy fewer of the achievable benefits. Utilisation if often limited to presenting general and product information to customer; however, e-solutions in purchasing are appreciated.

Extension of data traffic, especially the mobile data traffic, is remarkable. This represents new horizons in information exchange because it eliminates the barriers of immobility. The recent mobile phones are ready to substitute for a desktop PC or notebook is many functions.

Generational theory draws up that Generation Y was born in the age of computers, Generation Z was born with the Internet, and Generation Alpha members are born into a permanent on-line era. The last group includes small children who are currently of less interest in terms of the aims of the presente paper, which focusses on higher education or the labour market. However, their attitudes to ICT may move forward the methodological developments for other generations. An Alpha child uses services and databases by touch screens without any knowledge of the technology or design behind it. These children perceive ICT as natural and obvious. I believe that service design shall give similarly simple utilisation possibilities for older generations as well, i.e. the user's attention must not devoured by the operation of the ICT tool, including the hardware or the service framework, rather the focus must be kept on the content of the service.

The empirical results of my survey are in harmony with the general trends. "Smartphoning" spread remarkably between 2012 and 2015. The fact that 89.1% of the respondents considered themselves as regular users in 2015 can be regarded as a ground-breaking result, especially considering that the ratio was 52.4% in 2012. The share of tablets is below my expectations. However, the ratio of both regular and occasional users doubled during the period, while the ratio of non-users decreased

from 80.5% to 63.9%. Notebooks were the most popular both in 2012 and in 2015, even though the ratio of regular users decreased from 66.5% to 60.5%.

The survey asked about the time spent with computer activities (see Table 1). The average value of 4 to 5 hours per day is quite much. The survey shows an increase, but there is a significant change between the years only in case of weekend usage. Checking the results by sub-samples, on weekdays the part-time students spend more time in front of the computer but it is still the opposite on weekends.

## EVALUATION OF CHANGING PREFERENCES

The core element of the analysis was the calculation of preference orders related to data storage tools and useful type of computers. USB flash memory still remained the preferred data storage tool in 2015. The popularity of on-line data storage has increased greatly but its weight lags behind USB flash memory even in 2015 (9.7% versus 52.3%).

The preferred computer type was the notebook in both years. There is no change in the weight of desktop PCs, but its rank in the preference order dropped on the list. Usefulness of smartphones shows a notable step forward (the weight moved from 7.9 to 20.7).

There is a surprisingly high ratio of respondents who have a clear preference order in either year or topic analysed. Despite this, the coefficient of concordance shows a quite low group level of consensus. In the case of data storage tools, the consensus decreased from 2012 to 2015. This may be assign that the current technology-generated change in preferences is not finalised yet, and that adaptation takes place more slowly than the development of the technical background. This phenomenon is observed in each sub-sample of the research.

## CONCLUSIONS

There are two main conclusions based on the survey:

- changes in utilisation of ICT tools are much slower than the appearance of new tools and solutions,
- the smartphone keeps its place as the key element of the actual utilisation.

Considering the limitations of data collection, further investigation is required that includes both the expansion of the research sample and deploying quantitative analysis for understanding personal motivations.

Karcsics (2007) detected three main development strategies based on the maturity of employee competencies:

- catching up (entry-level),
- compliance with current competitive situation,
- providing skills to ensure long-term competitive advantage.

I believe that nowadays entry-level tasks can be limited to the content and usage of specific corporate systems in case of the students belonging to Generation Y. On the one hand ICT background is granted and achievable, on the other hand the changes of related attitudes has begun. There is a need for improving compliance with the current competitive situation in order to achieve a harmonic development between education and labour market expectations. The focus must be on teaching how to exploit the ICT possibilities during problem solving. Case studies, homework assignments and targeted projects can foster the progress.

In addition, diffusion of smartphones is a warning sign to higher education institutions. Smartphones may give the way to reach the students and to arouse their interest in course materials and other relevant information. General and targeted information flow is channelled: Facebook, Twitter and mobile-conforming webpages are important but not enough. The content of education must be adapted in the interest of two main challenges:

- it allows the effective utilisation of the ICT tools held by the students,
- it motivates the ICT users to identify with the learning objectives.

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# The Changing Role of Nuclear Power in the European Union: Reflections from Official Scenarios Released before and after the Fukushima Daiichi Accident

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*SUMMARY*

*Nuclear energy plays an important role in the global and European energy sectors. The nuclear disaster of Fukushima Daiichi has amplified the debate on the potential future roles of nuclear energy in the EU and has had impacts on the European Member States' energy policies; however, the reactions of the member states were vary. Concerns about common legislation, waste management, safety and risk management have also strengthened. Initiatives were taken at national, regional and international levels. The goal of this study is to highlight the main advantages and disadvantages of nuclear energy utilisation in the light of the official forecasts released before and after the Japanese accident.*
*Keywords: nuclear energy, energy forecasts, European Union*
*Journal of Economic Literature (JEL) codes: Q47, N70, P48*
*DOI: http://dx.doi.org/10.18096/TMP.2017.01.03*

## INTRODUCTION

Regarding the current role of nuclear power globally, it should be noted that in 2017 449 commercial nuclear power reactors are operating in 31 countries, with over 392,116 MWe (megawatt electrical) of total capacity (WEC 2017). Recently, the average age of the world's nuclear reactors is 29.53 years; 64.81% of the global nuclear reactors have operated for at least 30 years while 90 reactors have run for 40 years or more. The largest number of reactors can be found in the USA (99), which is followed by France (58) and Japan (42), while the distribution of the installed gross capacity by world region indicates that Europe has the largest nuclear power plant capacities. In 2015 nuclear reactors generated 2,441 TWh (terawatt-hours) of electricity globally, which means that worldwide 10.7% of total electricity generation came from nuclear energy and the "big five" nuclear generating countries, i.e. the USA, France, Russia, South Korea and China (before 2012 Germany was one of the biggest nuclear energy generating countries) produced 70% of the total nuclear-based electricity in the world (Schneider et al. 2016).

After the nuclear accident in Fukushima in March 2011, the continued use of nuclear energy in the European Union (EU) gained vast political and public attention. In the EU it is up to each member state to decide whether to produce nuclear power. Debate on nuclear energy utilisation among European member states is not a new phenomenon. As Nuttall stressed in 2009, in the EU the national opinions on nuclear energy generation differ significantly due to the diverse national experiences. Nuttall classified the member states based on their opinions using key criteria reflecting the formal government policies, the extent to which policy is a consensus across major political parties, the level of acquiescence and public acceptance of policy, and the scale of operating infrastructures in 2006 (Nuttall 2009). According to this classification (see Table 1), member states were almost exactly balanced in their opinion of nuclear energy. Analysing the impact of the Fukushima disaster, Thomas (2012) distinguishes between four types of European reactions:

1. Reject the option of new reactors and force the closure of existing plants,
2. Accelerate the closure of existing plants in countries with previously long-term nuclear phase-out policies; enhanced public pressure against nuclear power plants,
3. Not proceed with plans for new plants,
4. Proceed with plans for new plants as if the accident in Fukushima had little or no relevance at all.

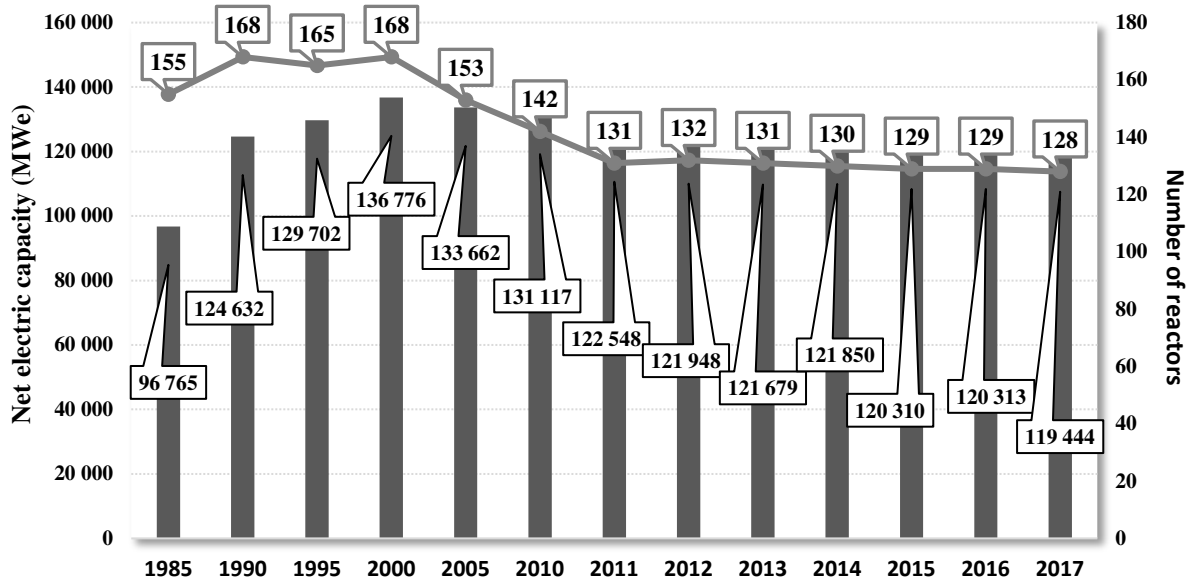
*Table 1*
*EU member states' opinions concerning nuclear energy before and after the Fukushima Daiichi Accident*

| **EU member states' opinion concerning nuclear energy in 2006** | | | | |
|---|---|---|---|---|
| **Strongly Positive** | **Weakly Positive** | **Neutral** | **Weakly Negative** | **Strongly Negative** |
| Finland; France; Romania; Lithuania; Bulgaria; Czech Republic; Hungary; Slovakia | UK; Netherlands; Spain; Portugal; Poland; Latvia; Estonia; Slovenia | Luxembourg; Denmark; Malta; Cyprus | Italy; Germany; Sweden; Belgium; Greece | Ireland; Austria |
| **EU member states' opinion concerning nuclear energy after the Fukushima accident** | | | | |
| **Positive (Strongly or weakly)** | | **Divided** | **Negative (Strongly or weakly)** | |
| UK; Poland; Finland; Romania; Czech Republic; Hungary; Slovakia | | Bulgaria; France; Lithuania; Netherlands; Slovenia; Spain; Sweden | Austria; Italy; Denmark; Germany; Belgium | |

Source: own summary based on Nuttall (2009, pp. 7-8) and Holmberg (2013)

Classification in table 1 can be confirmed by the facts presented in ESA (2013), Södersten (2012), Feblowitz (2013), and IEA (2013). According to these sources, following the 2011 nuclear catastrophe at Fukushima, Germany announced that it had decided to replace atomic reactors with more fossil fuel-fired plants and a growing share of clean-energy sources, and eight reactors were shut down immediately. The German Chancellor also stated that by 2022 all nuclear reactors in the country would be closed down. Italy decided not to restart its nuclear power programme, which was abandoned in the 1980s, and Switzerland also decided to abandon plans to build new nuclear reactors and will phase out its existing plants. In other countries, the Fukushima accident seems to have had limited political impact. Bulgaria, the Czech Republic, Romania, Slovakia, Finland and the United Kingdom continued their ongoing projects to expand nuclear power. A strategy plan for new construction has been approved in Poland and political support for future new construction was confirmed in the UK. After the 2012 French elections, France expressed its intention to reduce the share of nuclear in its future energy mix. The French government has scheduled closure of the country's oldest plant in 2016; however, the government continues to support the construction of the first European Pressurised Reactor at Flamanville (IEA, 2013, p. 34). The Flamanville-3 project is six years late and now expected to start up until the fourth trimester 2018 (Schneider et al. 2016, p. 180). As Holmberg (2013) highlighted, in spite of these limited changes and movements in national approaches, opinions concerning the role of nuclear energy remained diverse among the member states (see also Table 1).

In 2017 there is a total of 128 nuclear reactors in 14 of the 28 countries of the EU, with an installed net electric capacity of 110,561 MWe in operation. In addition to nuclear reactors and power plants a sum of 140 research reactors can also be found in the EU (46 in Germany, 26 in France, 19 in the UK and 14 in Italy), moreover 26 nuclear fabrication, 10 fuel processing, and 45 fuel storage facilities are situated across the member states (EC 2013; WEC 2016). Regarding the geographical distribution of reactors, around 45% of the European Union's nuclear park is located in France, and only 14% can be found in the Eastern European Countries with nuclear plants. From technological point of view the 128 nuclear reactors in operation in the European Union are based on different technologies and types, but are mainly pressurised water reactors (101), although boiling water reactors (11) gas cooled reactors (14) and pressurised heavy-water reactors (2) can also be found. Figure 1 shows the number and the net operating capacity of nuclear reactors in the European Union between 1985 and 2017.



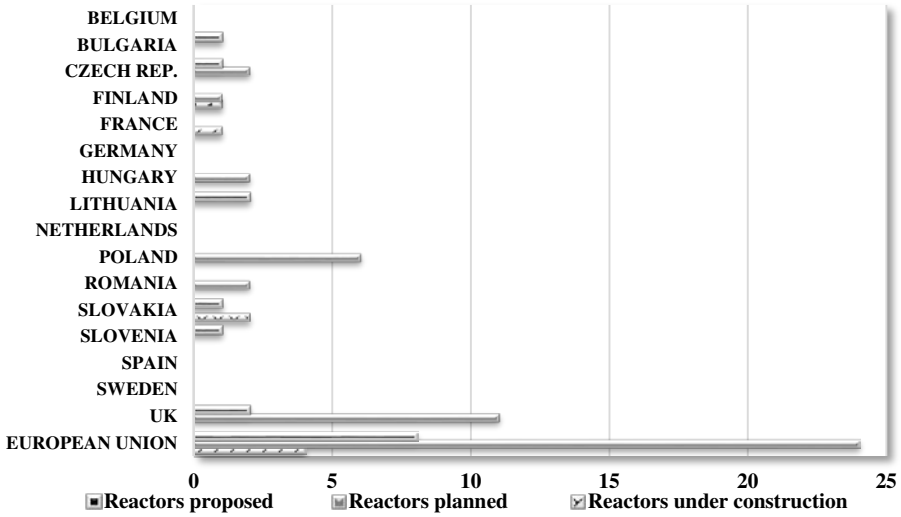

Source: own summary based on PRIS database

*Figure 1. Number of nuclear reactors and net operating capacity (in GWe) in the European Union (including the UK)*

Between 2009-2010 nuclear power capacities increased about 1% and 2 GW were removed from the system. The net operating capacity in the EU achieved its historical maximum in 1998, and in 2013 the number of reactors was 12 fewer than before the Fukushima events (8 reactors in Germany and 1 in the UK exited from service). It should be noted that in the European Union the so-called "Nuclear Renaissance"[1] was suppressed by the economic crisis and market uncertainties induced by deregulation, liberalisation and privatisation tendencies. Since 2000 only two new nuclear reactors (in the Czech Republic and Romania) have been connected to the grid (WEC 2016, p. 21); therefore, in the absence of newly constructed plants, nuclear reactors in the European Union are ageing.

Figure 2 illustrates the number of grid-connected European nuclear reactors by years of operation. According to this figure, 14 reactors from the total capacity have reached or exceeded the age of 40 years, and the large majority of installed reactors have been operating for at least 30 years. In 2017, the average age of European nuclear reactors is 32.53 years. In addition to this, while nuclear reactors are designed for 30-40 years of operation, there is a tendency that the operators of the reactors try to extend the reactor's lifetime to 50-60 years. According to its forecast, the EC (2013) also suggests that between 2010 and 2025, 38 nuclear reactors will have to be decommissioned in the EU and the decommissioning time of 104 reactors will be apposite after 2025, or is still unknown. While Foratom (2015) proposed a target of commissioning 100 new nuclear reactors between 2025 and 2045 (WNA 2017a), as Figure 3 shows, as of March 2017 two reactors – Olkiluoto-3 in Finland and Flamanville-3 in France – are under construction in the western part of the EU, while in June 2009 the construction of Mochovce-3&4 in Slovakia restarted and the General Assembly of Slovenské Elektrárne (SE) shareholders approved SE's strategic plan for 2017-2021, including the release of funds (€5.4 billion) for the Mochovce nuclear power plant expansion (Enerdata 2017). According to the latest available information Mochovce-3&4 are expected to start commercial operation in 2017. Besides these, delayed construction projects representing a total of 4,392GWe nuclear capacity and 32 new units (sum of 38,645GWe) are planned or proposed in the European Union.

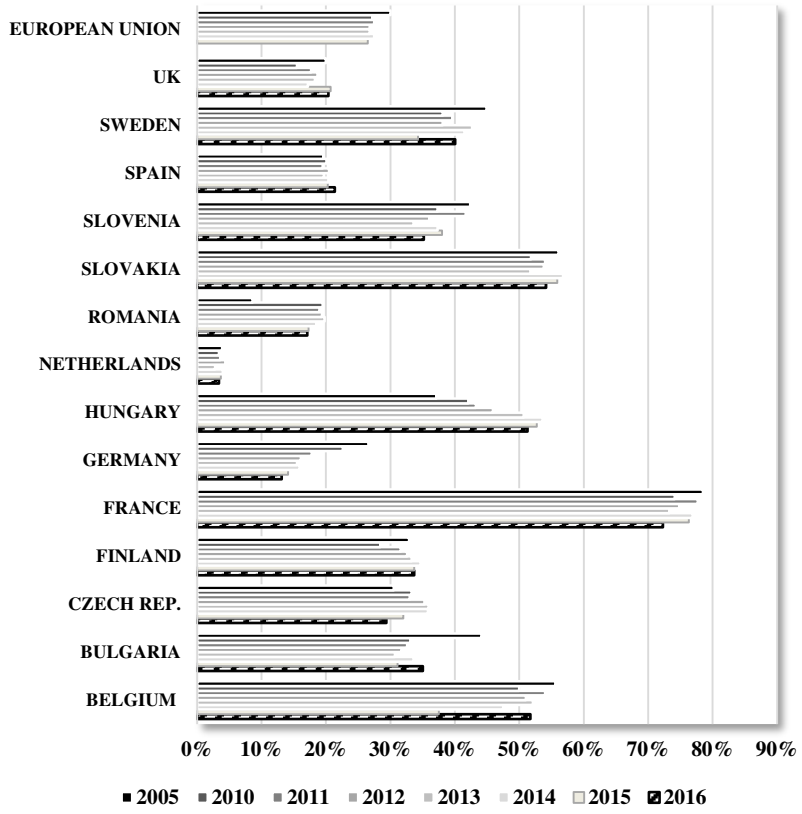
[1] *As WNA titled the phenomenon in which several countries around the world decided to invest or reinvest in nuclear generation in the beginning of the 21st century.*




Source: own summary based on PRIS database

*Figure 2. Number of nuclear reactors proposed, planned or under construction in the EU-28 (as of March 2017)*

In 2011 primary production of nuclear energy in the EU-27 counted for 234,010 Mtoe, which represents a 1% reduction between 2005 and 2011, while during the period between 2011 and 2015 primary production of nuclear energy reduced by 5.47% to 221,202 Mtoe. Nuclear energy was the most important source of electricity production in 2012, when nuclear power produced 26.8% of the commercial electricity in the European Union.




Source: own model, based on PRIS and EUROSTAT databases

*Figure 3. Shares of nuclear energy in electricity production – EU-28*

Figure 3 illustrates the changes in the share of nuclear power in electricity production by the European member states. As the figure shows, between 2011 and 2012 the contribution of nuclear energy to electricity generation stagnated or decreased in most of the member states; a significant increase was observed only in the Netherlands (+22.22 percentage points), Czech Republic (+6.97%p) and Hungary (+6.00%p). In France 74.8% of electricity was generated by nuclear reactors, and nearly half of nuclear electricity generated in the EU came from French nuclear power plants in 2012. Between 2012 and 2016 the contribution of nuclear energy to electricity generation slightly increased in most of the member states, while a significant reduction can be observed three countries, namely in the Netherlands (23%p), Czech Republic (17%p) and Germany (19%p). Although electricity production is by far the principal function of today's operating reactors, in the EU member states a number of them are also currently used for district heating (in Hungary, Bulgaria, Romania, Czech Republic, Slovakia) and for process heating (in Slovakia) as well (IAEA 2013, 2017).

In order to better understand the debate on nuclear power and the fragmented nature of national policies, in the following section pros and cons of nuclear energy generation will be summarised in the light of the effects of Fukushima and the future role of nuclear energy presented in the European energy scenarios published before and after the accident.

## DATA AND METHODS

In order to examine the main impacts of the Fukushima Daiichi accident and the future role of nuclear power use in the European Union, scenarios released before and after the Japanese disaster are analysed.

*Table 2*
*Overview of the EU-28 scenarios released before March 2011*

| Study | Scenario name | Main targets |
|---|---|---|
| **IEA (2009): World Energy Outlook** | **WEO ref** | No specific targets |
| | **WEO 450 ppm** | Stabilising worldwide greenhouse gas (GHG) concentration below 450 ppm |
| **IEA (2010): Energy Technology Perspectives** | **ETP Baseline** | No specific targets |
| | **ETP Blue Map** | Stabilising worldwide GHG-concentration below 450ppm |
| **EU DG ENER (2010): Trends to 2030 update 2009** | **EU DG TREN Reference** | 20-20-20 targets achieved by 2030 |
| | **EU DG – ENV Baseline** | |
| | **EU DG – ENV NSAT** | |
| | **EU DG – ENV NSAT-CDM** | |
| **ECF (2010): Roadmap 2050** | **ECF Baseline** | No specific targets |
| | **ECF 80% RES** | -80% GHG of 1990 levels by 2050 |
| | **ECF 60% RES** | -60% GHG of 1990 levels by 2050 |
| | **ECF 40% RES** | -40% GHG of 1990 levels by 2050 |
| **Greenpeace&EREC (2010): Energy [R]evolution** | **Reference Scenario E[R] Ref.** | No specific targets |
| | **Revolution Scenario E [R] basic** | -80% GHG of 1990 levels by 2050 |
| | **Advanced Scenario E[R] Adv** | 100% Renewable energy sources (RES) share of primary energy demand and -95% GHG of 1990 levels by 2050 |
| **Eurelectric (2009): Power Choices** | **Eurelectric Power Choices** | -40% GHG of 1990 levels by 2030 and -75% by 2050 |

Source: Prognos (2011)

Studies published before 2011 were summarised by Prognos (2011), commissioned by the European Commission. This paper investigates eight governmental, non-governmental and academic or university studies with 26 mid- and long-term future energy scenarios for the European Union, particularly with regard to the role of nuclear power. Table 2 summarises the main targets of the 13 EU-28 scenarios analysed by Prognos (2011) and selected for further investigation in this paper.

Studies released after the Fukushima Daiichi fallout are the available publications of IEA (2012a) *World Energy Outlook;* European Commission (2011) *Energy Roadmap 2050;* and IEA (2012b) *Energy Technology Perspectives,* representing in sum 11 scenarios, while IEA (2016) *World Energy Outlook* consists the latest available official energy scenarios. The main goals of the 14 scenarios examined are reflected in Table 3.

*Table 3*
*Main targets and details of scenarios released after 11 March 2011*

| Study | Scenario Short name | Main targets |
|---|---|---|
| **IEA (2012a) World Energy Outlook** | Current policy scenario WEO_2012_current_EU | Government policies adopted by mid-2012 continue unchanged |
| | New policy scenario WEO_2012_new_EU | To provide a benchmark to assess the potential achievements of recent developments in energy and climate policy. Existing policies are maintained and recently announced commitments and plans are implemented in a cautious manner. |
| | 450 ppm scenario WEO_450_EU | To demonstrate a plausible path to achieve the climate target. Policies are adopted that put the world on a pathway consistent with having around a 50% chance of limiting the global increase in average temperature to 2°C in the long term, compared with pre-industrial levels. |
| **IEA (2016) World Energy Outlook** | Current policy scenario WEO_current_2016 | Implementation of any new policies or measures beyond those already supported by specific implementing measures in place as of mid-2016. |
| | New policy scenario WEO_new_2016 | Current measures are specifically time-bound and expire, they are not normally assumed to lapse on expiry, but are continued at a similar level of intensity through to 2040. |
| | 450ppm scenario WEO_450_2016 | Limiting the average global temperature increase in 2100 to 2°C above pre-industrial levels. |
| **IEA (2012b) Energy Technology Perspectives** | 6°C scenario (6DS) ETP_2012_6Ds | Largely an extension of current trends. By 2050, energy use almost doubles (compared with 2009) and GHG-emissions rise even more. The average global temperature rise is projected to be at least 6°C in the long term. |
| | 4°C scenario (4DS) ETP_2012_4Ds | Takes into account recent pledges made by countries to limit emissions and step up efforts to improve energy efficiency. In many respects this is an ambitious scenario that requires significant changes in policy and technologies. Moreover, capping the temperature increase at 4°C requires significant additional cuts in emissions in the period after 2050. |
| | 2°C scenario (2DS) ETP_2012_2Ds. | Energy system consistent with the 450ppm emissions trajectory. The 2DS acknowledges that transforming the energy sector is vital, but not the sole solution: the goal can only be achieved if $CO_2$ and greenhouse gas emissions in non-energy sectors are also reduced. |
| **EC (2011) Energy Roadmap 2050** | Reference scenario EU_2011_ref | 40% emission reduction by 2050<br>Includes current trends and long-term projections on economic development, policies adopted by March 2010, i.e. 2020 targets for RES share and GHG reductions as well as the Emissions Trading Scheme (ETS) Directive. |
| | Current policy initiatives EU_2011_cpi | 40% emission reduction by 2050<br>Updated measures adopted, e.g. after the Fukushima events following the natural disasters in Japan, and being proposed as in the Energy 2020 strategy; the scenario also includes proposed actions concerning the "Energy Efficiency Plan" and the new "Energy Taxation Directive" |
| | High energy efficiency EU_2011_high_ee | 85% emission reduction by 2050<br>Political commitment to very high energy savings; including e.g. more stringent minimum requirements for appliances and new buildings; high renovation rates of existing buildings; establishment of energy savings obligations on energy utilities. This leads to a decrease in energy demand of 41% by 2050 as compared to the peaks in 2005-2006. |
| | High renewable energy sources EU_2011_high_res | 85% emission reduction by 2050<br>No technology is preferred; all energy sources can compete on a market basis with no specific support measures. Decarbonisation is driven by carbon pricing, assuming public acceptance of both nuclear power and Carbon Capture & Storage (CCS). |
| | Diversified supply technologies EU_2011_div_tech | 85% emission reduction by 2050<br>Strong support measures for RES leading to a very high share of RES in gross final energy consumption (75% in 2050) and a share of RES in electricity consumption reaching 97%. |
| | Delayed CCS. EU_2011_d_ccs | 85% of GHG emission reduction by 2050<br>Assuming that CCS is delayed, leading to higher shares for nuclear energy with decarbonisation driven by carbon prices rather than technology push. |
| | Low nuclear EU_2011_low nuclear | 85% emission reduction by 2050<br>Similar to diversified supply technologies scenario but assuming that no new nuclear capacity (besides reactors currently under construction) is being built, resulting in a higher penetration of CCS (around 32% in power generation). |

Source: own summary, based on EC (2011) and IEA (2012a, 2012b, 2013)

Besides the aforementioned studies and scenarios, statistics of nuclear reactors used in this paper are provided by the EUROSTAT database and the PRIS database of the International Atomic Energy Agency (IAEA). MS Excel was used for the calculations and for the creation of figures.

# RESULTS

## *Strengths and Weaknesses of Nuclear Energy*

The future role of nuclear power plants in the European Union depends on the main supporting and adverse factors associated with the use of nuclear energy. Based on the relevant literature and reports, these factors are summarised in Table 4. Promoters of nuclear energy often stress that nuclear power meets the main goals of the European Energy Policy and criteria for a sustainable energy mix, i.e. use of nuclear power can contribute to energy independence, security of supply, while it is affordable and has low emission potential (Bernard 2013). There is broad international acceptance that stabilising the atmospheric concentration of greenhouse gases at below 450 parts per million (ppm) of carbon-dioxide equivalent would help avoid the worst impacts of climate change. In the EU, the energy sector is by far the largest source of greenhouse-gas (GHG) emissions, accounting for 29% of the total in 2015. Nuclear energy is seen to offer a major contribution to action against climate change, due to its low emissions of $CO_2$. Compared to fossil-fuel based energy generation technologies, nuclear power at the point of electricity generation does not produce any GHG emissions that damage local air quality (e.g. WEC 2007a; 2007b; Bauer et al. 2008; NEEDS 2008). If nuclear energy were expanded 10 fold, it could help in reducing total annual $CO_2$ emissions in the second half of the 21st century by about 30% (van der Zwaan 2006; IEA 2013). It is also estimated that nuclear power plants have nearly zero regional environmental impact regarding their acidification and eutrophication potentials. The major environmental and health issues of nuclear energy utilisation are considered to be radioactive waste generation and management and ionizing radiation. However, there is a controversy at European level as to whether nuclear energy should be classified as renewable. On 4 February 2011 the European Council recognised its status as carbon-neutral energy, alongside renewables. Concepts rejecting the renewable status of nuclear power plants are based on the fact that natural uranium and other types of fuel are not renewable energy resources.

*Table 4*
*The nuclear debate*

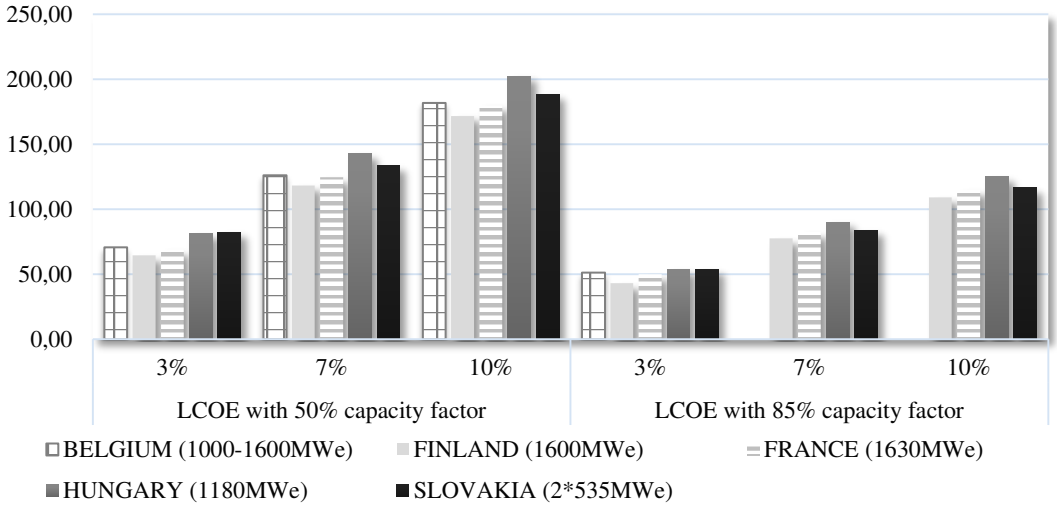
| PROS | CONS |
|---|---|
| 1. Supports the goal of European energy policy by meeting the 4 criteria for a sustainable mix:<br>a. low carbon energy source<br>b. competitive costs<br>c. reduce fossil fuel dependency<br>d. reduce GHG emissions<br>2. Stable output<br>3. High efficiency<br>4. Ready-to-use technology<br>5. Existing supply chain available<br>6. Wastes and risks can be managed<br>7. Nuclear safety can be ensured by appropriate measures | 1. Public pressure against the use of nuclear energy<br>2. Waste and safety concepts and costs (as well as health, environmental effects)<br>3. Need for further RD&D activities<br>4. Problems associated with financing new nuclear projects, state aid needed<br>5. Need for ageing management<br>6. Need for risk and hazard management<br>7. Long construction time<br>8. Risk of exposure to radiation<br>9. Problems with fuel and waste transportation<br>10. Uranium is not a renewable source<br>11. Strong dependence on external sources of uranium<br>12. Non-proliferation issues |

Source: own summary, based on WEC (2007a), IEA & NAE (2010), Andoura et al. (2011), Keppler & Marcantonini (2011), Euroconfluences (2011), OECD&NEA (2012), Thadani et al. (2012), Fisher (2013), Keppler et al. (2013), Bernard (2013), ENEF (2013), Poncelet (2013)

Uranium is a main source of fuel for nuclear reactors, and according to the WEC (2016) worldwide output of total identified uranium resources has grown by 70% since 2005, and identified resources of uranium are considered sufficient for over 100 years of supply based on current requirements. In 2012, demand for natural uranium in the EU represented approximately one third of global uranium requirements. Regarding energy independence, Europe is strongly dependent on external sources of uranium. Uranium is mined in 20 countries, although about 80% of world production comes from just ten mines in five countries: Australia, Canada, Kazakhstan, Namibia and Niger in 2016 (WNA 2016). European uranium delivered to EU utilities originated in the Czech Republic and Romania and covered only 2.6% of the EU's total requirements in 2015 (ESA 2015). However, uranium reserves are distributed more evenly and available in large quantities in several politically stable countries (including Canada and Australia) by comparison with hydrocarbons. According to ESA (2015) in 2015 the enrichment services

supplied to EU utilities totalled 12,493 tSW (1 tonne of separative work equals to 1000 separative work unit, which measures the effort made in order to separate the fissile, and hence valuable, U-235 isotopes from the non-fissile U-238 isotopes, both of which are present in natural uranium), delivered in 1,989 tonnes of low-enriched uranium, which contained the equivalent of 16,090 tonnes of uranium (tU). Of this, 60% of the requirements were delivered by European providers, while the quantity of mixed-oxide fuel loaded into nuclear power plants in the EU totalled 10,780 kg of plutonium, which represents a 15% increase over the amount of plutonium used in 2011. ESA (2015) suggest that gross average reactor requirements for natural uranium will grow to 16,745 tU/year for 2016-2025 and then decrease to 14,588 tU/year for the 2026-2035 period. For 2016-2025 gross average reactor requirements for separative work will reach 13,657tSW/year and 11,890 tSW/year for the period between 2026 and 2035 (ESA 2015).

One of the biggest advantages of nuclear energy is seen in its stability. Nuclear power plants have high availability and load factors, while their dispatchable nature and load-following capability ensure that the energy produced is not dependent on weather conditions. According to the PRIS database, for the period 2014-2016 the EU-wide average energy availability of nuclear plants was 83.86%, and the highest availability was experienced in Romania, Finland and Slovenia, while in 2016 unit capability factors exceeded 90% in Finland, Hungary, Romania and Spain.




Source: IEA & NAE (2015, p. 59)

*Figure 4. Levelised costs (LCOE) of electricity of European nuclear plants (USD/MWh)*

Nuclear energy is said to be one of the most competitive energy generation technologies due to its cost structure and limited impacts of fuel price volatility. According to the joint report of the International Energy Agency and the Nuclear Energy Agency (2015) the levelised cost of electricity (LCOE) - i.e. the per-kilowatt-hour cost building and operating a generating plant over an assumed financial life and duty cycle (EIA 2017, p. 1) - of new nuclear plants in 2030 will be competitive with other generating options; however the more investment intensive the option, the more sensitive the LCOE is to the value of the discount rate (see Figure 4). Investment costs represent by far the largest share (around 60% on average) of LCOE, as construction costs of nuclear energy generation are significantly higher in comparison to those for fossil fuel technologies. In 2016 nuclear production costs in the European Union were around 1eurocent/kWh, which is much lower than for coal and gas plants (WNA 2017b). Since fuel costs represent only 10-15% of total generation costs, fuel price volatility has little influence on production costs compared to fossil based energy generation.

It is worth mentioning that beside fuel cost fluctuations the range of generating costs depends on the age of the given nuclear plant and the regulatory requirements concerning safety inspections and security measures, since O&M costs represent around 24%. The IEA & NAE (2015) also estimates that decommissioning and disposal costs make up 10% and 15% of the capital costs of a plant. While nuclear investment costs are estimated to show a constant but small decline by 2035 or 2050 in scenario studies analysed by Prognos (2011), the EC (2011) estimates a slightly higher risk premiums for new nuclear investment in Current Policy Incentives and Decarbonisation scenarios, because they consider that investors might factor into their decisions the possible effects of policy reactions to the Fukushima accident, which affect nuclear plants under investment consideration. It is also estimated by the IEA (2012b) that due to the aging nuclear European capacity, serious

investments need to start around 2020, and while the third generation designs of nuclear power plants deliver superior safety they are extremely expensive. Due to cost overruns and project delays, capital needs of a nuclear project stretch the financial capability even of the largest utilities, and the very unusual risks hinder bank financing (IEA 2012b, p. 178). This also suggests that in order to be able to refinance the high capital costs, new nuclear power plants need a guaranteed long operating life and guaranteed high full-load operation. In competitive energy markets investment risks and financial challenges are dominant (van der Zwaan 2008; WEC 2013). In general, in the EU-27 between 2000 and 2004 energy investments were delayed because of the political and regulatory changes affecting energy markets. Energy scenarios for 2035 and 2050 being analysed emphasise that measures towards the creation of the integrated European energy market will continue to affect the risks associated with new energy investments. OECD & NEA (2012, p. 81) suggests that decisions to build a nuclear power plant represent a greater commercial risk than is normally associated with other electricity sources, because:

- The technical complexity of nuclear plants tends to lead to delays in construction and cost overruns;
- Changes in government policy or legislation affecting nuclear energy, or in regulatory requirements, could delay the plant in entering operation, adding to costs;
- Such changes occurring during the plant's operating lifetime could also add to costs and potentially prevent the plant from operating for its full lifetime;
- The long planning and construction timescale and long operational lifetime provide greater potential for long-term changes in the electricity market to impact revenues;
- At the same time, the high proportion of fixed costs (due largely to high investment costs) results in greater vulnerability to short-term market fluctuations;
- There may be uncertainties about the costs the plant will be required to pay for decommissioning and long-lived waste disposal.

ENEF (2010) highlighted that external financing of nuclear project is particularly challenging because of: high capital cost and long payback times; uncertainties related to planning and construction period including supply chain constraints, possible delays, cost overruns and changing regulations; the fact that the economics of nuclear power is sensitive to regulation related to safety and market conditions (volatility in the price of carbon credits); the specific nature of nuclear projects (political uncertainties, public acceptance); and the related costs of spent fuel, waste management and decommissioning. It is also stressed in the literature (e.g. van der Zwaan 2008; Fiáth & Megyes 2010; Kiyar & Wittneben 2012; Virág et al. 2012) that in the new liberalised energy markets with new types of risks (market risks, political risks, regulatory risks, price and cost risks, technological risks, etc.), private investors value rapid and high returns increasing the cost of capital. The economic crisis and the Fukushima Daiichi accident have exacerbated the problem of financing new nuclear power plants by highlighting the need for higher safety standards and creating a more critical public attitude (Kiyar & Wittneben 2012). In order to facilitate new constructions, ENEF (2010) suggests that new and innovative financing models must be stimulated, such as power user investments, utility joint ventures and power user–power supplier agreements, and project finance.

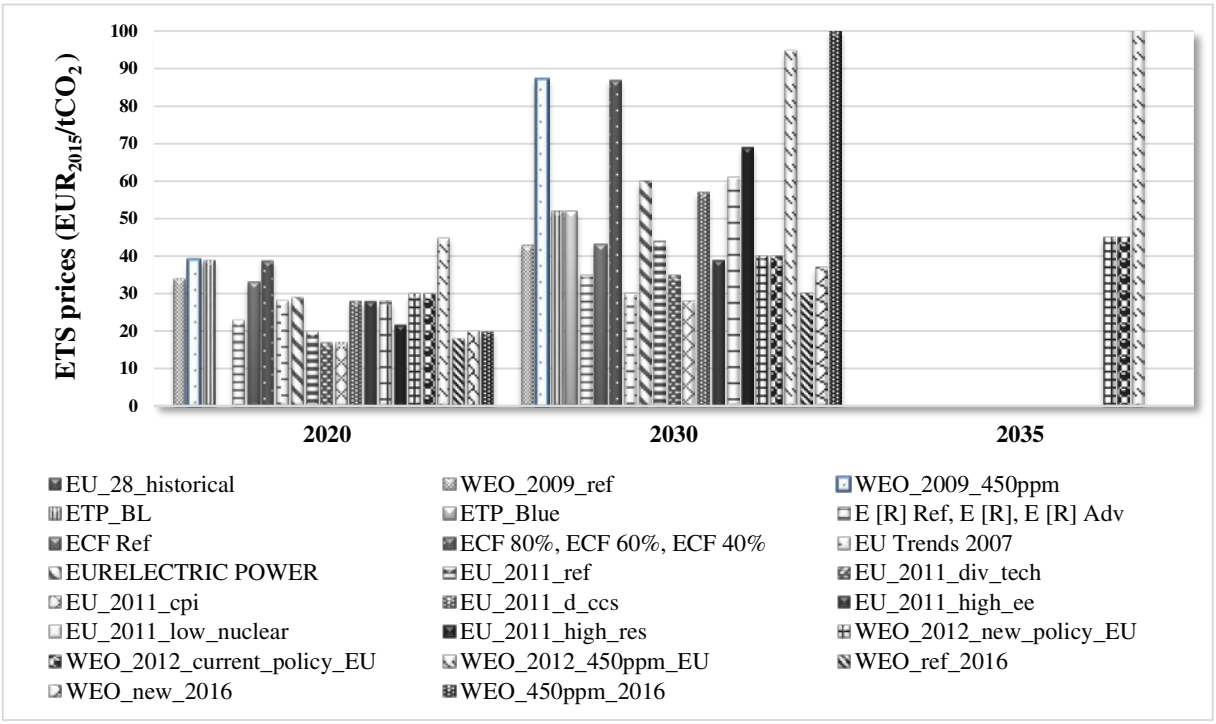
While the nuclear industry itself is multi-faceted and supports 250,000 highly qualified direct jobs, including engineers and researchers, and around 800,000 jobs in total (Foratom 2012, p. 16), public acceptance of nuclear energy utilisation is one of the five classic problematic features of nuclear energy. However, according to Berényi (2015, p. 81) public awareness, knowledge about the possibilities, legal regulation, reliability of supply chain and cultural and religious traditions should also be considered in an investment project initiative. The 2005 Eurobarometer survey (EC 2005) showed that the EU public is not well informed on nuclear issues, including possible benefits in terms of mitigating climate change and the risks associated with the different levels of radioactive waste (EC 2007, p. 16). It found that 40% of the opponents of nuclear energy would change their mind if solutions to nuclear waste issues were found (EC 2007, p. 16). According to the report of Eurobarometer on Nuclear Safety (EC 2010), before the Fukushima accident 68% of European citizens thought that nuclear energy helped to make nations less dependent on fuel imports, 51% believed that nuclear energy ensured more competitive and more stable energy prices, and 46% considered nuclear energy as a technology that helps to limit climate change. While 51% of the respondents agreed that the risks of nuclear power as an energy source outweigh its benefits, 73% of EU citizens wanted nuclear energy to be maintained or decreased.

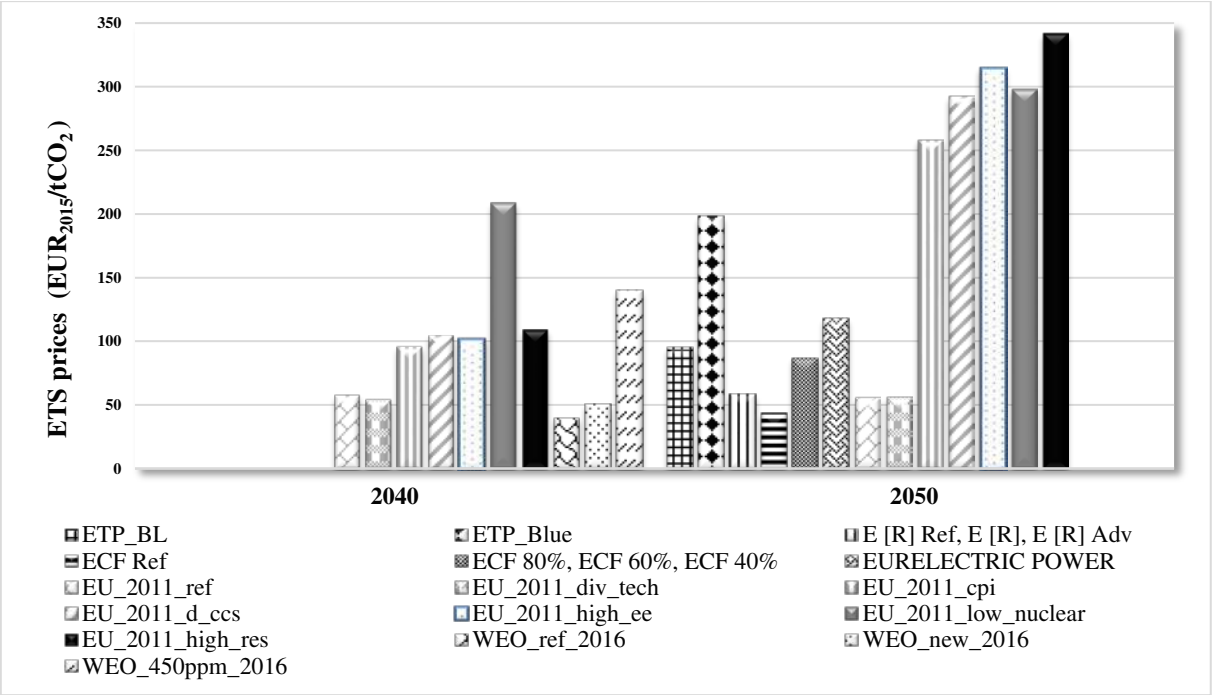
According to the survey of IPSOS MORI (2012a) held after the Fukushima Daiichi accident, only 38% of global respondents supported nuclear energy as a way to producing electricity. In the European Union the reactions of citizens were diverse: in Germany and Belgium opposition to nuclear energy increased, and in 9 of 27 EU countries (Belgium, France, Germany, UK, Hungary, Italy, Poland, Spain and Sweden) less than 1/5 of those opposed to nuclear power reported that they had been influenced by the accident (IPSOS MORI 2011). Another survey of IPSOS MORI (2012b) comparing attitudes to nuclear energy in April 2011 (at the height of the Fukushima crisis) and in September 2012 showed that worldwide the level of public support for nuclear energy had increased by around 14% to 45% during that period in most countries. However, it should be noted that since then no European-wide opinion poll has been carried out (Foratom 2017, p. 5). Public acceptance, political attitude, approaches and measures towards the use of nuclear energy are significantly influenced by proliferation, radioactive waste management and nuclear safety concerns.

In response to the Japanese nuclear crisis, the European Union restarted discussions on the potential need for common action on the issue of nuclear crisis prevention, and the scope and modalities of stress tests as targeted reassessment of the safety margins of nuclear power plants in the light of the lessons drawn from the events in Fukushima related to extreme natural events challenging the plant's safety functions was developed (Andoura et al. 2011, p. 3; EC 2012). Additional costs of safety measures and improvements of nuclear power plants is estimated to be in the range of €30 million to €200 million per reactor unit (EC 2012).

Besides the aforementioned aspects, the future of nuclear energy utilisation in the European Union is influenced by trends in energy and electricity demand, the development of different energy generation technologies, and policy decisions regarding climate change, nuclear safety requirements and RD&D. Figure 5 shows that carbon prices are estimated to rise moderately by 2030 and 2050 respectively in all scenarios, despite the low recent EU-ETS prices and the uncertainty associated with the future system of EU-ETS. It should be noted that high carbon prices encourage the replacement of fossil-fuel based energy technologies by low carbon technologies, which is in favour of nuclear competitiveness for a base load electricity supply relative to fossil fuel technologies (ENEF, 2012 p. 51).

Regarding fossil fuel prices, all scenarios reveal a moderate increase in coal prices by 2035 or 2050, and increasing gas and oil prices until 2030 can be expected, since, as Bartha (2015, p. 12) highlights, fuel prices are mostly influenced by the price of oil. In the medium term electricity prices are estimated to increase in almost all scenarios examined. Investment costs of renewable energy generation technologies are assumed to significantly decline (especially for concentrated solar power plants and wind) in the long term due to their learning rates, while the investment costs of coal and gas technologies are expected to increase because of necessity for carbon capture and storage (however it is also expected that Carbon Capture and Storage technologies will only be commercially available after 2030). ENEF (2012) emphasises that competition between technologies will also be influenced by national and EU-level taxation, the use of feed-in tariffs and subsidies for renewable technologies, and the stability and predictability of national and EU-level legislation, while technological progress regarding traditional and new type of grid structures (smart grids, smart metering) is also expected.





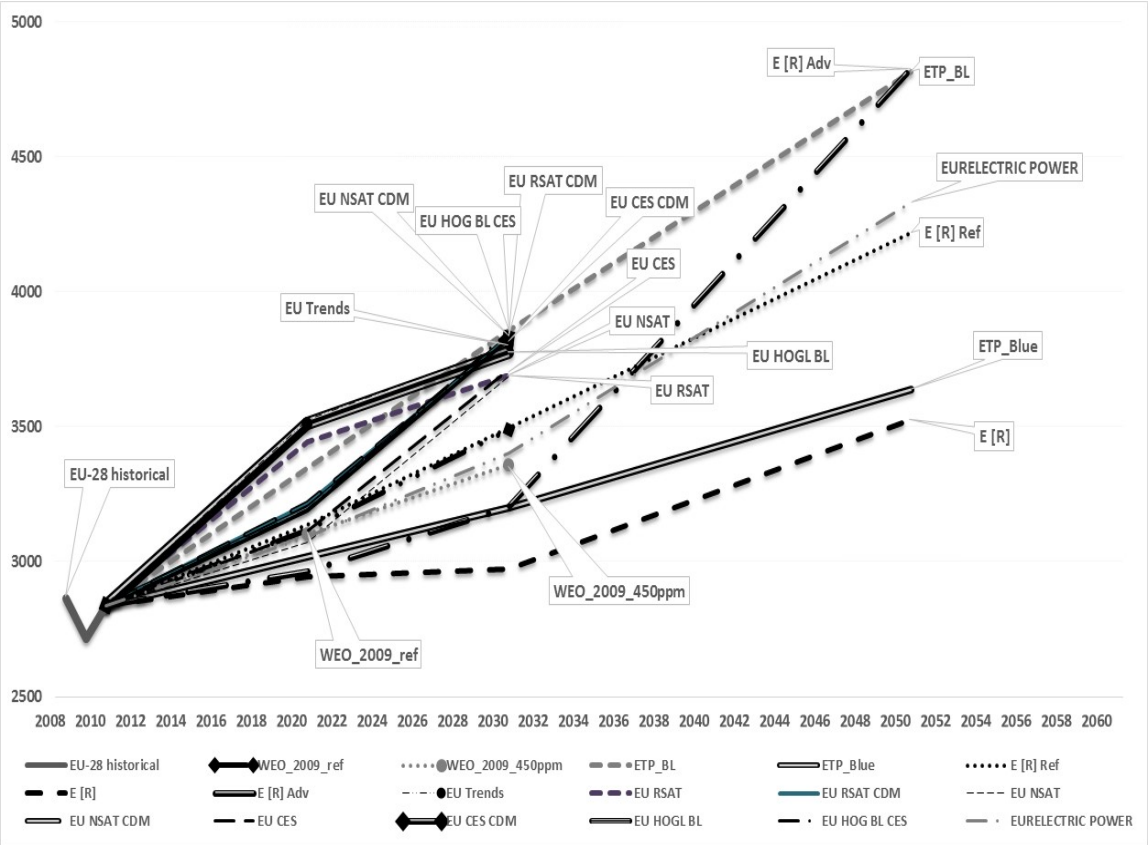

Source: own summary based on IEA (2009, 2010, 2012a; 2012b, 2016), Greenpeace & EREC (2009), Eurelectric (2009), EU DG ENER (2010), ECF (2010), and EC (2011)

*Figure 5. ETS prices in $EUR_{2015}/tCO_2$ in all scenarios examined*

Achieving the EU's energy objectives is only possible with modernisation of existing energy infrastructures. Energy R&D and innovation play an essential role in developing cheaper, more efficient and reliable energy technologies. In IEA member countries spending on low carbon energy RD&D over the last decade has shifted towards renewable sources, notably wind energy and solar PV, and as highlighted in IEA (2016), in the European Union the share of public RD&D spending on nuclear energy fell to 10% of the total budget by 2015. While the performance of existing nuclear reactors has been improving due to incremental innovations focusing on operational, safety, security, waste management, standardisation, and radiation protection issues, radical innovations in new type of nuclear designs and advanced fuels are still awaited against the fast technological innovations in renewable based technologies. Scenario studies analysed in this paper assume that the main research focus will still concentrate on Generation III/III+ reactor designs and Generation IV reactors are expected to become available for deployment beyond 2030. Besides electricity generation, the most important opportunity for nuclear energy in the available scenarios is the potential use of nuclear energy for direct heat and transportation purposes.

## *Trends in Nuclear Capacities and Share in Electricity Generation*

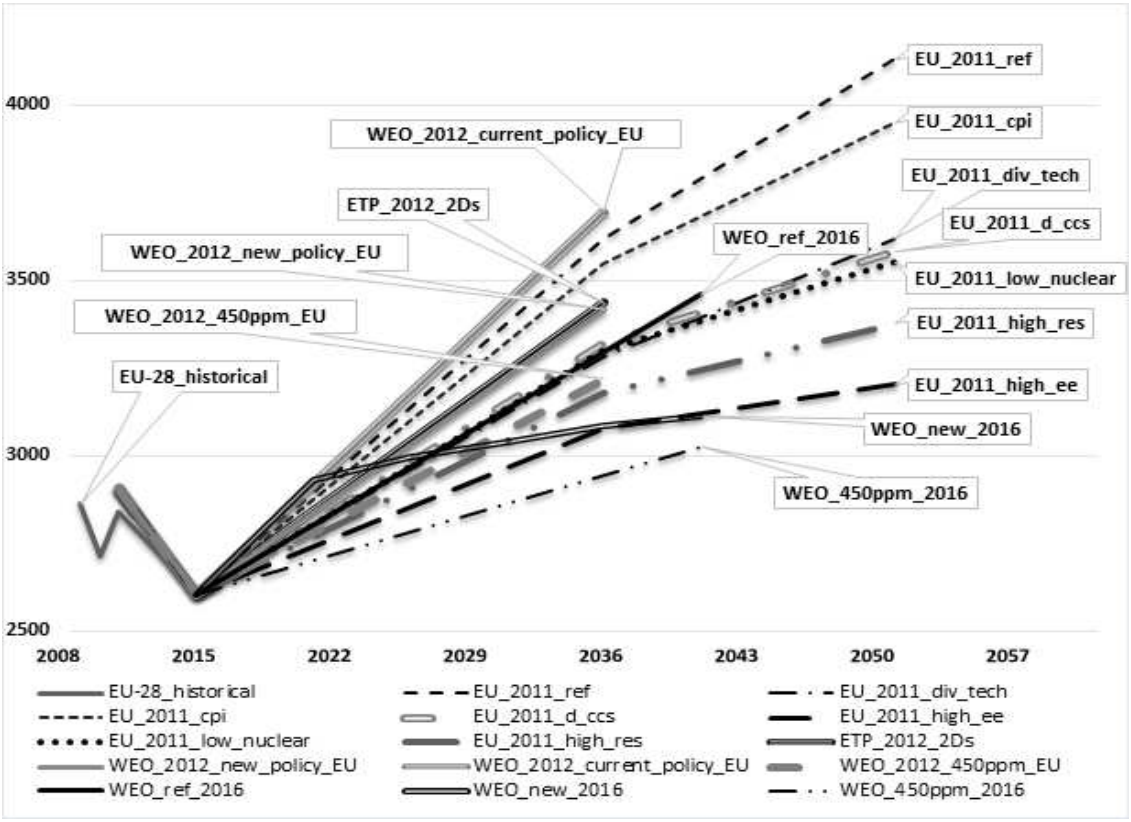
Regarding electricity demand, as can be seen in Figure 6 and Figure 7, all scenarios from the Prognos (2011) study and scenarios published directly after the Fukushima accident suggest that electricity demand could rise steadily until 2030, but by varying degrees due to the varied population growth expected by the authors. However, the decarbonisation of electricity generation and the expected rate of substitution towards electricity for fossil fuels in transportation and heating could play a significant role in the increase of total electricity demand.




Source: own summary based on IEA (2009, 2010), Greenpeace & EREC (2009), Eurelectric (2009), EU DG ENER (2010), and ECF (2010)

*Figure 6. Estimates of development of electricity demand in scenarios published before the Fukushima Daiichi accident*

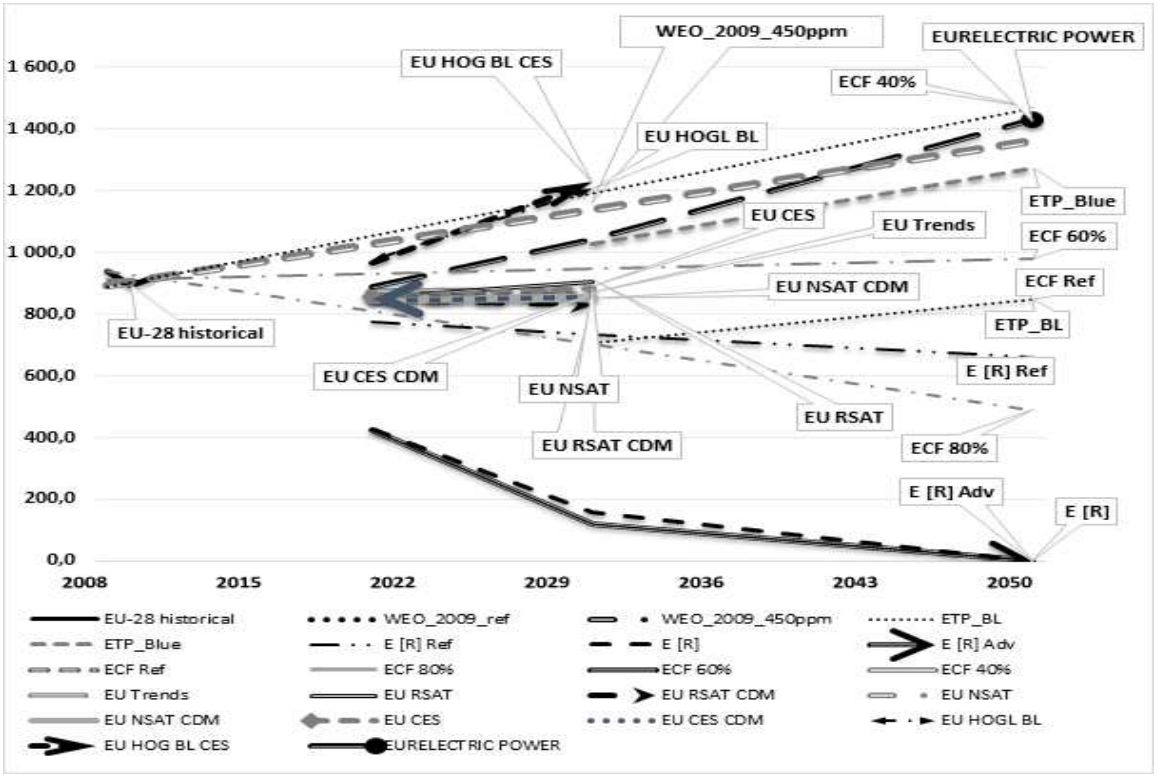
Despite the fact that changes in the development of electricity generation and in its structure highly depend on the different assumptions used in the scenarios regarding renewable energy targets, GHG targets, limitations of new plant constructions and their cost structure, renewable energy sources are expected to play a major role across all scenarios in delivering electricity in 2050. In almost all the scenarios from Prognos (2011) and those released after the Fukushima accident, wind power technologies provide the major share of electricity from renewable sources. Electricity generation from fossil fuel sources will decline by 2050, according to all scenarios being analysed. According to the EU's Energy Roadmap 2050 (EC 2011), the share of oil in net electricity generation will decline from 30% (in 2005) to 2.1-15.2% by 2050, while in all scenarios of EU Roadmap 2050 the share of gas and coal in power generation will also decrease by 2050 compared to 2005, to 15.1-19.5% and 2.1-15.2% respectively. In nearly in all scenarios (with the exceptions of Eurelectric's Power Choices scenario, ECF's 40% RES scenario, and EU's Reference scenario) renewable energy sources contribute more to electricity supply in 2050 than fossil fuels or nuclear power; however, the role of Carbon Capture and Storage varies across the scenarios (Förster et al. 2012).




Source: own summary, based on EC (2011), IEA (2012a, 2012b, 2016), EC (2011)

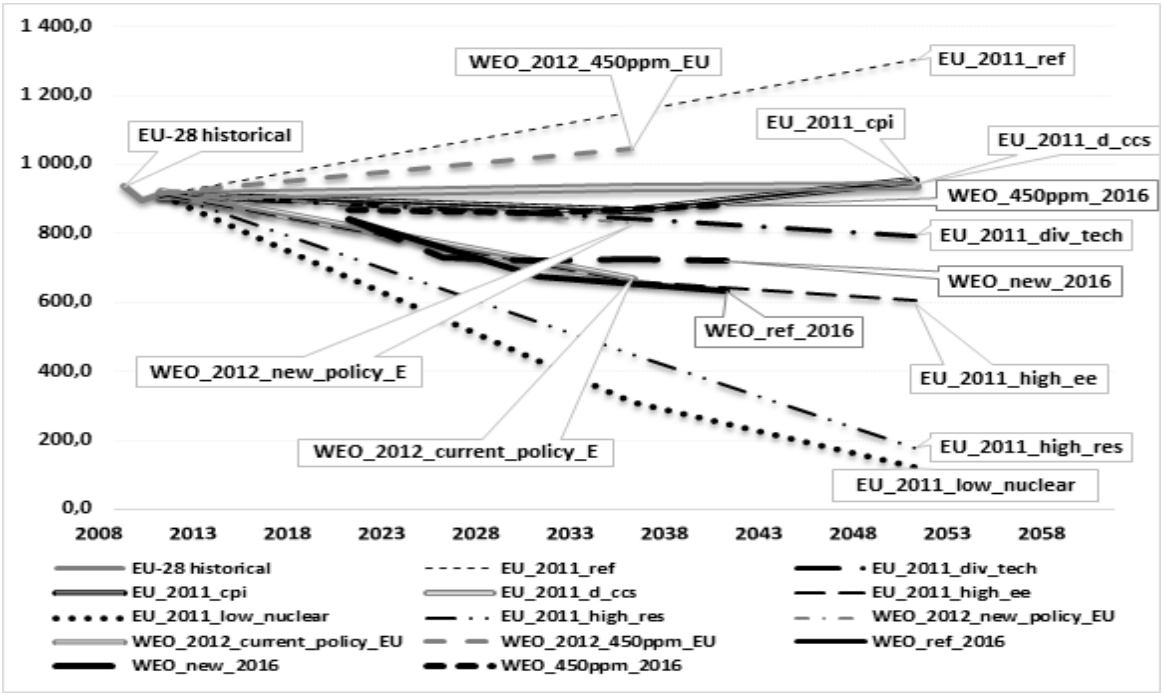
*Figure 7. Estimates in development of electricity demand in scenarios published after the Fukushima accident*

Figures 8 and 9 display nuclear capacity estimated in the scenario studies examined. For nuclear power capacities and generation, in contrast to the global picture, the situation for the EU shows a large degree of variation. Looking at the baseline or reference scenarios before 2011, Eurelectric (2009), IEA (2009, 2010) and ECF (2010) scenarios project the continuing growth of nuclear generation. Nuclear generation and capacities tend to be highest in scenarios which have to reach ambitious emission targets. The use of nuclear power increases in almost all alternative scenarios published before 2011. These scenarios suggests that nuclear power plants are expected to be an economical option to provide baseload power, whereas fossil-fuel plants are mainly used for load-following, with the exception of coal-fired plants with CCS (Prognos 2011, p. 74). The Eurelectric's Power Choices Scenario projects an initial decline in nuclear power before a rapid rate of growth in the period 2020-2050. Overall, it can be stated that in the scenarios examined in the Prognos (2011) study, nuclear energy based electricity generation tends to expand in the European Union, reaching shares of 35-45% of electricity generation. However, these scenarios generally do not calculate with the potential lifetime expansions of nuclear power plants and do not analyse in detail the relevant frameworks or contexts in which nuclear power can develop. While among the studies published before 2011 the range of scenario projections is wide due to different assumptions, European scenarios of the EC (2011) and IEA (2012a, 2012b), presume that nuclear power generation and capacities will stabilise or even decrease by 2030 or 2050.




Source: own summary based on IEA (2009, 2010), Greenpeace & EREC (2009), Eurelectric (2009), EU DG ENER (2010), and ECF (2010)

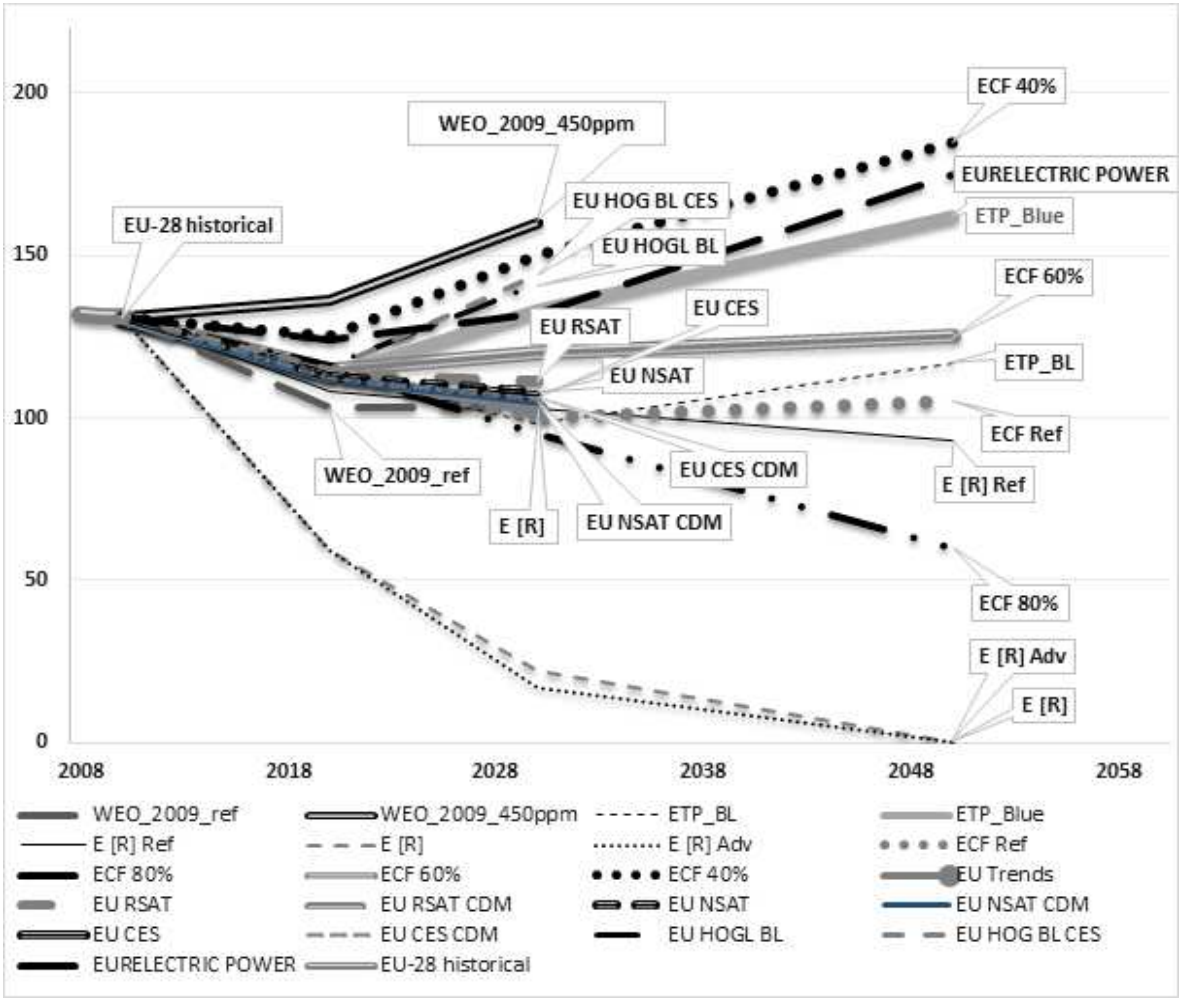
*Figure 8. Development of European nuclear power generation in scenarios released before the Fukushima Daiichi accident (TWh)*




Source: own summary, based on EC (2011) and IEA (2012a, 2012b, 2016)

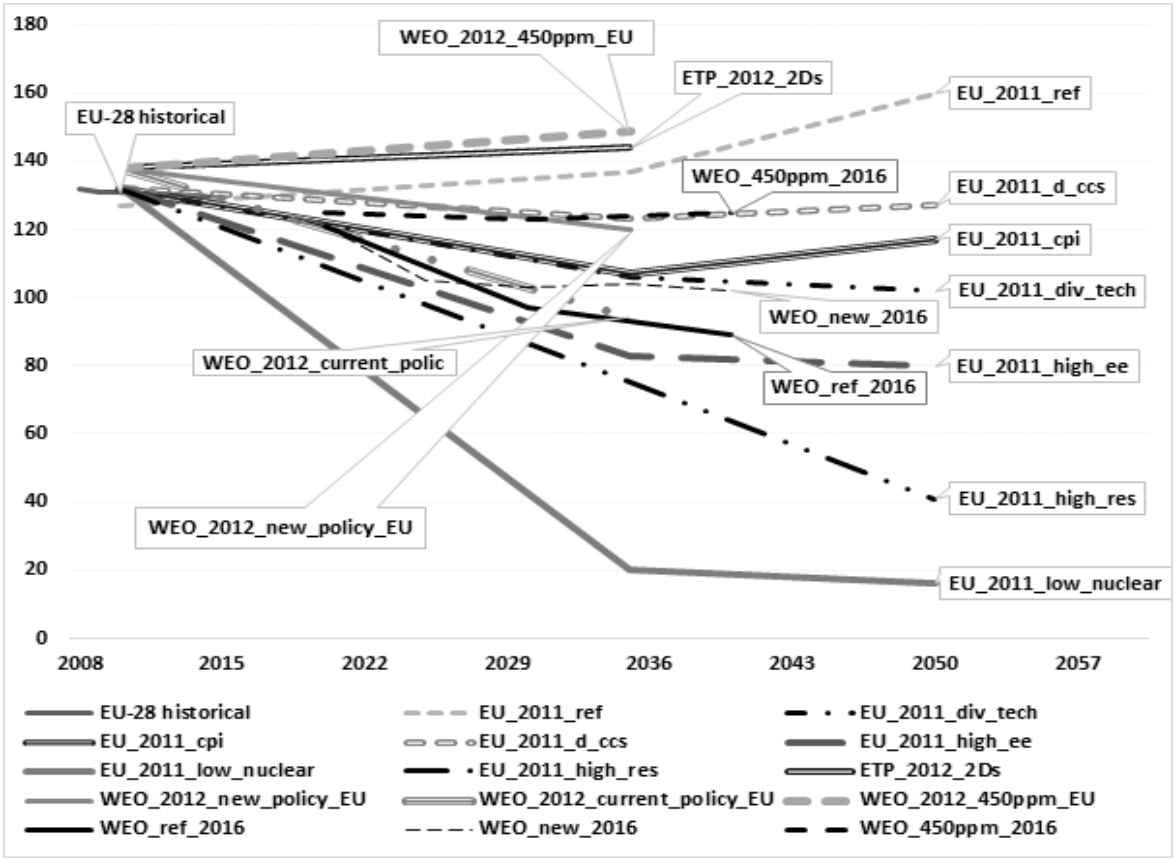
*Figure 9. Development of European nuclear power generation in scenarios released after the Fukushima Daiichi accident (TWh)*

As Figures 10 and 11 show, nuclear power generation and nuclear power capacity development in the European Union according to all scenarios released after 2011 will remain well under the level of 1,350 TWh and 160 GWe respectively, which are much lower compared to the earlier. In the WEO New Policy Scenario it is assumed that in the European Union installed capacity of nuclear power will reduce from 129 GW to 120 GW by 2035 as a result of the expected reduced competitiveness of nuclear power and higher rate of retirements. In contrast, the WEO 450 ppm scenario of IEA (2012a) expects the highest nuclear capacity development (120 GW) and the second highest share of nuclear power in total electricity generation (1,045 TWh) by 2035. According to the ETP's 2DS scenario, in 2050 nuclear energy could account for around another one fifth of the electricity mix; however, it is also stressed in the forecast that while it is expected that most of the member states with nuclear power remain committed to its use despite the Fukushima accident, nuclear deployment by 2025 will be below levels required to achieve the 2DS objectives (IEA 2012b, p. 14).




Source: own summary based on IEA (2009, 2010), Greenpeace & EREC (2009), Eurelectric (2009), EU DG ENER (2010), and ECF (2010)

*Figure 10. Predicted development of European nuclear capacities released before the Fukushima Daiichi accident (GWe)*




Source: own summary, based on EC (2011) and IEA (2012a, 2012b, 2016)

*Figure 11. Predicted development of European nuclear capacities released after the Fukushima Daiichi accident (GWe)*

The EU's Roadmap scenarios suggest that nuclear energy will be needed to provide a significant contribution in the energy transformation process in those member states where it is pursued (EC 2011, p. 9). Compared to the Reference Scenario, which expects the highest growth rate of nuclear development by 2050, in the Current Policy Initiatives scenario the share of nuclear power is lower due to a change in nuclear assumptions and policy changes after the Fukushima Daiichi accident. While nuclear power remains a key source of low carbon electricity generation, its contribution is expected to be lower than it was in the previous European scenarios. The highest penetration of nuclear comes in delayed EU's Carbon Capture and Storage and Diversified Supply technologies scenarios (18% and 15% in primary energy, respectively); however, in the Diversified Supply Technologies Scenario nuclear generation is projected to decline after 2035 (EC 2011).

In general all scenarios from Prognos (2011) stick only to the phase-out policies that were implemented before 2011. Although some scenarios (e.g. Greenpeace & EREC 2010) assumed total nuclear phase-out in the EU, in most of the studies nuclear phase-out assumptions are focused only on Belgium and Germany. A country-specific analysis is only revealed in EU DG ENER (2010) scenarios, in which Austria, Cyprus, Denmark, Greece, Ireland, Latvia, Luxembourg, Malta and Portugal are assumed to not to take into consideration nuclear power plants, while in Italy and Poland new nuclear power plants are expected to be developed, and the remaining European member states are assumed to have the possibility to further invest in nuclear power (Prognos 2011, p.112). Nuclear power capacities and the share of nuclear energy in electricity production are expected to significantly decline in most of the scenarios released before March 2011 (except in the ETP Blue Map), indicating that generation share will increase slightly by 2030, with EU DG–ENV NSAT and EU DG–ENV NSAT CDM scenarios assuming minor development of nuclear power until 2020 and roughly stable generation until 2030, and the Eurelectric scenario which presuming a 42% increase in generation by 2050. In the scenarios of IEA (2012a, 2012b) and EC (2011) released directly after the accident, the most important problems and questions of nuclear power utilisation in the European Union are associated with public acceptance and waste management. All scenarios take into consideration the current and expected policy reactions of the member states to the nuclear accident in Fukushima. It is also expected in the scenarios (except for EU_ref_2011) that political reaction after Fukushima and the increasing importance of security issues after stress tests might lead to a lower investment in nuclear power due to higher investment costs. In *Energy*

*Technology Perspectives* published by IEA in 2012, it is also stated that low investment in nuclear power generation and capacity by 2050 might lead to higher energy prices, higher $CO_2$ emissions and higher import dependency in importing regions, i.e. it would make the achievement of sustainability targets more expensive and more difficult to reach (IEA 2012b, p. 178). These scenarios assume accelerated nuclear phase-outs in at least Germany and Switzerland. However, regarding the share of nuclear energy in electricity generation the studies are divided: while some scenarios presume that nuclear power will play a substantial role in the decarbonisation of the European electricity sector, others predict that the contribution of nuclear generation to total electricity generated in the EU will decrease by 2030 and 2050. The latest scenarios of the IEA (2016) forecast that nuclear capacities in the EU overall will decrease by 2035 but that capacities will increase in the UK, Finland and the Czech Republic and stabilise in France and Slovenia. Retirement of all nuclear plants in Germany will be achieved by the end of 2025. In Hungary and Slovakia nuclear capacities are expected to increase until 2030 and then decrease according to the IEA (2016) forecasts.

# CONCLUSIONS

After the Fukushima Daiichi accident EU member states revised their energy policies associated with nuclear energy utilisation. The accident resulted in unprecedented efforts to review the safety of nuclear installations and legislation in Europe. Nuclear energy plays an important role in the European Union as the second largest source of electricity; however, the ageing of the reactors requires actions from each member state. Due to the fact that member states retain sovereignty over the use of nuclear power, some of the countries (e.g. France and Finland) are still expanding their nuclear capacities, building (Slovakia) or planning to build new nuclear reactors (Bulgaria, Romania, Czech Republic, Slovenia, the UK), or investing in nuclear fleet life-extension, upgrade or uprate activities (e.g. Hungary, Sweden, Slovakia, Spain), while after the Fukushima accident Germany and Belgium agreed to phase out nuclear generation by about 2022 and 2025, respectively. This study outlines the differences among the different medium and long-term scenarios released before and after the Fukushima accident regarding the future role of nuclear energy, taking into account the main advantages and disadvantages of nuclear power in the EU. The following conclusions can be drawn after the analysis:

- Nuclear power is seen as an important source of low-carbon electricity, supporting energy security goals; nuclear power plants contribute to competitive base-load electricity supply,
- Lifetime-extensions, plant upgrade and uprate, plant retirements and licence renewals need common rules, standards and policies and financial support,
- For the member states wishing to encourage new nuclear power plants and maintain nuclear options in the long term, new and innovative financing models must be stimulated,
- Direct impacts of policy changes after the Fukushima Daiichi accident did not fundamentally change the tendencies drawn up from earlier energy scenarios, since capacity shut-downs were already taken into account, at least in the case of Belgium and Germany.
- Most of the scenarios released after the Japanese accident indicate a higher rate of reduction in nuclear capacities in the EU by 2030 or 2050 and a smaller share of nuclear power in electricity generation than the studies published before 2011, while low-carbon scenarios still presume that nuclear power will play a substantial role in the decarbonisation of the European electricity sector as manifested in a larger share of nuclear power in electricity generation in the EU,
- Higher rates of uncertainty associated with the direction of future trends and status of EU-ETS system, electricity prices, or fuel prices are assigned in the latest scenarios examined compared to the assumptions of earlier studies.

***Abbreviations***

**EC:** European Commission
**ECF:** European Climate Foundation
**ENEF:** European Nuclear Energy Forum
**EU-ETS:** The EU Emission Trading System
**Foratom:** European Atomic Forum
**GWe:** gigawatt electric, electric output of a power plant in gigawatt
**GHG:** Greenhouse Gas
**IAEA:** International Atomic Energy Agency
**IEA:** International Energy Agency
**MWe:** megawatt electric, electric output of a power plant in megawatt
**NAE:** Nuclear Energy Agency
**OECD:** Organisation for Economic Co-operation and Development
**RD&D:** Research, Development &Demonstration
**RES:** Renewable Energy Sources
**SWU:** Separative Work Unit
**tU:** tonne of Uranium
**tSW:** tonne of Separative Work
**TWh:** terrawatt-hour, power in terrawatts multiplied by the time in hours
**WEC:** World Energy Council
**WNA:** World Nuclear Association

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PRIS database: Power Reactor Information System Database of the International Atomic Energy Agency: https://www.iaea.org/pris/

# Mergers and Acquisitions: Their Role in the Process of Diversification of an Enterprise

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*SUMMARY*

*This article aims to present the possibilities of using mergers and acquisitions (M&As) in diversification. Its theoretical part contains definitions of diversification and a review of literature on M&As in enterprise growth. Next, it analyzes the M&A market in Poland compared to the markets of Central and Southeast Europe. It presents diversification in the light of the main theories of firm growth and contains a review of the research on the subject of diversification as a growth concept of companies. The empirical section presents case study analyses of six Polish companies regarding the ways in which the firms pursue diversification. The research shows that the dairy companies engage in product diversification, while the meat firms implement industrial diversification. The companies examined in the course of research exemplify the phenomena connected with the use of M&As in diversification.*

*Keywords: Mergers and Acquisitions, Diversification, Competitive Advantage, Strategy Processes*
*Journal of Economic Literature (JEL) codes: D2, L2, L250*
*DOI: http://dx.doi.org/10.18096/TMP.2017.01.04*

## INTRODUCTION

The subject of mergers and acquisitions (M&As) has been discussed in the literature for many years and from various perspectives, both theoretical and empirical. Many scholars (Manne 1965; Walking & Long 1984; Allgood & Farrell 2000; Brigham & Houston 2001; Domadaron 2002; Gaugham 2002; Krug & Aguilera 2005; Arthaud-Day et al. 2006; Frąckowiak 2009) emphasize the role of M&A deals in enterprise expansion. They make it possible to access new organizational resources and markets, and frequently lead to diversification.

The issues concerning diversification are primarily connected with the growth concept of an enterprise (Ansoff 1957). Diversification is also analyzed on the grounds of the theory of firm growth as well as on the basis of the resource-based theory of a firm: Penrose (1959), Wernerfelt (1984) or Geroski (1999). Firm growth through diversification received attention also from Marris (1963, 1964) and Coad (2007). Other scholars such as Douma (1991), Grant et al. (1988), Montgomery (1982), Porter (1987) or Rumelt (1982) analyze the reasons for and methods of diversification and show that the greatest success is achieved by those firms that adopt the strategy of related diversification. This view is confirmed by the latest research (Jarosiński 2002, 2004; Romanowska 2004; Ferris et al. 2010). However, the theoretical studies that have been conducted so far leave a research gap. They do not go deep enough into the role of mergers and acquisitions in the methods of diversification. There is insufficient research regarding the use of mergers and acquisitions in the process of firm growth as well as the market-product character of diversification.

The objective of this article is to present the possibilities of using mergers and acquisitions in the strategy of diversification. The first part of the paper contains a survey of the literature. Firstly, the main definitions of the term 'diversification' are presented. Next, the article discusses M&A related issues and analyzes the M&A market in Poland, as opposed to the markets of Central and Southeast Europe. On the basis of the literature on the aforementioned subject, diversification is described in the light of the main theories of firm growth. Furthermore, the paper presents a review of the most important studies on diversification. It also cites research results concerning the use of M&As in two key branches of the Polish economy, namely, the dairy and meat industries. What is more, it identifies the top transactions that took place on the analyzed markets.

In the available studies concerning the use of M&As in diversification, the issue of the relation between them is only one element of given research, if it is at all discussed. Therefore, there is a need to conduct deeper analysis of this subject.

The second part of the paper presents the research methodology. It describes the methods adopted to carry out the study and carefully explains why given firms were selected for the purpose of the research. In order to illustrate the role of M&A deals in diversification, the case study method was employed. It was used to perform an in-depth analysis of two firms operating in the dairy industry *(SM Mlekpol* and *SM Mlekovita)* and four firms from the meat industry *(GK Animex, GK Sokołów SA, PKM Duda SA GK,* and *GK Farmutil HS SA)*. The aforementioned companies exemplify the phenomena connected with the use of M&As in diversification.

The analyses made it possible to identify the biggest firms first in the dairy industry and then in the meat industry. The model perspective presents the deals that were closed and the profiles of activity of the firms acquired by the companies from the discussed industries.

The third part of the article presents the results of the research as well as the author's final remarks. The results of research on diversification presented here are consistent with the world trends described in the literature. They also confirm the findings of previous studies on diversification. The dominant form of diversification is external development with particular emphasis on acquisition.

The novelty of the paper lies in the fact that it describes the market-product character of diversification. The analyses of the dairy firms present possibilities of growth achieved through product diversification, while the studies concerning the meat firms point out the opportunities brought on by industrial diversification. The research conclusions and final remarks may trigger discussion about the methods of diversification of companies as the deliberations presented in this article confirm the assumption that there is a need for further and more detailed research on these matters.

# LITERATURE REVIEW

Globalization forces firms to cope with a growing number of competitors. Organizations of all sizes must combine effectiveness and competitiveness with being sensitive to the needs of their local customers. Such a situation poses new challenges to managers and necessitates dynamic adaptation. Contemporary firms are in the center of revolutionary transformations. The literature on management lists ten so-called megatrends in the changing environment of a firm. They are the following: strong growth impulses and recession processes, liberalization of economies, accelerated internationalization and globalization, increasing competition, technological advancement, shorter life cycle of products, new IT processes (virtual revolution), demographic changes, new values in the society and increasing awareness of the significance of ecology (Romanowska, 2001).

The megatrends enumerated above exert a strong influence on the economic system as well as on the concepts and methods of management. We can also observe continuous increases in the specialization, size and market value of contemporary firms. There is also a tendency to limit the scope of vertical integration and to create "slim" or even virtual firms. These changes increase the role of M&As as a method of enterprise expansion.

When analyzing the causes of M&As, Gaughan (2010: 18) directs his attention to liberalization of barriers to trade, expansion of capital markets and markets of the financial sector and development of new technologies, as well as increasing global competition. With the use of M&As firms gain access to new organizational resources and markets. They also introduce the strategy of diversification by means of investing in new sources of competitive advantage.

The literature on this subject defines diversification as a strategy involving setting up new, additional activity. This is the point of view on diversification expressed by Miller & Dess (1996: 42). Rue & Holland (1986: 124-125) emphasize that we can talk about diversification only when a company enters areas that differ considerably from its current activity. Similarly, for Mintzberg & Quinn (1992: 79), diversification signifies starting to operate on a different economic path. Another scholar (Romanowska, 2009: 67) perceives diversification as an expansion of the range of products and services beyond the borders of one sector.

As can be seen, all aforementioned authors associate diversification with the beginning of a new activity, one different than activities currently conducted, or with entering new markets with new products. Moreover, it leads to the creation of new quality in the market-product combination of an enterprise. According to Rajzer (2001: 63), notwithstanding its diversity, the process of diversification may be based on internal financing or on acquisitions and mergers with other firms.

## *M&A Deals and Enterprise Growth*

The intensification of changes taking place in the market creates the need for increasing the potential of an enterprise. Further growth may be achieved in a variety of ways, depending on the possibilities of particular companies. They frequently do not possess enough strategic potential to be able to fully take advantage of the ongoing transformations. *The Economist* (2009) presents an opinion that the process of concentration as well as the growth of large firms is caused by their increasing awareness of the risk connected with sub-suppliers. Unreliable suppliers may indeed frequently affect the production cycle in large concerns in a negative way. So as not to lose their established brands and reputation, big firms must focus on their core competences. Instead of

subcontracting particular areas of their operation, the enterprises take control over subsequent links of the chain of value. Through the use of M&As, they incorporate firms considered to be crucial in their growth concept. Actions involving the purchase of an entire firm or its part become alternatives to internal growth.

Frąckowiak (2009: 26-27) defines mergers as "consolidations or combining of enterprises, whereas acquisitions refer to the purchase of stocks or shares". A merger takes place when at least two autonomous firms are combined. This is a mutual agreement as a result of which a new business unit is created. Mergers can take two possible forms. The first one involves the combining of companies of similar sizes. Their economic powers are relatively equal. The firms are liquidated in order to create a new enterprise. The characteristic feature of such a merger is the fact that each firm loses its independence and ceases to be a legal entity. A new company is founded on the existing potentials. In this respect, we should understand a merger as a *consolidation* of enterprises.

In the literature the issue of mergers and acquisitions is analyzed from various angles. For instance, Manne (1965) discusses M&A deals by looking at them from the perspective of taking control over the assets of the acquired company. The author claims that what motivates an acquisition is the price of stocks, which is lower than that which would be possible if a given company was better managed.

However, other scholars (Walking & Long 1984; Allgood & Farrell 2000; Krug & Aguilera 2005; Arthaud-Day et al. 2006 ) turn their attention to hostile takeovers. They stress that such deals are a way of disciplining managers. When a takeover deal is closed, current management is usually replaced with new management that can use a firm's potential in the right way. The risk of being replaced is a very strong motivator for managers.

In the literature, the subject of M&As is also discussed from the perspective of multiplying owner benefit and achieving the synergy effect (Hamrol & Tarczyński 2002). Synergy means *combined work*, which in the context of M&As refers to the benefits brought by combining the operations in two or more business units. The synergy is connected with the fact that firms joined by capital or integrated in terms of organization can generate greater value than a business entity which functions on its own (Hamrol & Tarczyński 2002: 132).

In this context Brigham & Houston (2001) and Domadaron (2002) analyze factors that affect the creation of synergy. The researchers find that synergy can be achieved though: operational activity (an increase of sales revenues), financial activity (lower transaction costs, reducing the cost of capital, tax benefits), diversified effectiveness of operations conducted by the merging firms and the increase of market power.

When discussing M&A-related issues it is also worth quoting Wernerfelt (1984: 175). The scholar is of the opinion that M&As provide an opportunity to trade resources that would be unmarketable in a different situation, and also offer a chance to buy or sell resources in *bundles.* This signifies that in a given *bundle* one can sell or buy a combination of technological capabilities and business contacts. The author stresses, however, that the imperfection of these transactions stems from a relatively small number of buyers and sellers as well as from the diversity of firms. As a consequence, a given firm has different value for different buyers. It is crucial for the acquiring company that the *bundles of resources* make it possible to achieve synergy between resources that a firm already possesses and those that are bought.

As has already been mentioned, M&As are one of the ways of developing a firm. They are an alternative for growth based on the internal method involving the use of a firm's own resources and skills or traditionally understood capital investment. Moreover, M&As are processes which are of great interest for modern companies. They exert an enormous influence on the competitiveness and growth of not only firms but also entire sectors, or even economy.

In the course of discussion about M&As it should be noted that these transactions carry great risk and generate additional costs. What is more, M&As are connected with the change of organization culture, management or laying off some of the employees. Therefore, they are transactions that cause a number of various effects in firms and their environment. The motives for M&As notwithstanding, these deals frequently do not lead to the expected increase of the values of the companies. Thus, they are difficult and complicated processes. It ought to be emphasized that in many cases M&As end in failure and a definite identification of the factors determining their success is not simple.

In the literature on the subject matter of this paper scholars such as Sudarsanam (1998: 234-245) analyze the consequences of M&As and carry out an extensive survey of the world research. A common feature of these studies is the conclusion that M&As frequently fail, which means that the value of a given business drops in comparison to its value before the transaction. For instance, the findings of research conducted by the consulting company Coopers & Lybrand (1993) concern the experience gained during takeovers of British firms. On the basis of this research, Sudarsanam points out the causes of the failures or successes of the transactions. The most common factors contributing to failure include: the attitude of the managers of the company that is taken over and cultural differences (85%), lack of plans concerning integration (80%), lack of knowledge about the industry or about the target company (45%), bad management of the company that was taken over (45%), lack of experience in the area of acquisitions (30%). On the other hand, the factors contributing to the success of a merger or acquisition enumerated by Sudarsanam include: the creation of detailed integration plans and the pace of their implementation (76%), a clear objective of the takeover (76%), a cultural match between both companies (59%), good cooperation with the management of the company that was taken over (47%),

knowledge about the taken-over company and its industry (41%).

A similar viewpoint on the factors conditioning the M&A processes is proposed by Korpus (2014). The author is of the opinion that successful combining of firms which contributes to the increase of their value does not take place very often. Moreover, Korpus notes that a great number of successful transactions largely depend on the skills and attitudes of the managers that conduct them. When analyzing the factors influencing M&As, the scholar emphasizes the importance of *due diligence*. According to her, *due diligence* serves to investigate the target, identify its potential problematic areas in the entire transaction as well as sufficiently prepare for integration. Therefore, *due diligence* minimizes the risk carried by M&As and is one of the factors determining their success.

*Due diligence,* also called *investment audit,* is an investigation of the current condition of a given firm, the aim of which is to identify its strengths and weaknesses as well as to point out potential opportunities and dangers. Such an examination involves every aspect of the potential transaction and its result has a significant influence on the decision to take over a firm and on its price. Generally, *due diligence* concerns commercial, financial, legal, environmental and technical aspects. Particular elements of the investigation ought to identify the main risks carried by the basic activity of the target company as well as the opportunities the transaction may create. More information on the subject of *due diligence* can be found in Gąsior (2005: 177–187) or Bernhardt (1994).

The discussion presented so far shows that M&A deals involve purchasing the entire company or a part of it. Their essential element is the expectation that the combined companies are going to be worth more than the sum of their individual values would be if they functioned independently. Synergy refers to the benefits which can be obtained only when firms become one and which lead to the increase of the value added. However, it should be emphasized that M&As are difficult and complicated processes and in numerous cases they result in failure.

## *The M&A Market in Poland Compared to the Markets of Central and Southeast Europe*

The report *Poland compared to Central Europe – 2010 Edition* concludes that in the period from January 1to December 31 2009 firms in Poland closed 556 M&A transactions worth over €8.5 bn. The data concerning transaction values includes the value of operations disclosed, which make up about 72% of the total. The combined value of all the M&A deals in Poland closed in this period amounted to €12 bn. Among the 556 transactions, 36 involved restructuring within corporate groups and their value amounted to €1,827 m (KPMG & DEALWATCH, 2010). In comparison, in 2008 Poland recorded a total of 548 transactions worth almost €8.54bn.

When comparing the Polish M&A market in 2009 and 2008, we should notice that it was stable. The number of transactions rose by less than 1.5%. Moreover, the market comes out well when contrasted with the regional data. In 2009 in Central Europe 1,663 M&A transactions were concluded. Their total value (as the sum of transactions whose value was disclosed) amounted to almost €25 bn. The combined value of all the transactions was €43 bn. The data demonstrates that Poland's share in the M&A market made up about a third of all deals closed in Central Europe (KPMG & DEALWATCH, 2010).

When analysing the M&A market it is also worth quoting research results included in another report called *Central and Southeast Europe - M&A Barometer 2012.* The study was conducted by Ernst & Young in 11 countries: Bulgaria, Croatia, the Czech Republic, Greece, Hungary, Poland, Romania, Serbia, Slovakia, Slovenia and Turkey. The study revealed that only in five countries did the M&A market grow in 2012. These countries were the Czech Republic, Greece, Poland, Slovakia and Turkey. In the entire region the value of the transactions decreased by 17.6%. What is more, the findings show that in 2012 in Central and Southeast Europe 1,108 deals were closed and their value totalled $41.8 bn. In 2012 the highest number of transactions (297) was recorded in Turkey. As for the volume of closed deals, the second position belonged to Poland (276 transactions), while the third to the Czech Republic (155 transactions). As for the value of the deals, however, in 2012 Poland was in the third position with deals worth $8.02 bn. The first position belonged to Turkey, the second one to the Czech Republic. In 2012 in Poland, in comparison to 2011 ($22bn), the value of transactions decreased (EYGM, 2013).

The aforementioned research shows that in the whole region the highest number of M&As took place in the industrial, services, mining and energy sectors. Transactions of the highest value were carried out in the banking, food, and mining and energy sectors. Most of the transactions involved strategic investors. In Poland they made up 90% of the total. 59% of all the deals concerned firms operating in Poland, 30% were M&A deals involving foreign investors, while the remaining 11% were conducted by Polish firms operating abroad. The most active foreign investors in Poland were the USA, Germany and the UK.

When analysing the M&A market it is also worth quoting research results included in another report called *M&A Barometer H1 2014. Central and Southeast Europe* (2014). The report states that the total value of M&A deals in Central and Southeast Europe in the first half of 2014 amounted to US$18.5 bn. This is a rise by over a third compared with the same period in 2013. Turkey was the country that held the first position in terms of the value of transactions. It was followed by the Czech Republic and Poland. Turkey was the top country in terms of the volume of closed deals as well (153 transactions). The second position belonged to Poland (112 deals), while the third to the Czech Republic (111 deals). What is more, the report states that 629 transactions were completed in the first half of 2014 in the entire Central and Southeast Europe area (11

countries). The value of the transactions in the respective period was $18.5 bn. This is a 35.9% increase compared to the first half of 2013. Moreover, the research found that in the whole region the major target of transactions was IT companies (16%). Further targets of takeovers were manufacturing companies and service firms, which made up 13% and 10% of the deals, respectively. Other sectors in the region in which acquisitions took place were energy and mining (7%), pharmaceutical industry (7%) and real estate (7%). In Poland a majority of the M&As (63%) were closed by strategic investors, whereas financial investors completed 37% of all the transactions. The main sector of economy undergoing ownership transformations was IT (EYGM, 2014).

The analyses presented above allow one to conclude that, despite the changes in the number and value of the transactions, Poland is still an attractive country in terms of mergers and acquisitions. Over 50% of all the deals closed in Central and Southeast Europe were domestic. This signifies that both the buyer and the target company originated from the same country. In Poland, 32% of investors were foreign investors from countries such as Germany, the USA, Sweden, France and Greece. In 17% of the transactions Polish companies took over foreign firms. For instance, in June 2014 *PKN Orlen* acquired the Canadian mining company *Birchill Exploration* for over $200 m. This was the largest transaction in the oil industry. It is also worth remembering that at the end of 2013 PKN Orlen from Płock acquired *TriOil*, a Canadian company listed on the Toronto stock exchange. At the same time *Grupa Azoty* purchased the exploration rights for deposits of phosphate rock in Senegal for about $29 m. Further Polish mergers were carried out by the company *PZU*. They included the acquisition of *Link4* as well as insurance companies in Lithuania and Latvia for about €350 m. The examples of transactions mentioned above demonstrate that Polish companies are becoming more active in the international M&A market.

## *Diversification in the Light of the Theories of Firm Growth*

In the theory of strategic management the classic model of the strategy of growth of an organization was designed in the 1950s by Ansoff (1957). Primary growth strategies based on this model involve investing in product and market development. Investing in product development entails modification of existing products and introducing product innovations, but most importantly, investing in new products. Investing in market development, in turn, involves competing in geographically new markets, which leads to internationalization. According to Ansoff (1957) the next step in the process of growth of a firm is diversification, which consists in abandoning not only the current technologies of product manufacturing but also the current market structure. According to Ansoff, diversification involves relocation of resources possessed by an enterprise to actions significantly different from those that the firm carried out in the past. He also emphasizes that diversification requires involvement in industries, technologies and markets that are new for the company, with products that are also new. Therefore, diversification is an undertaking leading to growth in new fields.

In the literature the issues connected with firm growth are explained in the *theory of the growth of the firm* developed by Penrose (1959). The central issue constituting the core of the theory is the optimal growth rate of a firm as well as the determinants and limits to growth. When analyzing the mechanisms of firm growth, Penrose stresses the role of resources. On the grounds of the theory of the growth of the firm, the author treats a company as a collection of physical and human resources. The scholar claims that a firm's directions of expansion are determined by its physical resources, skills and experience of the managers as well as by its unused resources. Thus, Penrose develops the *resource-based theory of the firm*. The author also believes that a firm is not only products and markets, but also particular internal resources which are indivisible, specialized and unique for a given company. She also emphasizes the role of possessing resources and, in particular, the importance of the services which these resources may provide. According to Penrose, a firm's success is determined not only by such resources as labor or capital, but also by the quantity and quality of the services which these resources introduce into the manufacturing processes. Penrose identifies the following fundamental strategies in the process of firm growth: internal expansion, diversification, expansion through mergers and acquisitions, and innovations.

Also the work of Wernerfelt (1984: 172-173) is in agreement with the resource-based theory of the firm. In his view, a company's resources can be both tangible and intangible. Examples of such resources include the brand, accumulated knowledge, technology, qualified personnel, business contacts, buildings and machinery, effective procedures, and capital. According to Wernerfelt, all the elements connected with a company which can be perceived as its strengths or weaknesses can be called resources.

Geroski (1999: 16-30), in turn, believes that when a firm is created it possesses some particular ability or knowledge that it develops later in a unique way. This signifies that on the basis of its current knowledge, a firm learns how to develop new skills and expand its knowledge. Similarly to Penrose, Geroski perceives a firm through its resources and emphasizes that internal resources are an individual matter and firms can possess stocks of underused resources that push them to grow. As for diversification, Geroski analyzes the organizational capabilities of a company. The scholar believes that the choice of the right diversification strategy is connected with the issue of core competences, and claims that diversification should be based on an understanding what a given firm is able to do to acquire particular skills.

Diversification is also of interest to Coad (2007: 34-35), who makes reference to the managerial growth model developed by Marris (1963, 1964). From the perspective of the aforementioned model, Coad assumes that firms grow only due to diversification. Above a certain level of growth, further diversification generates lower profit. This is confirmed by observations of the events taking place on the stock market. According to Coad, the reactions to diversification announcements as well as subsequent analyses of the profits of diversified firms show that diversification tends to exert a negative influence on a firm's financial performance. Conversely, diversified firms that decide to refocus their activities improve their financial results.

Diversification entails launching new activity, different from that or those currently conducted, or entering new markets with new products. However, before a decision to diversify is made, a company should thoroughly analyze its capabilities. According to Penrose (1959: 136), it ought to take into consideration if further growth is possible in the current field of operations. What should also be thought over is whether the resources and skills of a firm are sufficient to allow it to keep its position in its field and enter new areas at the same time, as well as whether the new fields are profitable and can be conquered. Penrose believes that the diversification strategy of a company should focus on the most effective use of the resources that are already possessed. The author stresses that growth by diversification is the most effective if the new activities are related to the existing resources.

In the professional literature the issues concerning the decisions to diversify are frequently connected with M&As. At this point it is again worth mentioning the words of Wernerfelt (1984: 175, 179) who points out that potential buyers tend to limit their search for firms they would like to take over to those that fulfill some simple criteria. The scholar's opinion is that in the process of managing the buyer's resource portfolio, the candidates for product or resource diversification must be evaluated both in terms of the short-term effects as well as in terms of their long-term capabilities for further expansion.

The discussion presented so far leads to the conclusion that diversification may be an attractive form of development for many firms that have reached considerable maturity. Moreover, it leads to the creation of new quality in the market-product combination of an enterprise, because it goes beyond the current processes in the chain of value added. Diversification may be connected with the processes currently taking place in a company or be conducted in fields completely new to a given firm.

When we look into growth from the perspective of products, it can be seen that companies expand their range of goods and services as well as cover new market segments. In this aspect, product development entails broadening their product portfolio. In a situation when investment in a product is done in a firm's current sector, we speak about product diversification. Therefore, *product diversification* means expanding the range of products by adding goods coming from new market segments of the current sector of operations.

Product development leads to the expansion of the range of products offered by a given company. In a situation when investing in product development involves products from outside a firm's current sector, with time we can speak of *industrial diversification*. This means entering new areas of operations understood as new sectors of the economy. In this case a sector is defined as a group of companies producing goods or services of similar purpose and using the same supply sources. Therefore, the market character of growth entails investment in products from new sectors or industries and signifies *industrial diversification*. In this sense, diversification is understood as broadening the product development strategy.

## *Diversification – a Survey of Selected Research*

In the literature on the subject matter of this article the issues connected with diversification are viewed from various perspectives, both in the theoretical and the empirical sense. As it has already been mentioned,, they particularly concern issues related to mergers and acquisitions and the possibilities to find more beneficial conditions of operation. For instance the researchers from the field of strategic management – Ferris et al. (2010) point out growth opportunities brought on by industrial diversification and stress that it is a strategy which lets a firm use its resources effectively and achieve synergy. Wiersema & Bowen (2008) in turn, turn their attention to the process of globalization of markets and industries. The scholars also mention opportunities of diversification in the international sense.

The professional literature contains an entire branch of research on the connection between the methods of diversification and company performance. Studies carried out by Rumelt (1982) found that the firms which develop through related (industrial) diversification perform better than specialized companies (not diversified) and than those which developed through conglomerate (unrelated) diversification. However, another study (Montgomery, 1982) proved that the differences in the performance of firms that diversified their operations in different ways were a result of the type of sector structure rather than of a given type of diversification. Similarly, Grant et al. (1988) found that related diversification does not ensure better performance than unrelated (conglomerate) diversification.

Nevertheless, research conducted at the beginning of the 21st century confirms the previously widely-held opinion that initial increase in the level of diversification causes fast growth in company performance, but at the same time a too high level of diversification leads to a drop in performance (Palich et al. 2000; Gary 2005; Miller 2006). The research cited above demonstrates that for every company there exists an optimal level of diversification, and after crossing this limit a firm's profitability begins to fall.

Investigation of the relationship between the level of diversification and the economic performance of a company has been conducted in Poland as well, for example by a group of scientists from the University of Lodz (Bohdanowicz et al. 2010). Their research dealt with the subject of the strategies of public companies. The analyses demonstrated that the higher the level of diversification of a company's activities, the higher its return on assets.

In the context of the effectiveness of the diversification strategy it is worth mentioning the research conducted by a team led by Romanowska (2011). The scholars analyzed for instance the influence of the level and character of diversification on the economic performance of corporate groups. Their studies regarded three categories of enterprises: specialized groups, groups with a dominant share in one sector, and diversified groups. The findings revealed very weak dependence between the degree of diversification and financial performance measured e.g. with ROE and ROA. The comparison of economic performance of the groups that adopted the strategies of related and unrelated diversification found no relation between the type of diversification and the amount of revenues generated by the examined corporate groups.

From the perspective of designing a growth strategy for a firm, however, the earlier studies of the team of Romanowska (2004) are of crucial importance. The research *Strategic Behaviours of Polish Enterprises in Global Sectors* investigated various aspects and areas of strategic behaviors of Polish firms. In the context of directions of company development, the scholars present different strategies following the model created by Ansoff. They point out that the opportunities arising from industrial diversification allow a firm to achieve synergy.

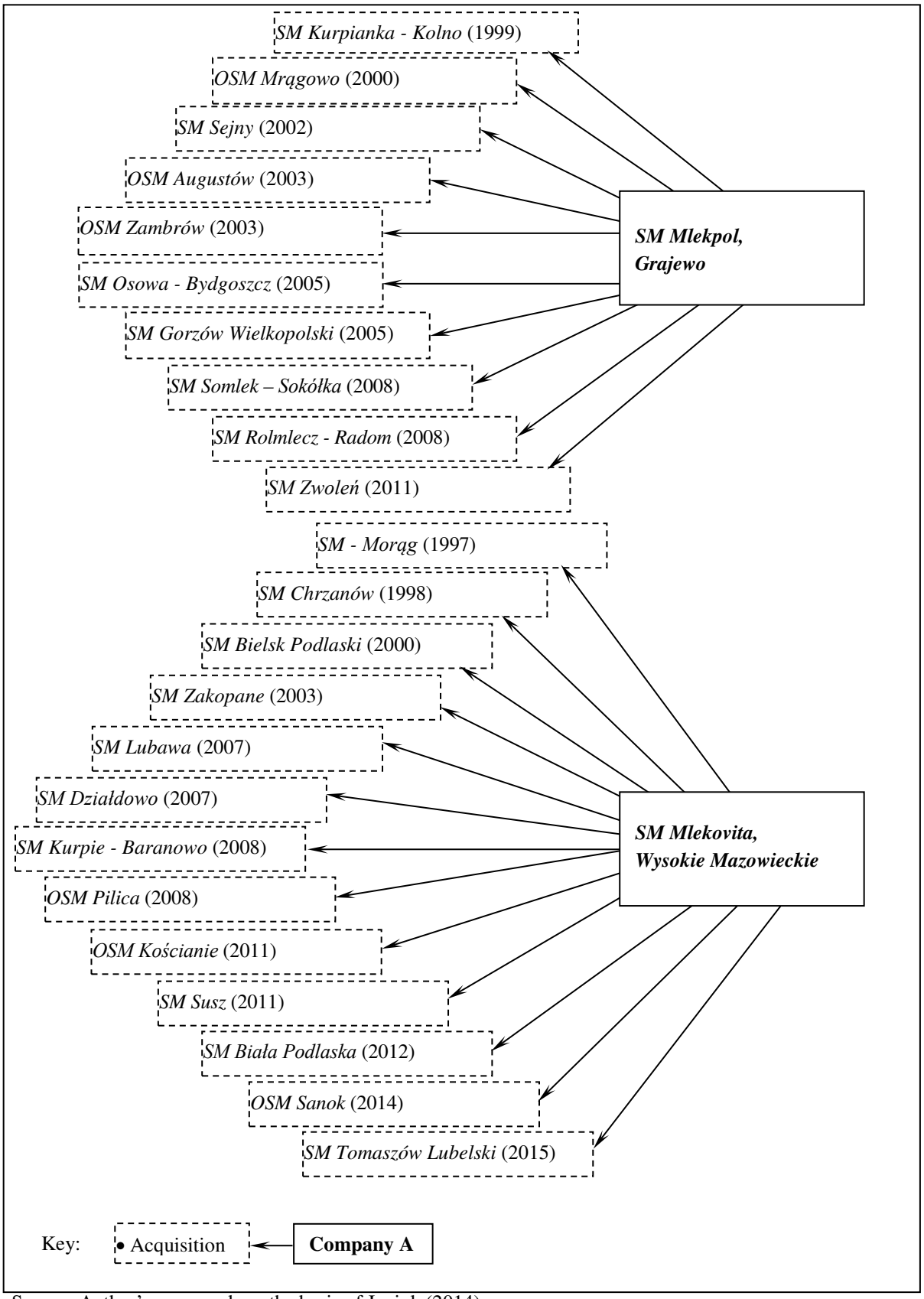
As for the methods of implementing the strategy of diversification, it is worth quoting the research conducted by Jarosiński (2002). His study examined the reasons and motives behind the Polish entrepreneurs' decisions to venture into the strategy of diversification, the methods of carrying out the process as well as the level and type of diversification. The conclusions of Jarosiński's study demonstrate that the main motive for undertaking diversification by the analyzed companies was the need for growth, while the dominant reason was the risk of losing their traditional markets. The most common way of pursuing the strategy of diversification was internal development. The dominant methods of diversification included purchasing shares in other companies, which should be understood as acquisitions usually leading to related diversification. The analyses also show that the examined enterprises were fully diversified at the time of the research.

Another study carried out by Jarosiński(2004) confirms the interest of Polish entrepreneurs in related diversification. The research investigated the changes in the level of product and industrial diversification of companies from the following five sectors: household appliances, paints and varnishes, brewing, chemical fertilizers and shipbuilding. The examination of these changes in the years 1990-2002 concluded that in the group of diversified companies the percentage of those that adopted the strategy of related diversification and those that chose unrelated diversification declined. Moreover, the research demonstrated that firms diversify their operations in a mixed way only marginally. Jarosiński also concludes that among the total of diversified companies in the analyzed period the dominant form of diversification was related (industrial) diversification.

In the context of ways of diversification, as has already been mentioned, a firm can become involved in both internal and external growth. Porter (1987) and Douma (1991), however, showed that companies tend to choose external development, with particular emphasis on acquisition. What is more, Porter concluded that as many as 74% of acquisitions in unrelated sectors ended in failure. Similarly, Douma found that 81% of entries into unrelated sectors failed, while in the case of entries into related sectors the failure rate was only 41%. The latest studies demonstrate that the greatest success is achieved by those companies that adopt the strategy of related diversification.

The issues connected with adopting the strategy of diversification also appear in the research on capital and organizational concentration of companies (Janiuk 2011, 2014). This type of study shows that, in their growth concepts, the companies pursue diversification through involvement in M&As.

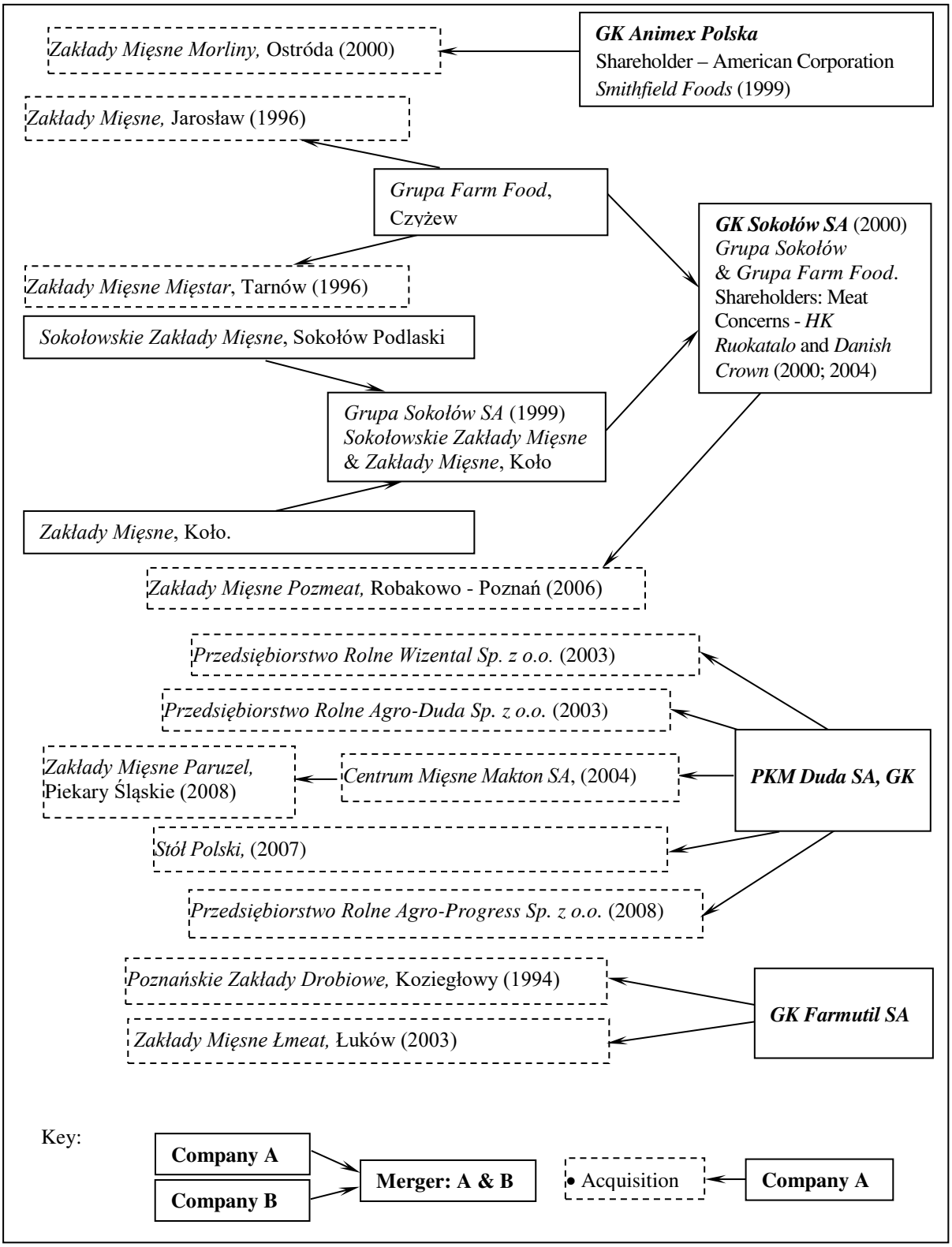
The research on the subject of concentration of the dairy industry in Poland (Janiuk 2014) identified the largest dairy companies: *SM Mlekpol – Grajewo* and *SM Mlekovita – Wysokie Mazowieckie.* These firms diversify through takeovers of smaller businesses with a similar profile. The top deals on the dairy market are presented in Figure 1.




Source: Author's own work on the basis of Janiuk (2014)

*Figure 1. Top transactions on the dairy market in Poland*

Moreover, the research dealing with the meat industry in Poland (Janiuk 2011) shows that firms strive to diversify. The study also found that the companies incorporate M&As in their growth concepts. The top deals on the meat market are presented in Figure 2.




Source: Author's own work on the basis of Janiuk (2011)

*Figure 2. Top transactions on the meat market in Poland*

### *Research Gap*

Research shows that in their pursuit of diversification, companies use mergers and acquisitions. However, the theoretical analysis conducted in this article reveals a research gap. The insufficiency of research regards the use of M&As in enterprise growth as well as the market and product character of diversification. In the available studies, which regard M&As and diversification, the issue of the relation between them is only one of the elements of the research, if it is discussed at all. Therefore, there is need to conduct a deeper analysis of the subject of the role of M&As in the methods of diversification of enterprises. Such research would make it possible to provide the answer to the following questions:

- What is the role of M&A deals in the diversification of enterprises?
- In what way do M&A deals enable a company to take control over subsequent elements of the economic path?
- How do M&A deals make it possible for companies to enter fields related in terms of technology, market or organization?

The answers to the questions posed above will make it possible to identify the opportunities which stem from the use of mergers and acquisitions in the strategy of industrial diversification of an enterprise.

## METHODOLOGY

The study uses the data gathered in the course of previously conducted analyses regarding capital and organizational concentration of companies in the two key industries of the Polish economy, namely the dairy industry (Janiuk 2014) and the meat industry (Janiuk 2011). Next, unobtrusive research was carried out. The method adopted was content analysis involving the examination of recorded texts such as books, magazines or website information (Babbie, 2008).

On the basis of previous analyses and the information from websites an in-depth analysis of the largest M&As in the dairy and the meat industry was performed. The previously carried out quantitative analyses served as a basis for the identification of the enterprises which most frequently make M&A deals parts of their growth concepts.

The next step of the study concerned the analysis of opportunities to use M&As in the strategy of diversification. The analysis of the enterprises took the form of case studies. In line with the Grounded Theory, a case study is a research tool enabling the researcher to fully understand phenomena observed in a real-life context (Babbie, 2008).

The case studies investigated the most active entities on the M&A market in the dairy industry (2 firms) and the meat industry (4 firms). The cases studied in the dairy industry are *SM Mlekpol* and *SM Mlekovita*, whereas in the meat industry the analyzed firms are *GK Animex, GK Sokołów SA, GK Farmutil HS SA* and *PKM Duda SA GK.* The use of case studies as a research method allowed for formulating extensive conclusions concerning the methods of diversification. In order to investigate the role of M&A transactions in the growth concepts of companies, analyses of each of the six cases was performed. The aforementioned companies exemplify the phenomena connected with the use of M&As in diversification.

The firms chosen for the study are the most active entities in their industries in terms of engagement in M&As. Therefore, considering the highly uncertain chance of success of M&A deals, which was pointed out in the theoretical part of the article, it can be generally assumed that in the cases of the firms selected for the study the transactions positively affect their growth process. The companies mentioned above have for years been actively participating in the consolidation process of their industries. Preliminary observations allow one to conclude that the analyzed firms pursue the strategy of diversification. They gradually increase their sales revenues as well as their market share (Janiuk 2011: 94; 2014: 39). However, in terms of the market-product character of diversification, dairy firms differ from meat companies. Therefore, the selected business entities are worth attention with regard to the way they use M&As to diversify their activities.

In accordance with the growth model created by Ansoff, the research presented in this paper follows its assumptions regarding the market-product character of diversification. Growth of the product character is understood as the broadening of the range of products by adding goods coming from new market segments but targeted for the current sector of operations – this means *product diversification*. Growth of the market character, on the other hand, is understood as the widening of the product portfolio, which involves entering new fields of operation perceived as new sectors of the economy – this means *industrial diversification* (related).

In-depth analyses made it possible to identify the biggest firms first in the dairy and then in the meat industry and present them in a comprehensive way. The model presents the deals that were closed and the profiles of activity of the firms acquired by the companies from the discussed industries. As a result, it was possible to formulate detailed conclusions on the subject of the role of M&As in the process of diversification of companies. Comprehensive presentation of the research results leads to the answers to the research questions posed above.

## RESEARCH RESULTS AND CONCLUSIONS

The analysis of the dairy industry demonstrates that *SM Mlekpol* and *SM Mlekovita* are enterprises which diversify their activities in the process of slow concentration of their industry. They are domestic capital companies which in

the process of their growth take over smaller entities operating on the market. The takeovers they performed involved firms with a similar profile of activities and led to the widening of the firms' range of products. In the context of diversification the acquisitions allow the companies to expand their product portfolio by goods coming from new segments of the dairy market. The target entities operate in the same sector of economy (dairy processing). This signifies that, by investing in product development and increasing the variety of their products, *SM Mlekpol* and *SM Mlekovita* are involved in product diversification. Product diversification of dairy companies as well as the profiles of activities of the taken over firms are presented in Table 1.

*Table 1*
*Product diversification of dairy companies and the profiles of activities of the acquired firms*

| Acquiring company<br>Enterprise functions | Acquired company | Profile of activities after the acquisition |
|---|---|---|
| ***SM Mlekpol, Grajewo***<br><br>Purchase of raw milk;<br>Milk processing plants:<br>Manufacture of dairy products;<br>Distribution and sales of dairy products; | *SM Kurpianka - Kolno* (1999) | Production: ripening and smoking cheeses, cheese spreads.<br>Sales of dairy products. |
| | *OSM Mrągowo* (2000) | Production: fermented products, kefir, milk drinks, whey powder, hard cheeses.<br>Sales of dairy products. |
| | *SM Sejny* (2002) | Production: ripening cheeses, spiced cheeses |
| | *OSM Augustów* (2003) | Sales of dairy products. |
| | *OSM Zambrów* (2003) | Production: UHT milk, quarks, whey powder, powdered milk.<br>Sales of dairy products. |
| | *SM Osowa - Bydgoszcz* (2005) | Production: milk and flavoured milk, quark<br>Sales of dairy products. |
| | *SM Gorzów Wielkopolski* (2005) | Production: powdered milk.<br>Wholesale outlet of dairy products. |
| | *SM Somlek - Sokółka* (2008) | Production: yoghurts, fermented milk.<br>Sales of dairy products. |
| | *SM Rolmlecz - Radom* (2008) | Production: UHT milk, UHT cream, butter, quark, cream cheese, bio-yoghurts, full and skimmed milk, powdered milk<br>Sales of dairy products. |
| | *SM Zwoleń* (2011) | Production: powdered milk. |
| SM Mlekovita,<br>***Wysokie Mazowieckie***<br><br>Purchase of raw milk;<br>Milk processing plants:<br>manufacture of dairy products;<br>Distribution and sales of dairy products; | *SM - Morąg* (1997) | Production: ripening cheeses.<br>Wholesale outlet of dairy products. |
| | *SM - Chrzanów* (1998) | Production: ripening cheeses.<br>Distribution Center. Sales network of dairy products. |
| | *SM Bielsk Podlaski* (2000) | Production: ripening cheeses.<br>Wholesale outlet, Distribution Center, Sales network |
| | *SM Zakopane* (2003) | Production: mozarella cheese, smoked ewe's milk cheese (oscypek).<br>Sales of dairy products. |
| | *SM Lubawa* (2007) | Production: cottage cheeses, quark.<br>Cheese Packing Plant.<br>Sales network of dairy products. |
| | *SM Działdowo* (2007) | Production: hard cheeses, butter.<br>Wholesale outlet, Distribution Center. Sales network of dairy products. |
| | *SM Kurpie – Baranowo* (2008) | Production: Cheddar cheese, butter.<br>Sales of dairy products. |
| | *OSM Pilica* (2008) | Production: cheeses, whey.<br>Sales of dairy products. |
| | *OSM Kościanie* (2011) | Production: flavoured cheeses, cream.<br>Wholesale outlet, Distribution Center. Sales network of dairy products. |
| | *SM Susz* (2011) | Production: cheeses, whey.<br>Sales of dairy products. |
| | *SM Biała Podlaska* (2012) | Production: cheeses, whey.<br>Sales network of dairy products. |
| | *OSM Sanok* (2014) | Production: cheeses, whey.<br>Wholesale outlet of dairy products. |
| | *SM Tomaszów Lubelski* (2015) | Production: cheeses, whey.<br>Wholesale outlet, Distribution Center. Sales network of dairy products. |

Source: author's own work on the basis of the conducted research.

The subsequent stage of the research regards firms operating in the meat industry. The investigation concluded that the largest meat companies are *GK Animex, GK Sokołów SA, GK Farmutil SA* and *PKM Duda SA GK.* When we look into the methods of diversification of the studied firms, what should draw our attention are the specific conditions in which the companies were set up.

*GK Animex* is a link of a foreign international corporation, *Smithfield Foods.* In Poland *Animex* has developed on the basis of the assets of state companies. In the processes of privatization and abolishment of monopolies in Polish economy, the firm went througha series of ownership transformations. It acquired stocks and shares in domestic fodder manufacturers, meat processing companies and meat product manufacturers. The target companies are specialized firms operating in the agricultural and food industry. In the case of *Animex*, restructuring involves for example incorporating independent businesses. The acquisitions tend to involve former partners and competitors on the meat market. One of the key transactions in line with this tendency was the acquisition of *Zakład Mięsny Morliny* in Ostróda. Apart from the development of *Animex's* production potential, the deal entailed gaining another well-known brand on the market.

*GK Sokołów SA* is also a company with a share of foreign capital. It was set up as the result of a merger between *Grupa Sokołów SA* and *Grupa Farm Food* (2000). The analysis reveals that the origins of these companies lie in the processes of ownership transformations of former state-owned manufacturing plants as well as with earlier M&As in the industry. *Grupa Sokołów SA* was created as a result of a merger between *Zakłady Mięsne SA* and *Zakłady Mięsne* in Koło (1999), whereas the genesis of the development of *Grupa Farm Food* involves the acquisitions of *Zakłady Mięsne Jarosław* in Jarosław (1996) and *Zakłady Mięsne Mięstar* in Tarnów (1996).

*PKM Duda* and *Farmutil,* on the other hand, are firms based on domestic capital. They have established their positions in the agricultural and food industry predominantly by exploiting the transformations of private companies. On the basis of their principal area of operation, the companies enter new fields with which they are related technologically, organizationally or in terms of market. In the process of natural investment of their financial surplus, they gradually expand their industrial and market scope of operations. They are aware of the opportunities arising from consolidation of the industry; therefore, they purchase shares or stocks of business entities functioning in the areas creating a chance of further growth. They pursue investment in technological development.

The studies of the cases of the meat companies allow one to conclude that diversification of their activities is based on M&As involving entities that are for example their suppliers, partners or competitors. The investigated companies take over firms operating in the broadly-defined agricultural and food industry by performing partial or full buyouts. They undertake forward or backward vertical diversification. These processes are called backward vertical diversification and forward vertical diversification, respectively. When the companies enter new areas of operation they also assume control over comparable phases of the creation of value on other economic paths. These types of activities are characteristic of industrial diversification. Industrial diversification of meat companies as well as the profiles of activities of the taken over firms are presented in Table 2.

*Table 2*
*Industrial diversification of meat companies and the profiles of activities of the acquired firms*

| **Acquiring company**<br>Enterprise functions | Acquired company | Profile of activities after the acquisition |
|---|---|---|
| ***GK Animex Polska:***<br><br>Agricultural production: Production and processing of fodder, livestock farms.<br>Meat processing: animal slaughter and meat processing. Operations on the market of pork, beef and poultry.<br>Manufacturing of meat products.<br>Manufacturing and sales of down and feathers.<br>Distribution and sales. | *Zakłady Mięsne Morliny,*<br>Ostróda (2000) | Production department: pork and beef processing. |
| ***GK Sokołów SA:***<br><br>Production of raw materials: agricultural and livestock farms;<br>Meat processing: animal slaughter and meat processing. Operations on the market of pork.<br>Manufacturing of meat products.<br>Distribution and sales. | *Zakład Mięsny Pozmeat,*<br>Robakowo - Poznań (2006) | Production department: pork processing. |
| ***PKM Duda SA:*** | *Wizental Sp. z o.o.* (2003) | Livestock farming: trade in livestock. |
| | *Agro-Duda Sp. z o.o.* (2003). | Livestock farming: trade in livestock. |

| | | |
|---|---|---|
| Agricultural production: production and processing of fodder, livestock farming; Meat processing: purchase of cattle and pigs for slaughter, slaughtering, processing and distribution of meat, purchase and processing of game. Operations on the market of pork, beef and game. Manufacturing of meat products. Distribution and sales. | *Centrum Mięsne Makton* (2004) | Production department: meat processing. Wholesale outlet. Meat distribution center. |
| | *Stół Polski* (2007) | Network of sales of meat and meat products. |
| | *Agro Progress Sp z. o.o.* (2008) | Livestock farming: trade in livestock. |
| | *Zakłady Mięsne Paruzel,* Piekary Śląskie (2008) | Meat processing and cold cuts production. |
| ***ZRP Farmutil SA:*** Agricultural production: processing of fodder, farming of pigs, poultry and cattle. Meat processing: purchase of livestock, slaughter and meat processing. Operations on the market of pork, beef and poultry. Manufacturing of meat products. Distribution and sales. | *Zakłady Drobiarskie,* Koziegłowy (1994) | Production department: poultry processing. |
| | *Zakłady Mięsne Łmeat,* Łuków (2003) | Production department: pork and beef processing. Wholesale outlet. Network of sales of meat products. |

Source: author's own work on the basis of the conducted research.

The research demonstrates that when the examined firms undertook and carried out diversification, in various respects they behaved in a way similar to that described in the literature. Although the motives and ways of diversification were formulated in a slightly different way, they still fully correspond to those cited in the references. The dominant form of diversification of the aforementioned companies is external development with particular emphasis on acquisition. The results of the case studies described above made it possible to formulate particular conclusions that lead to the answers to the research questions posed above.

The analyses of the dairy firms found that *SM Mlekpol* and *SM Mlekovita* perform takeovers of firms with profiles of activities similar to theirs, which leads to product diversification. The acquired companies are local competitors specialized in production for particular segments of the dairy market. The acquisitions create chances of benefitting from the incorporated assets and divided competences. In the process of research it was discovered that the transactions enable the companies to quickly strengthen their positions on the market. The observed acquisitions ought to be understood as incorporations as a result of which new branches or plants are created and function within the structures of the buyer. From this point of view, diversification concerns these entities which possess complementary resources in the product or market areas. These complementary resources and competences strengthen the core activity of the buyer. Such a form of product diversification contributes to the modernization of the production potential, optimization of the use of particular links of the chain of value and limits industrial risk. As a result, the number of unnecessary production factors is reduced, while product specialization of given businesses increases. Product diversification enables a firm to reduce costs as well as expand its product portfolio and distribution network. This empowers companies to become leaders in the dairy industry. It may be assumed that in the process of their future growth *SM Mlekpol* and *SM Mlekovita* are going to establish their positions with regard to their core activity and go beyond the borders of dairy industry later on. As a consequence, further investment in related areas of operation is going to lead them to industrial diversification.

Also the case studies of the meat companies presented above demonstrate that they have been using the strategy of diversification for years. However, in their case, it is industrial, not product diversification. *GK Animex, GK Sokołów SA, GK Zakład Rolniczo-Przemysłowy Farmutil HS SA,* as well as *Polski Koncern Mięsny Duda SA GK* are involved in mergers and acquisitions. When diversifying their activities, the companies take over businesses functioning in areas treated as crucial for their further growth. They pursue investment in technological development. Moreover, they purchase shares or stocks of firms that are their suppliers, partners or competitors. They adopt the strategy of industrial diversification by means of entering new areas of operation related to their core activity. The examined companies display interest in both backward and forward industrial diversification. In their growth concepts they create entities joined by capital connections. On the basis of their principal area of operation, they take control over new areas with which they are related technologically, organizationally or in terms of market. The M&As contribute to functional improvements and to changes in the involvement in the market. The firms' strategic decisions lead to the achievement of synergy as well. Their functioning in related fields makes it possible for them to expand their areas of operation to cover new elements of the economic path – this means industrial diversification.

Diversification is a strategy which determines investment priorities on given markets and points out directions of expansion. It decides to what extent a company is going to focus on particular areas of its operations. What is also noteworthy in this context is that in both the dairy and the meat industry the process of production concentration is of key importance. This creates the need to increase the scale of investment directed at modernizing the processing potential and at the construction of new production plants. Managers are aware that in such conditions success cannot be achieved

solely by means of internal growth. Therefore, the role of M&A deals as means of enterprise expansion is growing. Through the use of these transactions firms gain access to new organizational resources and to new markets. As a result, initially small corporate groups emerge and gradually increase their revenues. This brings on a steady intensification of consolidation processes in the sectors as well as technological concentration of production.

The basic limitation of this research is its lack of representativeness. The case studies presented above exemplify the phenomena regarding the use of diversification. The findings presented here can be of use only to entities possessing sufficient organizational potential to allow them to diversify their activities. In addition, the results may serve managers in the process of making decisions about the directions and methods of diversification.

The analyses also carry implications for further research, which can examine the optimum level of diversification and its types or investigate the relation between diversification and the economic condition of companies.

## FINAL REMARKS

The discussion presented above confirms that advancing globalization involves sectors of the economy, industrial markets, enterprises and competition. The fact that foreign firms are gradually entering the Polish market intensifies internationalization of the economy. In order to adapt to the changing conditions, enterprises must become actively involved in the changes. The pressure generated by globalization and increasing competition forces them to adjust to the new conditions. A characteristic feature of such adjustment is the act of setting ambitious goals. The completion of the tasks stemming from these goals leads to fast growth and sometimes also to expansion. It is expressed in the willingness to catch up with the best or assume the position of a leader.

M&As can be observed in various sectors of the economy. The motives behind these ways of combining of enterprises are diverse. They stem from the evolution of the environment, diversification of activity or the resources possessed by a given company. The interest in M&A transactions is also triggered by the need to accelerate growth and strengthen market positions. As a result, firms gain the possibility to complement their resources and competences. The transfer of knowledge and technology makes it possible to achieve synergy, economies of scale and to expand the scope of operations. However, M&As frequently fail. Only in a few cases do they lead to cost reduction and an increase of market share. The most common mistake made during M&As is insufficient analysis of such important aspects as risk, price and integration. The discussion presented so far in this paper indicates that *due diligence* minimizes the risk carried by the M&A transactions. It is treated as a factor determining their success.

Diversification entails launching new activity, different from that currently conducted, or entering new markets with new products. The study demonstrates that in their pursuit of diversification companies get involved in M&As. From the perspective of diversification it is crucial that the transactions ensure synergy between the resources that a firm already possesses and those to be purchased.

The results of research on diversification presented in this article are consistent with the world trends described in the literature. They also confirm the findings of Polish studies on diversification reviewed earlier in this paper. The dominant form of diversification in the cases of companies described here is external development with particular emphasis on acquisition. The investigated transactions make it possible for the companies to enter fields related in terms of technology, market or organization. As a consequence, the firms develop and strengthen their enterprise functions. Their brands become recognizable and their industrial and market scope of activity grows. This strengthens their competitive position on the market and helps them reduce the risk carried by cooperation with suppliers.

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# Relevance of Capital Structure Theories in the Service Sector

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*SUMMARY*

*The aim of this study is to examine the relevance of capital structure theories in the Hungarian service sector between 2008 and 2014. The service sector stands in the centre of research, as the role of this sector is becoming more and more important. Whereas the importance of other sectors has decreased in the previous years and decades, the role of services shows an increasing trend in developed societies. The paper focuses on three factors. Firstly, I examine whether the classical theory is relevant, in which there is a negative linkage between profitability and capital leverage. Secondly, I examine the linkage between liquidity and capital leverage. Finally, I examine the principle of maturity matching, namely if firms in the service sector keep the golden rule to finance their non-current assets from non-current liabilities and equity.*

*Keywords: corporate capital structure, services, Hungary*
*Journal of Economic Literature (JEL) code: G32*
*DOI: http://dx.doi.org/10.18096/TMP.2017.01.05*

## INTRODUCTION

The corporate capital structure means, in the classical sense, the ratio between the non-current liabilities and equity, which is voluntarily created and modified by the corporates. To acquire new financing sources, the company can issue new shares, which increases the equity base, or can take out a non-current loan and/or issue bonds, which raises the share of non-current liabilities. The main questions of theoretical and empirical researches related to the capital structure are the following:

1) Is there any optimal ratio between the two types of financing sources by which the value of the company can be maximised?
2) What kind of aspects should be considered by corporate managers when they make decisions on the way of financing an investment?
3) What is the correct requisition order of financing opportunities?

No consensus has been reached related to these questions, either in theory or in empirical studies. My study examines these issues after introducing the related theories.

## LITERATURE REVIEW

### *Agency Theory in Corporate Finance*

Generally, the financing markets do not operate perfectly efficiently, nor do they operate cost-free. Jensen and Meckling were the first to dealt with the theory based on agency cost (Jensen & Meckling 1976). The capital structure theory based on agency cost developed by them is based on the incomplete contract and information asymmetry.

The principal-agent relationship is established among people or groups when the principals delegate their ownership or other interests to an agent or a group of people working as an agent (Williamson 1988). The principal delegates his/her right to an agent if he/she judges that he/she is unable or does not wish to represent his/her interest independently due to the lack of knowledge, time or other resources.

The principal-agent theory assumes that the partners maximise their utilities in the principal-agent relationship, they behave in a rational and opportunistic manner and the maximisation of their own benefit is not inhibited by any harm of the partner's interest.

The agent theory explains the capital structure of corporations where the management and the ownership are

separated. The informational problem of agency theory is based on the fact that any economic actor has extra information, but it is probable, that in the future one of them will have extra information. He/she is called the agent, whereas the other partner, the principal, is the one who wants to ensure in a contract that the agent should act in his/her interest. If there is a deterministic linkage between the operation of the agent and the result of the operation, no problem arises. The problem occurs if the linkage is stochastic. If the compensation of the agent is exclusively the function of the output, the agent bears risk from the stochastic linkage. If the compensation is independent from the output, the agent is not encouraged to follow the principal's interest.

A further risk for the principal is that the agent – since he/she serves other's interests – tends to bear excessive risk, since he/she shares in the potential high return, but in case of loss only the principal's interest and wealth are damaged (moral hazard). The root of the problem is that the interests of the principal and the agent differ, and they try to solve this problem by making a proper contract. The manager is generally interested in the value increase of the organisation, while the shareholders are interested in the share price increase.

***a) The conflict between managers and shareholders***

In this case, the shareholders are the principals and the company management is the agent. The aim of shareholders is to persuade the company management to make decisions that maximise the value of the company. The problem is that the principals do not have accurate information about the investment opportunities of the firm, and the value of the company does not depend solely on the efforts of the management. In the theory, if the management discloses some actions, it bears the total cost, but it shares in the profit only through its ownership share (Mikolasek and Sulyok-Pap 1996). Generally, the management strives to overinvest. Even the management is not willing to liquidate the company if its net asset value is larger than the market price of the company.

In the representatives of the theory the increase of leverage is a satisfactory solution in these circumstances, since it decreases the free cash-flow spending on investments, and makes liquidation easier to enforce (Jensen & Meckling 1976).

Conflicts during the company operation between the personal goals of the management and the wealth maximisation of the owners may relate to the following fields:

- management of assets/investment decisions
- financing issues
- dividend payment.

In investment decisions, the basic appearance of the interest conflict is the difference of risk levels. The owner is interested in more risky projects, while the manager prefers the less risky investments, since the probability of default is lower. In financing decisions, the owner is interested in utilising the tax shield (higher debt level); the manager prefers to maintain liquidity and lower indebtedness to avoid bankruptcy. The conflict of interest between the owner and the manager in dividend payment comes from the fact that the interest of owner is to increase the value of sharess by receiving dividends; the manager strives to increase the retained earnings, which finance investments. Several options are available for the shareholders to encourage the management to consider the interest of the owners; the aim of the management is to maintain a balance between the shareholders' interests and the long-term interest of the company.

The following studies formulate and deduct findings related to the American capital market. Their aim was to make transparent the partners' interests.

*Conflict of ownership-management interests in investment decisions:*

1. The management undertakes investments only in a good liquidity position. If the liquidity of the company is fragile, then even investments with positive net present value are not realised. Research has discovered a positive linkage between the size of equity and the investments.
2. A special appearance of management's interest is the building of a corporate empire, increasing of the company size by takeovers. The mergers and takeovers ensure greater influence for the management and higher return due to the economics of scale. The management carries out even the weaker projects (overinvestment).
3. If the company has relatively high debt, the management is encouraged to seek new investment opportunities to increase the income generation of the company (the higher income and the bigger asset collateral make the debt service safer and the rating higher). By seeking the investment opportunities, the risk appetite is also increasing, so the conflict of interest between owner and management decreases.
4. If the company has internal liquidity, and this exceeds the value of investment opportunities, the management repays the liabilities and equity (loan repayment, repurchase of shares, dividend payment), which decreases the conflict of interest. (Ross et al. 1996; Harris & Raviv 1991; McConnel J.& Servaes H.1995).

*Conflicts of interest between owner and management in financing decisions:*

1. The owners often think that the corporate's leverage is too low, and the company does not utilise the tax shield of the loan. The rise of lending – in a favourable cash-flow position – may increase the income of the shareholders. In the USA, most of the companies have low leverage, and that is why their corporate tax commitments are significant, which supports the view that the management is too careful in lending, and avoids threats to the company's liquidity.
2. The external owners interpret signals in the lack of real internal performance indicators, and try to deduce from them the size of real corporate income. The lending is one of these signals; if the managers raise a loan, the

external owners deduct a good liquidity position, since the management (presumably having reliable information) undertakes the higher debt stock.

3. The management forms a multifactorial preference system in practice, in which the corporate specific factors have a significant role. So, the corporate asset features (significant tangible assets lead to high leverage, whereas significant intangible assets indicate equity finance), the uncertainty and fluctuation of operational profit, growing potential, financial independence, and the maintenance of flexibility determine the leverage (Ross et al., 1996)" (Szórádiné Szabó 2005).

What are the most important tools of owners' influence? One is to offer shares to managers, since the higher the share of the management in the company; the lower the "money-wasting" manner of management. In these situations, the manager prefers t investments that bear less risk. Another option is for the investors to introduce monitoring and control measures to decrease the agent costs. The monitoring follows the performance of the company and the management. Control mechanisms, legal norms and moral rules keep the management acting for the benefit of the owners. Monitoring means a general control framework and is part of the broad contract features by which the owner determines the acting scope of the management. Lending is an essential element, since it forces the company to pay cash, and limit the free cash flow available for the agent.[1]

***b) The conflict between bondholders and shareholders***

The conflict among bondholders and shareholders is rooted in asset substitution. Both the bond and the share have option characteristics; the share is simply a call option. The shareholders have got the opportunity to influence the parameters of the underlying assets. If the volatility of the underlying asset increases, then the option's value rises. The shareholders' interest is to increase the value of the equity, not the value of the whole company. For this reason, it can be imagined that the shareholders invest even if the net present value is negative, but the project has got substantial risk. The bondholders try to stand up against this, but they have got only two tools. These are:

1. They try to control the company to describe broader information services of the company. This makes the loan more expensive, because this means incremental costs for the company.
2. They interfere in the investment decisions; however, the management always has an advantage over the investors, since it is better informed and has a comparative advantage in company management.

The supporters of the theory draw the conclusion, that the asset substitution problem may decrease the leverage in case of some investors, but we should consider two important effects by determining the leverage.

1. Management reputation: The management is not always interested only in high return, but in the success of the company, which may counterbalance the effect of asset substitution. In the opinion of some researchers, the companies directed by management with a low reputation more often becomes the object of a takeover; that is the reason why the leverage in companies facing with hostile takeover is so low.
2. Corporate reputation: If the company is qualified as a reliable debtor by its credit record, then it can access loans at lower interest rates. Thus, a company with a good reputation benefits by maintaining its good credit record and this may decrease the asset substitution effect. (Mikolasek & Sulyok-Pap 1996).

The primary areas of bondholder-shareholder conflicts of interest are the following:

1. Investment decisions: The owners often try to solve problems stemming from a weak liquidity position and bankruptcy-close circumstances by starting new investments. However, the lenders try to avoid the risk and do not approve the new investments in these situations.
2. Financing decisions: The interest of lenders is good solvency, high liquidity and retaining the profit for the company.
3. Dividend policy: Considering the size of the dividend the lender's and the shareholder's interest differ in the short term, since the shareholder wants to receive income from the company, while the lender wants to retain the profit. A shareholder investing in the long run gives up his/her immediate income to increase the company's value and the share price by making investments with a positive net present value.

Further cases in the owner-lender's conflict of interest according to empirical research:

1. Owners of a company close to bankruptcy often want to make new investments to improve the profitability, but the risk of these actions is borne by the lenders.
2. If the lender judges that the corporate performance or the result of the investment is worse than could have been foreseen at the granting of the loan, the lower income decreases the value of the company (i.e. future cash inflow, the value of the assets). The risk of interest and principal repayment is increasing for the lenders, while the asset value as collateral becomes lower. The lender is likely to change the rating of the company, but the increasing interest rate and the additional collaterals decrease the cash income of the owner.

[1] *Lending does not always trigger the same control effect. If the company grows rapidly and has projects with high profit potential but its free-cash flow is limited, this method is less effective. However, if the company's growth potential is limited and has significant free-cash flow, the method could be very effective. (Jensen-Meckling 1976)*

3. The company raises a new loan, whose collateral is the available assets. The cost of loans is lower due to the good collateral. The new loan withdraws value from the lenders of the old assets. (If the new investment is not successful, the old assets cover the principal and interest payment of the new investment.)
4. The dividend payment and the share repurchase may be fields of conflict of interest. If the dividend payment significantly rises or some shares are repurchased due to the good liquidity position, this decreases the cash balance of the company, and the worse liquidity may lead to a worse rating (Ross et al. 1996)" (Szórádiné Szabó 2005).

What are the main tools of lender's influence? The appropriate tools exist in all the above-mentioned cases. All the tools should be included in the loan contract so that the best one can be applied in case of need.

Another valuable tool is the rating, which can select the potential insolvent debtor. The credit monitoring makes possible the ordinary control of the company and the modification of the loan contract if new circumstances emerge. However, these tools are available only in case of bank finance, while in case of bond finance the opportunities are limited.

## *Theories Based on Asymmetric Information*

The main idea of these theories is that one of the economic actors has more information than the rest of the actors. However, the others observe this actor's actions, and try to deduce the missing information. Therefore, these theories are often called signalling theories.

In case of leverage we assume that the corporate manager has the incremental information and he/she can judge the credit rating of the managed corporate, whereas the investors do not have internal information. They are observing the "signals" of the management. A good company naturally strives to differentiate itself from bad ones, the question is only whether they can send believable signals to the investors. The introduced models examine how they can send good signals by modifying the leverage.

The two classical models introduced here have several versions.

*Pecking order theory*

One explanation of the pecking order theory is based on information asymmetry. The asymmetric information comes from the fact that the management precisely knows what the value of the company is and what the net present value of the ongoing investments is, whereas the investors do not know exactly this, because they have less information than the management. When the financing of a project should be decided, the management focuses on two things: the net present value of the project and the cost of finance. The project is worth financing from equity issue if the company's shares are overvalued (since their price is higher than their value). Overpricing occurs if the incremental information available to the management is unfavourable and the market overvalues the share. If the managers – based on favourable information – know that the market undervalues the company shares, then they make a loss by issuing new shares and they give up the investment with positive net present value (Frank Murry Z. & Goyal Vidhan D.2003).

The theory predicts that the management seeks a financing source whose value least depends on the discrepancy of information, and whose value moderately changes when the information become public. This source may be first an internal source (in case of risk-free debt neither underpricing nor overpricing occurs, but the corporate debt is not risk free), thereafter corporate debt, and finally shares, which directly depend on the company value.

The pecking order theory first occurred in Donaldson (1961), who stated based on a corporate sample that the management uses firstly internal sources to finance its projects, and last turns to share issue. Related articles are (Myers 1984), (Myers &Majluf 1984) and (Harris & Raviv 1991).

According to the (Myers &Majluf 1984) study, the management has excess information compared to the market actors; if the management finances the corporate investments from share issue, then the market actors deduct from this that the management considers the share price overvalued and the share price will fall due to this belief. Naturally, this does not serve the interest of the shareholders. Thus, managers try to avoid the share issue and choose an alternative way of financing not to undermine the share price.

Myers (2001) summarises the core of the theory in the following way:

- Corporations prefer internal finance.
- The targeted dividend ratio is justified to the investment opportunities, nevertheless the management cares of flatting the fluctuation of dividend payment.
- With a rigid dividend policy, the unforeseen fluctuation of profit and investment opportunities results in the free cash flow being sometimes higher, sometimes lower than the capital expenses. If the free cash flow is more, the company repays the debt or invests in marketable securities; if it is less, the company uses its reserves or sells its securities.
- If the company needs an external source of finance, the company issues the most secure paper first, issues corporate bonds (raises a loan), then issues a hybrid paper like a convertible bond. The higher the riskiness of the assets, the higher the probability of financial distress. If there is no further space to borrow, and the potential cost of financial distress is significant, then it supplies the additional financial needs from share issue.

In the pecking order theory, there is no optimal liability/equity ratio. There are two types of equity: external and internal. The external equity (share issue) stands at the bottom of the hierarchy, the internal equity (retained profit) is on the top of it. The size of liabilities

mirrors the cumulative needs for external sources. However, there is a threshold of the liabilities' size, and if the needs exceed this, the company issues shares.

The pecking order theory has got an alternative starting point, namely, if the companies want to minimise the transaction cost of financing. This viewpoint is neglected in the professional literature, but I find it important to express this idea, because I think that the minimising of transaction cost has explanatory power in fact. In this approach, the enterprises choose at first those financing sources whose transaction costs are smallest, and turn only to new sources if the former sources are exhausted. There is a strict hierarchy among the sources (Brealey & Myers, 1992). The order of the main financing sources in this theory is the following:

1. Internal sources
   - 1.1. Retained profit
   - 1.2. Depreciation
   - 1.3. Decrease in working capital
   - 1.4. Sale of fixed assets
2. External sources
   - 2.1. Liabilities
     - 2.1.1. Sources from the trading cycle
       - 2.1.1.1. Account payable, bill of exchange
       - 2.1.1.2. Tax- and labour cost commitments
     - 2.1.2. Indirect liabilities
       - 2.1.2.1. Bank loan, bill of exchange discounting
       - 2.1.2.2. Factoring
       - 2.1.2.3. Leasing
     - 2.1.3. Direct liabilities
       - 2.1.3.1. Bond issue
   - 2.2. Equity
     - 2.2.1. Share issue

Thus, the company orders its sources by their transaction costs and calls on the following sources if the former sources are exhausted (Brealey & Myers (1992)).

The financial manager firstly chooses between the internal and external sources. Internal sources are those incomes, which come from the operation of the company. The external sources are provided by an external entity.

Internal sources come from the company's realised net revenue and other incomes. If we deduct the payable cost and expenses from the realised, collected revenue, we receive the internal sources. By another approach the internal sources are the sum of the retained profit, the depreciation and the potential asset sale. Here firstly the cash inflow from decrease of claims, stocks and receivables should be considered as asset sale, secondary the income from real estate, equipment and vehicle sales.

1. The main advantage of internal sources is that their transaction cost is zero.
2. There is no return expectation determined by a contract – as opposed to a loan – so if business is bad, its financial position will not be worse.
3. Internal sources are eternal sources; they are not burdened by repayment obligation.

However, it is not true that internal sources are cheap sources. The internal source is the money of the shareholders, and shareholders require the return of equity. Some managers tend to forget this and, since they have no valuable investment opportunities, they accumulate an insufficient stock of cash and securities. These assets do not earn so high a return, meaning that return of total assets decreases, thus the return expectations of shareholdrs are also reduced. These companies could become takeover targets.[2] Considering this, here is good advice for the company managers:

1. If the company has got too many sources, and they cannot be reinvested with higher return than its Weighted Average Cost of Capital (WACC), then the company should pay back its loans or pay dividends to the owners. Money should be saved, if the investors can be convinced that the money is needed for future profitable investments. The success of this effort can be measured by the share prices.
2. If the share price doesn't increase, the company has not successfully communicated that future acquisitions require a high cash reserve; the company risks a hostile takeover.

The big problem with using internal sources is that their size is limited for a rapidly growing company.

In the pecking order theory, the company turns to external sources if its internal sources cannot meet the financing needs. The external sources can be split in two parts – liabilities and new equity. The liabilities should be paid back sooner or later. Their most typical type is the bank loan. Equity does not need to be paid back; it is available till the liquidation of the company. A typical example of new equity is a share issue.

It could be surprising, but in the pecking order theory, if the indebtedness of the company is not high, liabilities are preferred against equity. The arguments of the pecking order theory in favour of liabilities are the following:

1. Dilution effect – This is the viewpoint of owners. If they issue new shares, the share of existing shareholders will decline. By decreasing ownership share their influence over management also declines, and so does their share in dividend income.
2. The owners' return expectation is always bigger than that of the creditors, because the owners bear higher risk. That is why the company can get a larger amount of loan than equity for a given amount of return. The equity risk is bigger for three reasons:
   a. The yield of a loan is fixed in a contract, while the yield of equity depends on the future performance of the company.
   b. The principal of a loan will be paid back sometime in the future. The equity invested in an enterprise can be withdrawn only after the liquidation of the company. The equity share can be sold earlier to another investor, but the big question here is the price.

[2] *We can find examples of the above phenomena in the Hungarian economy realised by leverage buyout.*

c. During a liquidation process the creditors are advanced against the owners. After satisfying the creditors the owners very often receive nothing.

3. Convincing new potential owners to buy shares requires much more money and energy and the process takes much more time due to the higher perceived risk. Consequently, the transaction cost of equity is much larger than the transaction cost of liabilities.

***Loan ratio as the signal of the company's future opportunities***

Loan ratio is the second classical model based on asymmetric information. This examines how the leverage can forecast the company's future market position.

(Ross 1996) can be considered as a pioneer achievement. It supposes two types of companies:

- Company type A has got high leverage and excellent asset quality
- Company type B has got low leverage and worse asset quality

The companies plan to carry out several projects with positive net present value. If a company seems to be an A type due to its leverage, it can raise loans up to the Gros Present Value (GPV) of its new project, unless it goes bankrupt. The same is true in case of a B-type company. This ensures the equilibrium circumstances, supposing that neither of the companies wants to send incorrect signals. If a company A showed itself as being of B type, then it would raise a limited amount of loan, but this will not be enough to accomplish all its projects. But if a type-B company showed itself as an A type, and raises more loans, it would go bankrupt. Ross assumes that the managers have no got share in the companies. Ross deducts three important consequences:

- The Modigliani&Miller irrelevance theory (Modigliani & Miller 1958) repeats, in that the cost of equity is independent from the financing decision regardless the companies' leverage.
- The probability of bankruptcy increases with increasing leverage.
- There is a positive correlation between the value of the company and the leverage: the firms with high ratings raise more loans.

*Herd mentality – Static financial leverage management*

Companies follow other companies when determining their leverage. For example, a pharmaceutical company chooses low leverage, similarly to the other pharmaceutical companies. This assumption is justified by empirical studies. A company of a given industry does not differ significantly from the industry average. If we see what the major factors are that determine the leverage, then the most influential factor is the sector of the company.

It is important to note that it could be dangerous to imitate the financing behaviour of fellow company if there are big differences in the industry in point of growing opportunities and risks. Then there are big differences in leverage, too. Secondly, if the given industry is going through transformation, the leverage should be changed, too.

We should also note that the stock exchange rewards the herding behaviour, so the ordinary invertor appreciates those investment targets whose leverage is close to average. If the investor is risk averse, he/she appreciates investment opportunities that do not consist of any abnormalities (Jaksity 2004).

# INTRODUCTION OF THE CORPORATE DATABASE

The empirical research is based on a database containing the annual balance sheets and income statement figures of the 5,000 largest Hungarian companies by their net sales between 2008 and 2014. Aggregated sector data are available; the database does not contain individual data. The sectorial identification of company clusters has been made by TEÁOR 08 codes[3]. The company data of the service sector were analysed from the database. I have chosen this sector because its weight and role show an increasing trend in current society, while the weights of the other sectors (agriculture, industry) have decreased in the previous years and decades. This paper examines the corporate structure influencing factors of the nine service sectors given in Table 1.

*Table 1*
*The distribution of the examined database by service sectors*

| Service subsector | Proportion in database (%) |
|---|---|
| Freight, warehousing, post, telecommunication | 27.6 |
| Accommodation, hospitality | 5.7 |
| Amusing, cultural and sport services | 5.2 |
| IT services | 8.5 |
| Financial services | 12.1 |
| Real estate services and estate rent | 12.6 |
| Services supporting economic activities | 16.3 |
| Education, research | 2.9 |
| Other services | 9.2 |
| **Total** | **100.0** |

Source: Own calculation

[3] *TEÁOR is the business sector classification system used in Hungary.*

The weights were determined by the number of companies. As we can see, the category of Freight, warehousing, post, telecommunication has the highest ratio. The areas of Economic services (including legal, accounting, tax advising, HR and administrative services), Real estate services and estate rent and Financial services also make up substantial parts of the database.

## HYPOTHESES OF RESEARCH

The paper of Katits &Szemán (2017) can be considered as the antecedent of my research. The authors prepared an analysis of the capital structure of Hungarian corporate sector between 1993 and 2014. The paper stated that the Hungarian enterprises generally increased their leverage in booming period and decreased in recession. Furthermore, the paper found a negative linkage between the profitability and the leverage of the economic sectors. The Hungarian enterprises tried to keep the maturity matching. This work continues to focus on the service sector because of its importance, focusing on the period between 2008 and 2014. I kept in mind that the results of examined hypotheses should be focused from the breaking out of the economic crisis to the latest available data.

*Profitability* – Test of Pecking Order and Trade-Off Theory

*Hypothesis 1: There is negative relationship between the profitability and capital leverage of service subsectors, so if the given subsector is more profitable than the average, its capital leverage is less; if, however, its profitability is lower than the average, it is forced to borrow more money.*

I assume the relevance of the *Pecking Order Theory*, which explains the fact that most empirical studies have detected a negative correlation between these two factors (e.g., Booth et al. 2001; Szemán 2008). Sufficient internal sources are available for profitable companies, so the capital leverage is lower, since the request for external sources is lower.

The *Trade-Off Theory* states that the higher the profitability of the company, the higher its tax shield potential, so this corporation will raise its leverage. Since there are no available individual company data, only aggregate sectorial data, only the service subsectors can be compared with each other.

*Relationship between the liquidity and the capital leverage* – Test of Pecking Order and Agent Theory

*Hypothesis 2: The better the liquidity of the service subsector, the lower its capital leverage.*

There are several scientific views relating to the liquidity in the theories of capital structure. The *Pecking Order Theory* – which is supported by several empirical studies – states that the companies with high liquid asset stock finance their investments from mobilising their liquid assets, and neither borrow nor raise capital. Some researchers argue that only companies whose current ratio is high have a good chance to borrow money, since they can repay their liabilities to the bank.

The *Agent Theory* also deals with the issue of liquid assets, arguing that borrowing forces the company to make continuous interest and principal payments, so it can help to control the managers (agents). From this reasoning, the aim is to decrease the level of liquid assets and increase the capital leverage.

I have chosen my hypothesis from the *Pecking Order Theory*, because its view is closer to the Hungarian historical tradition and mentality, companies could turn to loans provided by banks, if they could not realise their aims due to their limited liquidity.

*Examination of maturity matching*

*Hypothesis 3: Hungarian service sector companies keep the principle of maturity matching, namely they finance their current assets from current liabilities and their non-current assets from equity and non-current liabilities.*

Maturity matching means that the company strives to match the maturity of its liabilities and the used time of their assets. To create a financing strategy, it is important to consider the basic rule that the non-current investments should be financed from equity and non-current liabilities (loans, bonds), while the financing of current assets is made from current liabilities. In frame of investigating this hypothesis I examine whether the Hungarian service companies keep this rule. Earlier empirical research proved the relevance of maturity matching (Szemán 2008).

## EXAMINED VARIABLES

In this part, I present the applied indicators (dependent and independent variables) of my hypothesis tests. Naturally I know that the capital leverage as a dependent variable is determined by the company management, and its decision is substantially influenced by the current state of the company, which is reflected in the various financial indicators. Consequently, the independent variables and the dependent variable should have some degree of connection, and my aim is to detect how they connect.

*Indicator of capital leverage (dependent variable):*

One of the dependent variables is the ratio between total liabilities and equity:

- *Capital Leverage: Total Liabilities/Total Equity.* This ratio contains not only the non-current but also the current liabilities. It measures the general indebtedness of the company and shows what percentage of liabilities is covered by the equity capital.

As the classical capital structure means the ratio between equity and the non-current liabilities, most empirical research uses the non-current liabilities in the dependent variable (e.g. Baloghné Balla 2006). So, one of the capital leverage indicators used here is the following:

- *Capital Leverage2: Non-current liabilities/Total assets*. This is one of the "classic" indicators of capital structure. Its nominator contains only the non-current

liabilities, while the denominator is the total assets. It shows the share of non-current liabilities within the total sources of the company and reflects the solvency of the company and its access to credit.

*The variables of influencing factors (independent variables):*

- *Profitability:* Return on Assets (ROA) = Earnings Before Interests and Taxes (EBIT) / Total Assets
- *Liquidity:* Current Assets / Current Liabilities
- *Maturity matching:* Fixed assets / (Total Equity + Non-Current Liabilities)

The examination among variables was made with SPSS 22.0. Considering the limited number of observations, scatter plot charts were made and regression lines were fitted in them.

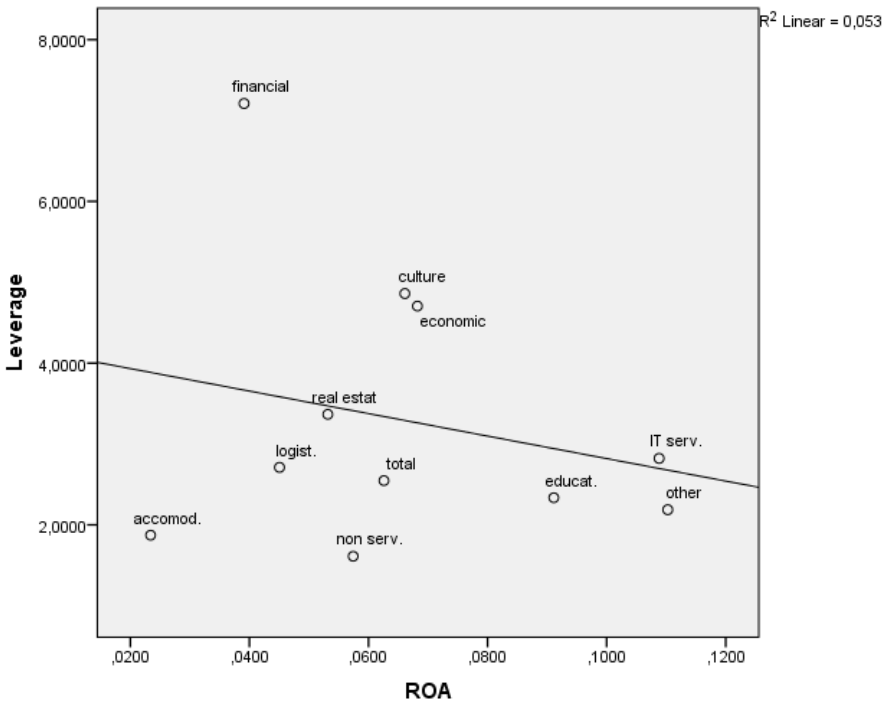
# RESULTS

*Hypothesis 1: There is negative relationship between the profitability and capital leverage of service subsectors, so if the given subsector is more profitable than the average, its capital leverage is less, if however, its profitability is lower than the average, it is forced to borrow more loan.*

This hypothesis examines the linkage between profitability and capital structure. To test this hypothesis the following indicators were used:

- *Profitability indicator: ROA= EBIT/Total assets*
- *Capital Leverage = Total liabilities/Total equity.*
- *Capital Leverage 2 (Leverage2) = Non-current liabilities/Total assets*

The EBIT as profit category was chosen instead of net income because the amount of EBIT is neutral to the financing structure, namely the interest expense decreases the net income, but leaves the EBIT untouched. However, the larger the EBIT is, the bigger is the net income ceteris paribus (Bozsik 2017). Figure 1 shows the linkage between ROA and Capital Leverage:




Source: own calculation based on TOP5000 data

*Figure 1. -Linkage between ROA and Capital Leverage*

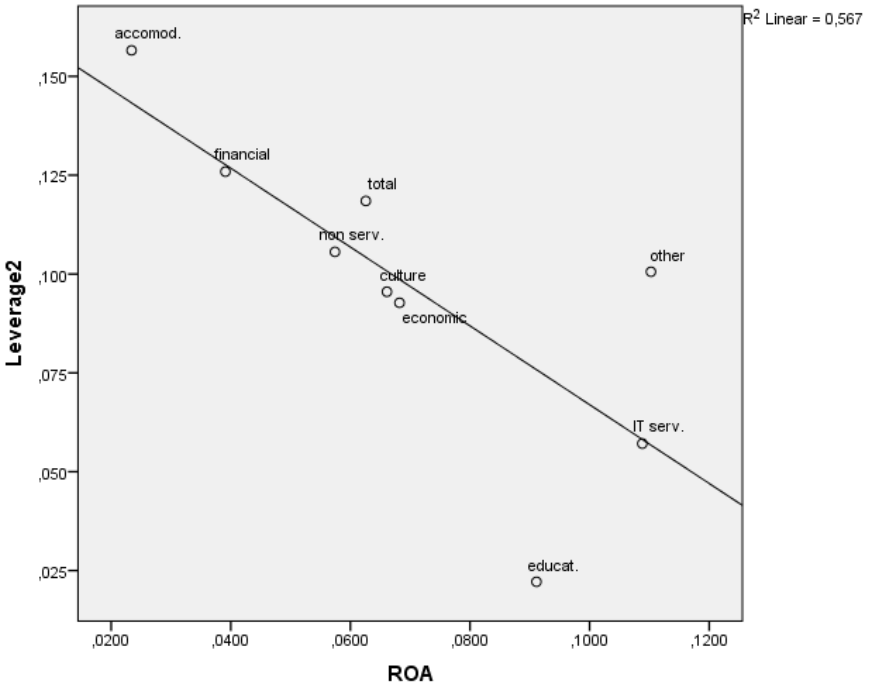
Analysing the figure, we can state that there is a weak negative relationship between the ROA and the Capital Leverage ratio. The low level of R2 indicator also reflects this. Thus, no meaningful linkage was found between the profitability and the overall indebtedness in the Hungarian service sector. The profitability does not influence significantly the company's liabilities.

The linkage between ROA and Capital Leverage2 (Non-current Liabilities / Total Assets) shows larger negative correlation.

Figure 2 shows the relationship between ROA and Capital Leverage2 excluding the real estate and the logistics sectors which proved outliers. The reason for this may be the special financing structure of these two sectors. The real estate companies build offices and flats and

finance them from borrowing. Real estate is perfect collateral. It is marketable, its market price can be precisely determined, it cannot be stolen and the mortgage right can be easily validated. The banks gladly finance this sector. The logistics sector uses vehicles, and here leasing is the ruling form of finance. The vehicles are also perfect collateral for leasing, since they are insured against damage and theft and if the company does not pay the leasing fee, the vehicle quickly returns to the lessor, while the vehicle remains in the lessor's possession during the leasing contract.

To sum up, the logistics and real estate sectors seem not to follow Hypotheses 1; they both offer perfect collateral for lending, so they are able to borrow at a low interest rate due to their negligible risk.




Source: own calculation based on TOP5000 data

*Figure 2. – The linkage between ROA and Capital Leverage2 excluding real estate and logistic sector*

As can be seen, the figure indicates a strong connection between the profitability and capital structure, which supports the Pecking Order Theory.

Summarising the results, the examination supports the hypothesis only in case of the Capital Leverage2 indicator and the profitability. The reason could be that the Capital Leverage includes the current liabilities, but the size of current liabilities is probably determined by the maturity matching principle (examined later) rather than the profit consideration.

*Hypothesis 2: The better the liquidity of the service subsector, the lower its capital leverage.*

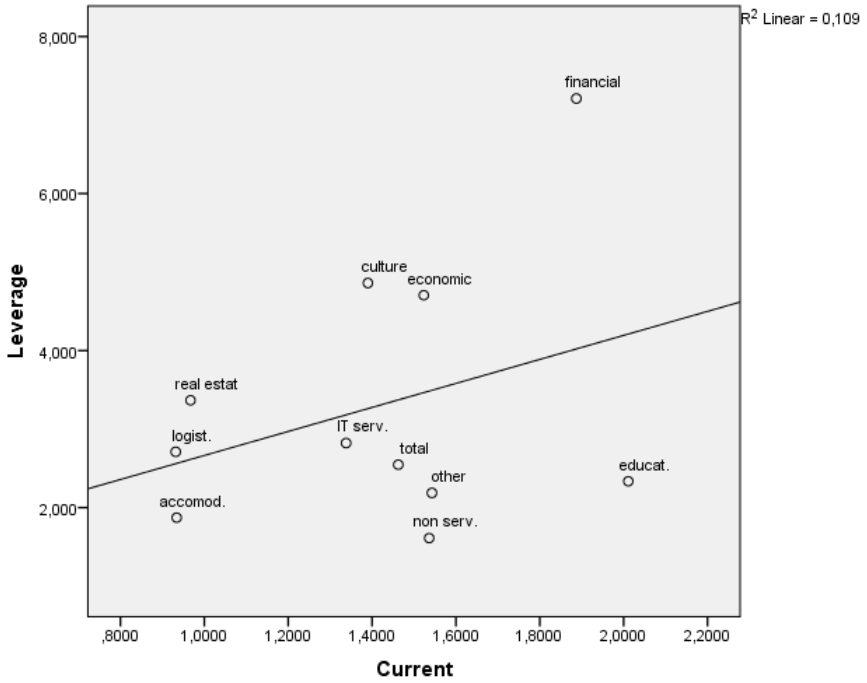
To test this hypothesis, the relationship between the current ratio and the capital leverage ratios was examined.

The current ratio was calculated for the 9 subsectors in the following way:

*Current ratio = Current assets/Current liabilities*

By studying this ratio, we examine whether the company is meeting its current payment commitments by liquidating its current assets. The current assets can be – theoretically – converted to cash in one year to pay the short-term liabilities. However, the too-high value is optimal only for creditors, because the return of current assets is generally significantly lower than or equal to the return of fixed assets, thus a too-high ratio of current assets decreases the overall return of the total assets. In addition, the high value of this ratio does not assure the company's liquidity, since part of current assets is practically permanent assets. However, a figure of less than 1 does not certainly indicate a prompt insolvency; during the continuous operation, if the turnover of the current assets is high enough, an elevated level of current liabilities can be managed.

The linkage between Current Ratio and Capital Leverage is shown in Figure 3.

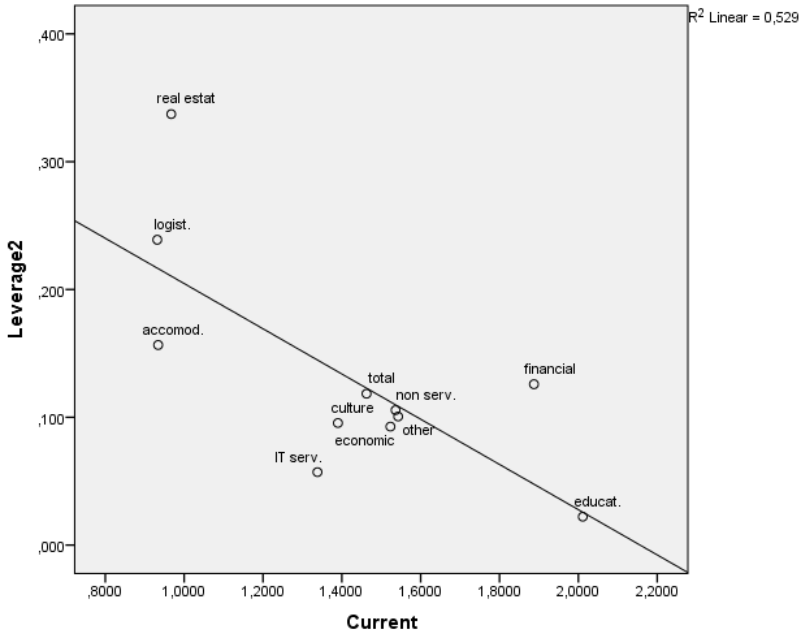



Source: own calculation based on TOP5000 data

*Figure 3. – The linkage between Current Ratio and Total Liabilities/Total Equity*

The chart doesn't prove any connection between the Current Ratio and Capital Leverage, especially if we neglect the financial sector. The very low value of the R2 indicator (excluding the financial sector, the R2 is practically zero) supports this statement. Thus, there is no observable connection between the overall indebtedness and the liquidity of the company. The liquidity does not influence the overall debt of the company.

Now let's look at the connection of the Current Ratio with the second indicator of capital leverage (Non-current liabilities/Total assets) in Figure 4.




Source: own calculation based on TOP5000 data

*Figure 4. – The linkage between Current Ratio and Capital Leverage2*

As can be seen, a much stronger negative linkage can be identified between the two variables. Highly liquid companies use lower long-term liabilities than companies with smaller liquidity. This result supports the Pecking Order Theory. The liquid companies may finance part of their investment by liquidating their current assets, which is part of their internal source of finance. Summarising the results, there is no observable connection between the overall indebtedness of the company and the liquidity; however, a strong linkage can be seen between the long-term debt level and the liquidity. The higher is the Current Ratio, the lower is the share of long term debt in the financing mix, which supports the relevance of the Pecking Order Theory.

*Hypothesis 3: The Hungarian service sector companies follow the principle of maturity matching; namely, they finance their non-current assets from equity and non-current liabilities and their current assets from current liabilities.*

Historically the question of maturity matching was an interesting issue. In the 1990s non-current source of finance were very limited, considering either equity or the non-current liabilities. However, times have changed, and Hypotheses 3 supposes that this scarcity – due to privatisation and with the strengthening two-tier bank system – is over.

The calculated indicator in the service sector is the following:

*Non-current assets / (Total equity + Non-current liabilities):* This indicator informs us about the share of long term financing funds in the financing of non-current assets.

If the indicator is lower than 1, the company has extra non-current funds for financing its permanent current assets, and consequently it follows a conservative financing strategy. If the indicator is higher than 1, the amount of non-current assets exceeds the size of non-current financing sources, so the company follows an aggressive financing strategy. The results are plotted in Table 2.

*Table 2*
*The indicator of Non-Current Assets / (Total Equity + Non-Current Liabilities) between 2008 and 2014*

| Maturity matching | 2008 | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 | Average |
|---|---|---|---|---|---|---|---|---|
| Other | 0,91 | 0,92 | 0,83 | 0,78 | 0,88 | 0,74 | 0,68 | 0,82 |
| Economic | 0,62 | 0,71 | 0,77 | 0,64 | 0,57 | 0,59 | 0,62 | 0,65 |
| Real estate | 1,25 | 1,37 | 1,19 | 1,16 | 1,13 | 1,08 | 1,00 | 1,17 |
| IT services | 0,57 | 0,68 | 0,61 | 0,80 | 0,79 | 0,90 | 0,83 | 0,74 |
| Education | 0,85 | 0,58 | 0,75 | 0,58 | 0,59 | 0,99 | 0,65 | 0,71 |
| Financial | 1,64 | 1,68 | 1,75 | 2,16 | 2,37 | 1,99 | 1,92 | 1,93 |
| Accomodation | 1,03 | 0,58 | 1,16 | 1,03 | 1,00 | 0,95 | 0,89 | 0,95 |
| Logistic | -0,27 | 1,36 | 2,25 | 1,16 | -0,77 | 1,00 | 1,07 | 0,83 |
| Cultural | 0,70 | 1,10 | 0,88 | 1,18 | 1,23 | 0,80 | 0,86 | 0,96 |
| **Total** | **0,77** | **0,90** | **0,98** | **0,93** | **0,80** | **0,89** | **0,86** | **0,87** |

Source: own calculation based on TOP5000 data

The Financial sector is an outlier, and its non-current sources are very limited, since the deposits are mostly short-term. The Logistics sector's negative equity underwent very extreme volatility during the period. The rest of the service sector generally follows a conservative financing strategy, so the service sector does not bear high financial risk in Hungary. Especially conservative are the Education and research and the IT sectors. Only the Real estate sector had a ratio higher than 1, but the value of its aggressive strategy continuously decreased during the period. The Culture sector had a ratio with relatively high volatility whose value was over 1 in 2011 and 2012.

To sum up, the service sector generally followed the maturity matching principle.

## CONCLUSIONS

Based on the TOP5000 corporate database between 2008 and 2014, the aggregate figures of service sector have supported the Hypotheses 1, 2 and 3.

*There is a negative linkage between the profitability and the capital leverage of the service sector*, thus if the companies have available internal sources – which is mostly determined by the profitability of the company – then the companies use these sources rather than borrow money. However, these linkages can be only proved for the indicator Capital Leverage2, except for Real estate and Logistics services, which are outliers. The facts generally support the relevance of Pecking Order Theory rather than the Trade-Off Theory.

*The larger the liquidity of the sector, the lower its capital leverage.* A negative linkage can be found between

the Current Ratio and Capital Leverage2. Here the real estate sector was the outlier. The facts also support the relevance of the Pecking Order Theory against the Agent Theory.

*The Hungarian service sector companies generally follow the maturity matching principle, i.e. they finance their non-current assets from non-current sources, namely from equity and from non-current liabilities.* The overall financial strategy of Hungarian service sector companies in one subsector, real estate and rent, became more conservative during the 2008-2014 period. This tendency can be explained by the increasing role of equity in finance.

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# To What Extent is Hungary a Knowledge-Based Economy?

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*SUMMARY*

*While we can generally see a decline of the share of industry, parallel to this trend the Visegrad countries are taking over more industrial production (mainly assembly). This will reduce the requirements for innovative knowledge workers. This "over-industrialisation" has led to a dual economy, in which domestic companies compete by utilising the comparative advantages of a cheaper labour force. In fact, products whose comparative advantages do not decrease as the development gap narrows are needed for sustainable economic development. If we continue to hinder the development of non-material services this way, then by decreasing innovative capacities we shall get deeper into the trap of dependent market economies.*

*Keywords: knowledge content, realisation of comparative advantages, upgrading the factors of production, knowledge capital, dependent market economies*

*Journal of Economic Literature (JEL) codes: E20, E21, F43, F62*

*DOI: http://dx.doi.org/10.18096/TMP.2017.01.06*

## INTRODUCTION

For centuries the greatest problem associated with the evaluation of Central and Eastern European (CEE) economies is that, although these countries follow the development of Western European nations in many aspects, they never do it effectively enough so that the accepted social and economic remedies can resolve their most pressing social concerns. As a consequence, a political reaction always arises that attacks the Western European paradigms and tries to replace them with other ones.

These developmental international arrangements always take into account mutual interests, but it can be debated whose interests will be best (or better) served. There are no clearly established rules in a "win-win" situation to determine how much one party gains compared to the other. It may happen that such an international arrangement causes unforeseen damage to one of the party's interests in the long run. As the results are only *partially* successful, the solutions can always be attacked by saying that they serve only the interests of Western Europe.

These unsatisfactorily-resolved social problems will lead to discussions, fights, and developmental detours, and they are accompanied by significant social loss. The goal of this paper is to help to minimise these losses, because in the long run the nations of Europe have a common, interdependent fate.

## THE LONG-TERM CONSEQUENCES OF AN INADEQUATELY THOUGHT OUT "WIN-WIN" SITUATION

If we look at the change in the structure of consumption of the European countries, we see a clear decline in the shares of traditional sectors (agriculture and industry) and an expansion in the share of non-material sectors.[1] This statement can be amplified by a further important observation: these changes in the consumption structure are proportional to the economic development level of each country. The more developed a country, the more its traditional industries shrink, and the greater the role of non-material services in its economy. CEE fits naturally into this process.

[1] *The actual pattern of consumption and production is shown in Figures F.1 and f.2 in the Appendix*

If we examine the long-term transformation of the production structures in Europe, the picture is not the same for each country. The Visegrad countries are taking over more and more specific types of industrial production (mainly assembly) from the developed European centre. Thus, the share of industry in their production structure is higher than what their economic development would justify. This difference is a consequence of the realisation of the comparative advantages in foreign trade. Its mechanism is presented in Figure 1.

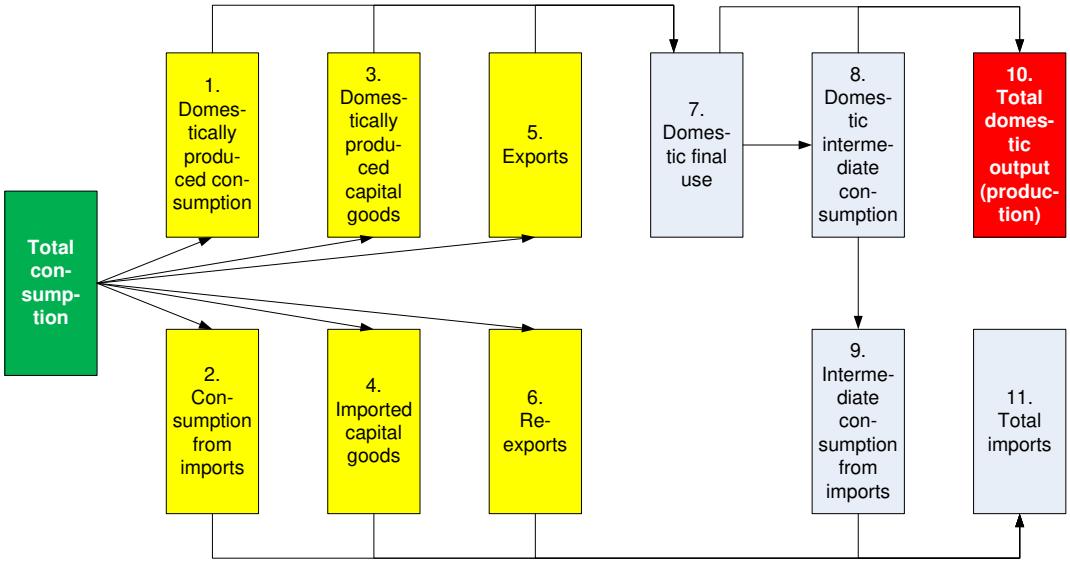



*Figure 1. Decisions that detach the production structure from consumption structure with the help of foreign trade*

If there were no foreign trade, then we ought to produce what we consume. So the production structures would closely fit the consumption structures. This link can be loosened by deciding what we are going to produce ourselves, and what we would like to import (Boxes 1-2). However this decision requires further decisions. It must be decided what exports will offset the consumption of imports (Boxes 5-6). To produce goods for both consumption and export we need capital goods, so we should also decide what kind of capital goods we are going to produce or import (Boxes 3-4). Only after these decisions can we determine the domestic final use (Box 7). But the enterprises delivering the products for final use will order from other companies, and that multiplies the domestic final use, and this intermediate use will require additional imports as well (Boxes 8-9). So the domestic production of a country is the total of the boxes of the upper row and the imports of the country by summation of the boxes below. These are the decisions that increase the shares of certain sectors in the production structure, while others are reduced.

It is important to note that these decisions are made by the state and the companies together. If the state limits or bans the import of certain products, then it promotes domestic production. In this case the companies mainly concentrate on developments where they are allowed to. If there is no state intervention, then comparative advantages will govern the enterprise decisions. This leads to the known general case where, in the more developed, more industrialised countries, the production of industry exceeds domestic consumption of those products. However, it is also true that as economic development advances, the share of industry within such a country's production shrinks, and these countries will concentrate their domestic activities in ever increasing proportion into non-material services.

This process can be described as classic modernization. People increasingly consume IT and business services, educational and health services, and sophisticated administrative services. These services are often very complex in content, and they require significant allocations of resources for their production. In addition, modern agriculture and industry need scientific services, without which their development would halt and their effectiveness decrease. All these activities are non-material services, the increasing share of which we are speaking about.

This process is also going on in Central and Eastern Europe, but somewhat distortedly. The share of the region's industry is greater than its economic development level justifies, and accordingly the share of non-material services is less. This process is led by the Czech Republic, followed closely by Slovakia and Hungary.

We should mention that in Hungary a very simplified interpretation of what it means to be "productive" has recently been revived, according to which only agriculture and industry can be regarded as productive. In the history of Hungarian economic science, there was a discussion in

the 1970s when, in accordance with international developments, a different, more modern concept was formulated in which anything that generated income was designated as productive. Outdated views have been revived because the "over-development" of industry had to be explained somehow. This word – "over-development" – is an important concept of study. It does not mean that industry should not be developed, but that "over-development" must be re-thought. Is it good for the Visegrad countries if they raise the proportion of their industry significantly higher than is justified by their economic development, while the non-material sphere's development is slowed down? Why may the "overdevelopment" of industry be a problem?

Figure 1 shows just how one should define the requirements for capital goods in the production process. However, for production, headcount is also needed, which requires equivalent investment mainly in education and healthcare. It can be proved that these human investments are less if the share of industry is greater. This is shown in Figure 2.

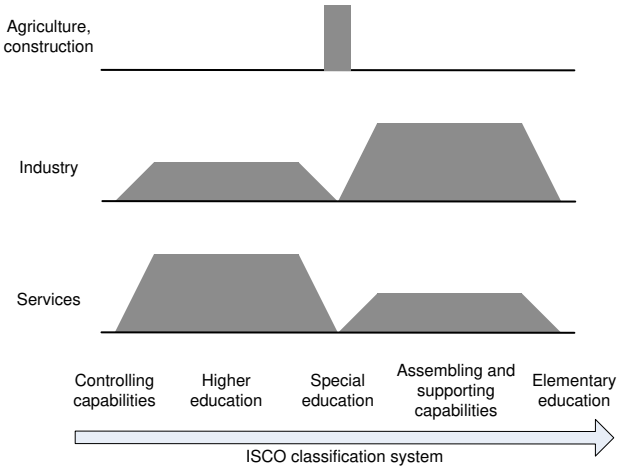



*Figure 2. The human investment requirements of different industries*

Based on the labour and production statistics of EUROSTAAT, industries can be divided into three groups according to their labour requirements per unit of production, both in the developed and in the Visegrad countries.

- To the first group belong the *specialised* sectors such as agriculture, construction, and trade. These are very ancient industries where human work has been gradually replaced by capital. They mainly require labour that is equipped with specific knowledge characteristic of these industries. So agricultural companies mainly require skilled workers in agriculture, trade companies need workers specialised in trade, etc. This is illustrated by the single histogram which rises at the special education section of the horizontal axis. The flat horizontal line indicates that there is no significant need for workers from the other educational groups.
- The second group includes the *traditional complex* sectors, for example, industry. All kinds of expertise are needed, but the pressure to increase profit by increasing productivity forces enterprises to replace expensive, highly skilled workers with capital and to increase the number of cheap assembly workers whose main task is to operate machinery. Over the long term this leads to an industrial specialisation with not-too-high, special vocational educational needs. It can be proved statistically that the majority of the people employed in the industrial sector are less educated skilled workers and assemblers, and there is a tendency to outsource the highly educated employees into the sector of non-material services. This is illustrated by the shape in the middle of Figure 2, where the rhombus of highly skilled workers is lower than that of the less educated workers. (at the bottom of Figure 2 the arrow symbolises falling educational needs).
- Finally into the third group are classified the emerging industries that offer a foundation for renewal. Here the employees face complex problems that can be solved only by higher and more general knowledge which fosters high-level innovation. Here the heights of the rhombuses are just the reverse, regardless of whether this relates to the Czech Republic or Germany.

It is logical that new activities always need more work and are more knowledge-intensive. Accordingly, the process of specialisation requires average skills and knowledge.

Using Leontieff's open-static input-output model, the author made calculations to quantify the impact of assembly-type industrial overdevelopment on the required human investments. The results are summarised in Figure 4.

These computations need rather large data samples and intensive processing. From the OECD input-output database we take the input-output tables for around 20 countries. From their "B" type domestic table we deduct their domestic final use vectors and their Leontieff inverse matrices. With their help, we build the equation

$$\mathbf{Q^? y^? = x^?}$$

for each selected country noted by **?**, where **?** is **HU** for Hungary, **SK** for Slovakia, **CZ** for Czech Republic, **PL** for Poland, **FR** for France, **GE** for Germany, **AU** for Austria, and **SE** for Sweden. In this equation

$\mathbf{Q^? = [E-B^?<x^?>^{-1}]^{-1}}$, where $\mathbf{B^?}$ is the matrix of domestic intermediate use,

$\mathbf{x^?}$ is the vector of production, and

$\mathbf{y^?}$ is the vector of domestic final use.

The equation $\mathbf{Q^H y^H = x^H}$ demonstrates the computation of $\mathbf{x^H}$, the Hungarian production vector, as a function of $\mathbf{y^H}$, the Hungarian domestic final use vector.

In the next step, from the domestic final use vector of each selected county we calculate a modified domestic

final use vector whose structure is the same as in the original final use vector, but its total is equal to the Hungarian final use vector's total:

$$\mathbf{y^?} = \mathbf{y^?}\ (<1'\mathbf{y^H}> /<1'\mathbf{y^?}>)$$

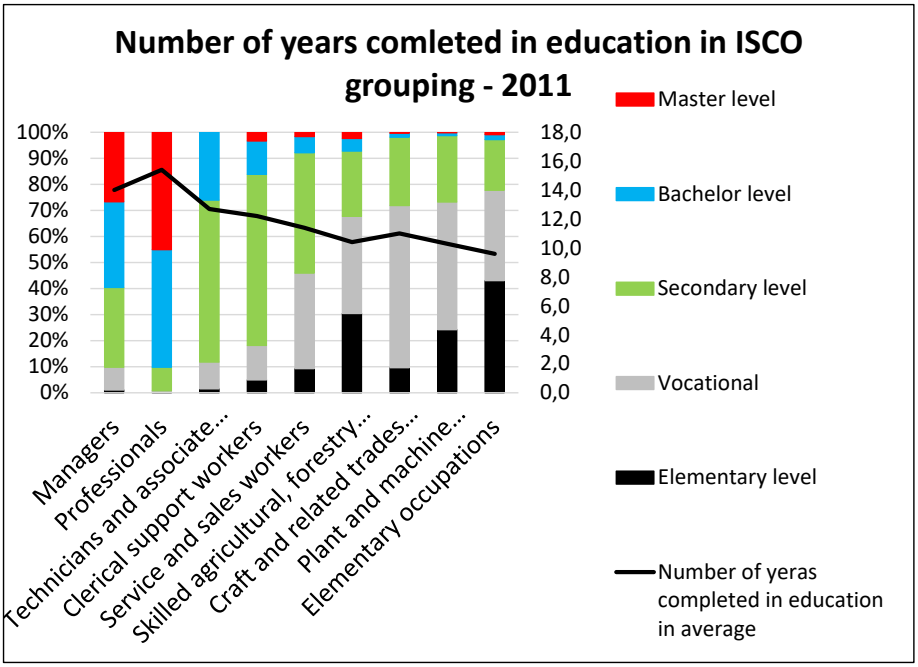
Then we calculate a production vector as the product of the Hungarian Leontieff inverse and the modified domestic final use vector in the following way:

$$\mathbf{x^?} = \mathbf{Q^H y^?}.$$

The result $\mathbf{x^?}$ shows what would be Hungary's production by sectors if Hungary had the **?** selected country's domestic final use structure.

Then we take the matrix $\mathbf{F^H}$ of Hungarian employment, having an ISCO x INDUSTRY structure, whose **ij**-element shows how much labour is needed for the production of industry **j** with the qualification **i**. But this data does not reflect well the human investment requirements, because they are expressed merely in the numbers of persons. It does not take into account that a highly skilled worker studies on average 15 and a half years, while an assembler only 10.3 years (See Figure 3).

Therefore, from the $\mathbf{F^H}$ employment matrix we create a $\mathbf{T^H}$ knowledge matrix by multiplying each row of $\mathbf{F^H}$ by the average number of years people should spend in study to get the appropriate ISCO classification. So $\mathbf{T^H}$ is an ISCO x INDUSTRY matrix whose **ij**-element shows that for the production of industry **j** how many years should be spent in different schools to get the ISCO classification **i**. This way the headcount requirements are modified to better express the necessary investment in education.




Source: Lakatos 2015

*Figure 3. Schooling structure in different occupations*

Then we determine the

$$\mathbf{T^?x^?}$$

product which shows how Hungary's learning demands (practically equivalent to knowledge demands) would evolve if Hungary had the domestic final use of country **?**.

The results are shown in Figure 4. The *HU HU* values show the actual Hungarian data. The *CZ HU* values indicate that Hungary could have the same output with less knowledge if it took the Czech domestic final use structure. However, if Hungary would approach the domestic final use structure of the more developed countries, then the country could get into trouble, because more knowledge would be required.

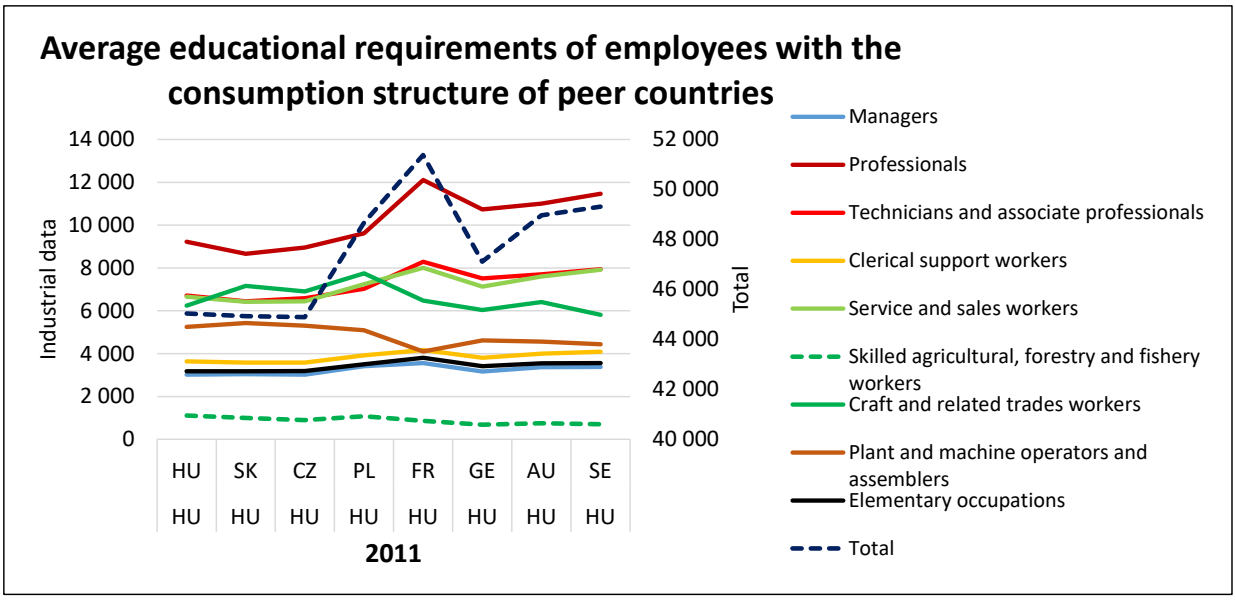



*Figure 4. Knowledge requirements of Hungarian employment in case of takeover of the domestic final use structure of some selected developed countries*

The number of assemblers on the Slovak and Czech paths would not decrease, however, in all other cases it would. Fewer highly skilled people would be required in the case of "over-industrialisation," while significantly more would be necessary if we follow the developed countries. Otherwise, the results of calculations can be understood even without input-output modelling. If the weight of industry in domestic final use is reduced, and the weight of non-material services is increased, then demand would increase for occupations which are necessary for the new types of activities. Vice versa: assembly type industry overdevelopment can reduce the requirements for highly educated, innovative knowledge workers. Of course it is a question whether this is good in the long run. It may prove to be a trap. Hereinafter I would like to investigate this issue on the micro level as well.

## THE REALISATION OF COMPARATIVE ADVANTAGES AND THE REDUCTION OF THE DEVELOPMENT GAP

If the CEE countries „over-develop," then it cannot be dismissed as a small problem. Complicated processes lead to this unfortunate outcome. These countries have democratic social systems. During the overdevelopment process, several governments succeeded each other in power. Obvious errors would have been easily eliminated by succeeding governments. There must be deeper causes if multiple governments support the same processes. Their goal must have been to utilize the comparative advantages as described by Ricardo. As a result of historical developments, during the transition from planned economies into market economies, the Central and Eastern European countries had one major comparative advantage: their medium-skilled, low-wage, but well-educated masses of workers. Obviously this had to be for sale if there was such a demand.

A leading Chinese economist, Justin Lifu Yin, named this pursuit of comparative advantage as the driving force of the renewal of China.[2] His views can be demonstrated by Figures 5 and 6.

[2] *See Lin 2012, Demystifying the Chinese Economy, pages 111-122.*

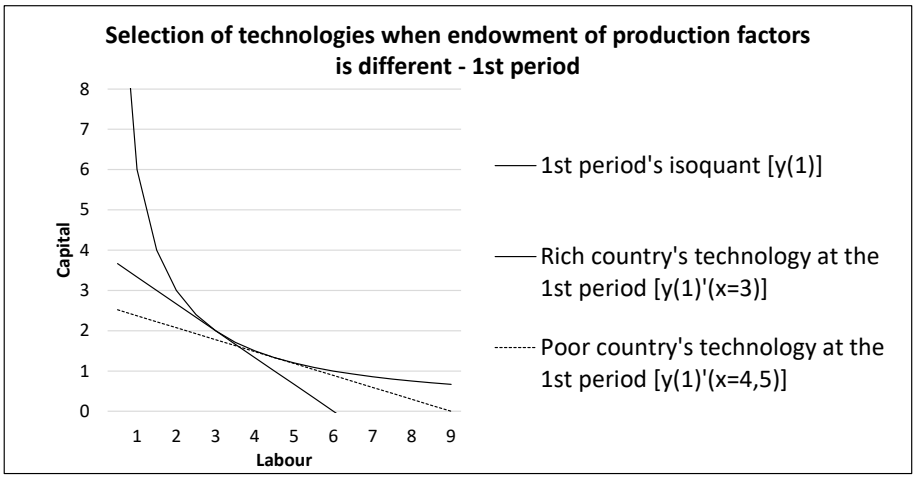



*Figure 5. Selection of technologies with different factor endowments*

**Explanation:**
m(1)R – the gradient of technology function of the rich country with minus sign;
m(1)P – the gradient of technology function of the poor country with minus sign;
m(1)R > m(1)P.

Lin (2012) claims that, at a lower stage of social development, producers are poorer and less able to accumulate. Richer societies are already advanced in accumulation. The enterprises of a rich country employ more machines and fewer workers. For them the red line represents the optimal technology, which in this example will work with 6 units of labour and almost 4 units of capital. For the companies of a poorer country, the capital is expensive and the labour is cheaper. Obviously they will select a technology with less capital and more labour, which in our examples requires 9 units of labour and two and half units of capital. The technology lines expressing their capital-to-labour ratios will touch the isoquant representing equal outputs of different capital and labour mix at different points.

This law can be generalised. With more labour intensive technology, the poorer country's poorer enterprises can compete with the rich country's richer enterprises. This shows the utilization of comparative advantages.

The theory of comparative advantages, however, deals only with factors that explain foreign trade. In his famous example, Ricardo explained why less-developed Portugal could produce more efficiently by exporting wine to England in exchange for imports of textiles, but he did not investigate the question of whether the development gap would be reduced between the two countries if both utilised their comparative advantages. According to Lin, however, this is possible if the poorer country's accumulation is quicker than that of the richer country. He named this process *upgrading the endowment structure*, which is the continuous and if possible quicker increase of the capital equipment of labour, i.e. capital used by one unit of labour.

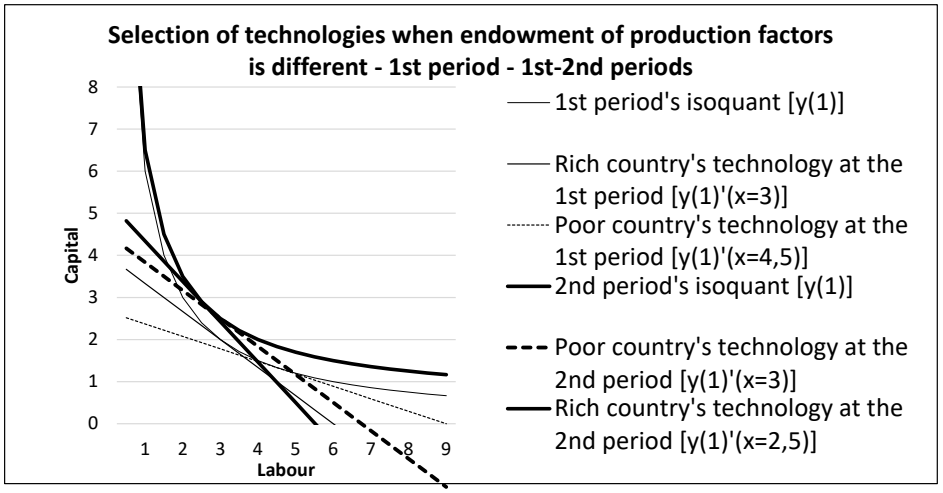



*Figure 6. Changes in selection of technologies over time*

**Explanation:**
m(2)R > M(1)R és m(2)P > M(1)P;
m(2)P/m(1)P > m(2)r/m(1)r

Figure 6 shows this process of upgrading over time. The solid lines represent the technologies of later periods. On the one hand, due to the increase in the overall efficiency of production factors, the isoquant of production shifts upwards; on the other hand, the accumulation of profit makes the lines representing technologies "steeper". As a result of accumulation, the scarcity of capital will be reduced, which reduces the relative price of capital and starts the substitution of work by capital. The question is, to what extent.

Since the necessary condition of becoming "steeper" is faster accumulation, the upgrading process will lead to a reduction in the development gap if, in the less-developed countries, the accumulation is faster and more intense. The findings of Lin (2012) can be summarised as follows:

- Empirical facts have proved the futility of development strategies that aim directly at upgrading the industrial technology structure.
- So, to upgrade that structure and to ensure maximum efficiency, the cause – the factor endowment structure – must be changed.
- Factor endowment refers to an economy's relative abundance in capital, labour, land, and natural resources. The major difference comes from capital accumulation. So, upgrading the endowment structure means increasing the relative abundance of capital.
- The key to upgrading the factor endowment structure of an economy is to increase each period's surplus production and the proportion of surplus accumulated as capital. With more surplus, and with a bigger proportion of it accumulated as capital, upgrading the factor endowment structure is faster.
- With a given surplus, the rate of capital accumulation also hinges on whether people are willing to accumulate.
- Hindrances to this process must be reduced: burdens imposed by politics, rent seeking, corruption, etc.

This collection of statements will be further referred to as *Lin's theorem*. As a matter of fact, this theorem is not new. The logic of Harrod-Domar models, as well as that of Solow's production function, is the same. In their view, the causes of differences in the development of nations are in accumulation: variances in time, size, and efficiency. For the time being, let us accept this claim. Later we shall return to it, because if we begin to examine what factors make the process of accumulation of individual nations different, then we have to consider other factors too, like knowledge capital (Roamer 1994), institutions (Acemoglu, Robinson 2012), historical developments, the distribution of income, the ecological environment (Stiglitz 2001, Sen 1999), etc. Now let us take a look at what the upgrading process looks like.

Before the statistical quantification of the upgrading process, we must examine the measurability of production factors. Without that, we cannot examine the capital-to-labour ratios in their use. Unfortunately, the necessary data for other Central and Eastern European countries are not available. So we can analyse only the Hungarian upgrading process.

Every year since 2009, Corvinus University of Budapest has received from the Hungarian Tax Authority the full corporate tax database (with the items made anonymous). This database contains the balance sheet and profit and loss account of each important enterprise. This data is constantly monitored by the state, and therefore this is one of the most important and reliable sources of national accounts, even though it is not free of errors. From this data, one can derive the tangible assets (or total assets) of 450,000 Hungarian enterprises along with their average number of employees. Simple division gives the first approximation of the *technical equipment of work*, which is the tangible capital per employee.

The use of labour and capital has costs. These costs are reported in the lines of the profit and loss accounts and can be assigned either to capital or to labour. However, we soon run into difficulties if we would like to assign all costs reported in the balance sheet to either labour or capital, because there is an ever-increasing cost item, that of so-called *"other inputs"*, which has ever-increasing number of cost elements that cannot be assigned to any of the reported production factors. For instance, costs allocated for managing bad debts are in the category of customer relations, which belongs to neither tangible capital nor labour. It belongs to a new capital item: *intangible* capital. The same is true for advertising expenses, or for non-wage expenditures dedicated to organisational development. This raises the question of how much, in fact, is the capital and what does it consist of? Is it equal to the tangible capital reported in the balance sheet, or is it more than that? This question must be answered if we want to calculate the *technical equipment of work*. Among other things, these considerations lead to a Roamer-type production function (Figure 7), which expands the traditional Cobb Douglas production function by the intangible factors of production.

If we accept this production function, then the concept of *capital* expands. There will be both tangible and intangible capital. The company's capital will be equal to the $\mathbf{T + I_1^E + I_1^I}$ part in the left box in Figure 7. In our study, this sum will be denoted by **E**. Remember that the $\mathbf{I_2}$ elements are not part of **E**. The $\mathbf{I_2}$ elements are part of the human capital, **H**, and will never belong to the company. They can only be leased by the company and are strictly connected to labour. In this case, however, besides the technological lines touching the isoquant, new technological lines will appear. More specifically, the area they cover will be divided into two parts, as shown in Figure 8. The area under the dashed line represents the tangible technical equipment of work, while the area between the dashed line and the solid line represents the intangible technical equipment of labour.

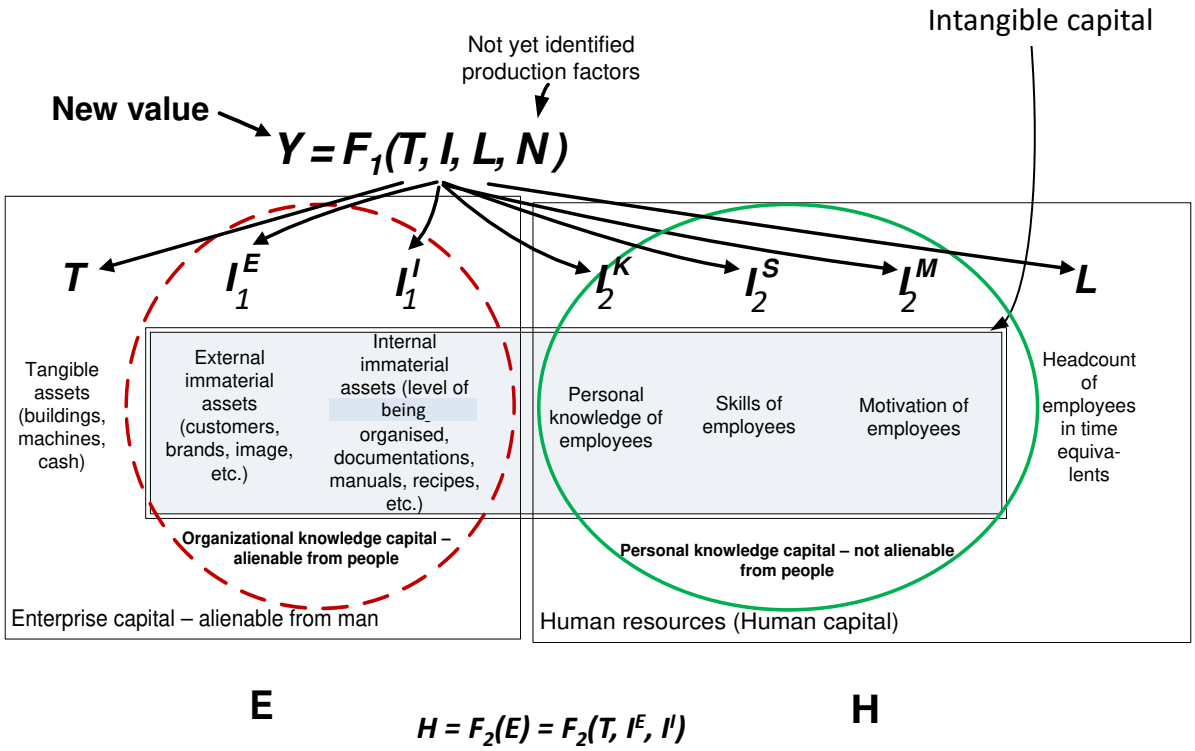



*Figure 7. The extension of the Cobb-Douglas type production function with the elements intangible capital*

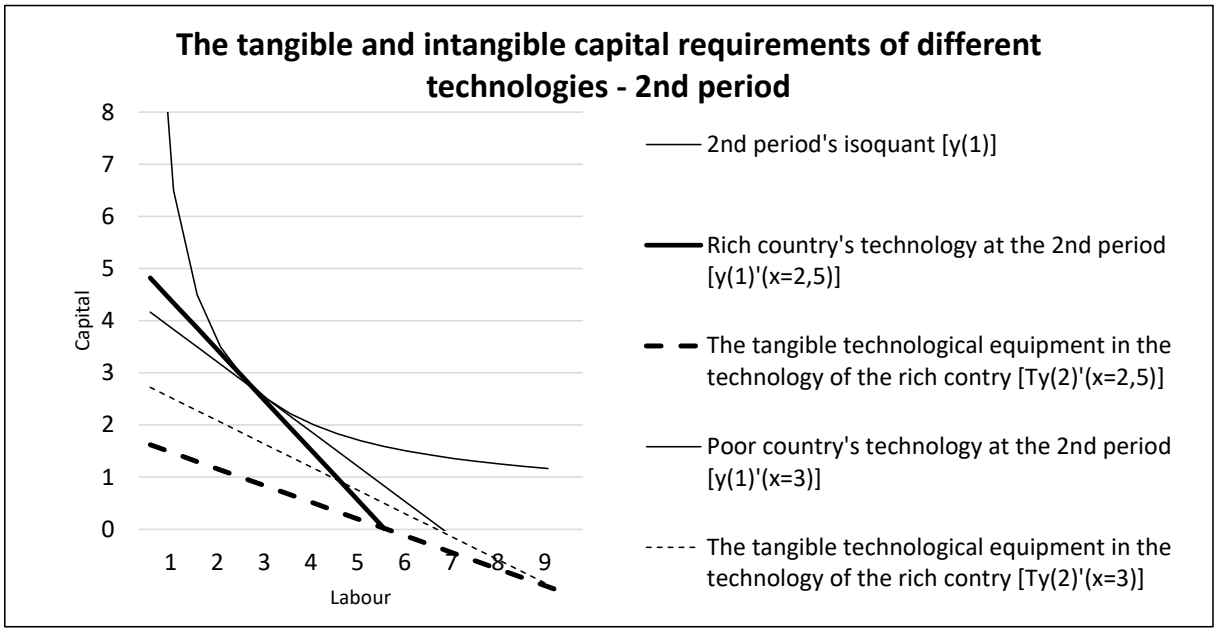



*Figure 8. The tangible and intangible technical equipment of labour*

**Explanation:**
mTR and mTP – Tangible technological equipment of rich and poor countries, respectively;
mIR and mIP – Intangible technological equipment of rich and poor countries;

As development proceeds, mIR will slowly increase and exceed mTR-t, and mIP also will gradually surpass mTP-t. This supposes that, during upgrading, the gap should be reduced not only in tangible technological equipment but also in intangible technological equipment.

At this point the definition of technical equipment must be more generally discussed. Since the concept of capital has been expanded, and since the interpretation of the volume of immaterial enterprise assets is somewhat unambiguous, from now on, we will interpret *technical equipment of labour* to be the ratio of total capital costs to total labour costs. Since the numerator can be divided into three elements, we differentiate tangible, intangible, and total technical equipment.

There is no production factor without its accompanying cost. The cost is equal to some sacrifice of the production factors. Therefore, the costs should be proportionate to the usage of the factors of production. The balance sheet does not measure the enterprise's total capital because it does not contain intangible production factors. It does, however, report the total costs. If we assign all labour-related cost to labour, then the remaining costs are proportionate to **E**, the enterprise's capital. So, from the costs assigned to enterprise capital, we can estimate the value of the enterprise's capital.

Before the quantification, we simplify the production function of Figure 7:

$$\mathbf{Y = c^T T + c^L L + c^I I}$$

where

- Y = Value added
- T = Visible/tangible assets (simply the balance sheet total)
- L = Number of employees
- I = Immaterial (or knowledge) assets additionally invested by the enterprise: business development, customer retention, organizational efficiency, etc.
- $c^T$ = unit cost of the usage of T, visible/tangible assets,
- $c^L$ = unit cost of the usage of L, employees and their personal knowledge, skills, and motivation
- $c^I$ = unit cost of the usage of I, immaterial and knowledge assets.

The equation relies on the following economic considerations:

- A company can produce new value only by using its assets.
- Beyond the visible/tangible assets and the employees involved in production, additional invisible, immaterial/intangible assets must be used. These include the following:
  - The *personal knowledge of employees* ($I^K$), their *skills* ($I^S$) and *motivation* ($I^M$). These three make up the human assets (H) bound to L.
  - Further immaterial assets, such as *client assets* needed to acquire and retain customers and suppliers ($I^E$), and organisational assets in the form of know-how, knowledge base, and organisation ($I^I$). These assets increase the invested enterprise assets (E).
- The use of assets requires costs (depreciation, wages, advertising, customer retention, business development, knowledge base and know-how development, training, etc.).
- If the entrepreneur incorporates his profit expectations into his costs, then sustainable production has one precondition: **the produced value added must cover the costs of the production factors.**

In the equation $\boldsymbol{Y = c^T T + c^L L + c^I I}$, only $\boldsymbol{c^I}$ and $\boldsymbol{I}$ are unknown. If we estimate $\boldsymbol{c^I}$, then $\boldsymbol{I}$ can be calculated in the following way:

$$\mathbf{I = (Y - c^T T - c^L L)/c^I = c^I I/c^I}$$

In our calculations, we assume that revenue expectations of the much riskier immaterial investments (increased by profit expectations) are twice as big as the revenue expectations of the visible/tangible investments ($\mathbf{c^I = 2c^T}$). In this way, we can quantify the aggregate production functions of each enterprise group in the Hungarian economy. One part of these is presented in Table 1.

The production functions in Table 1 reveal much about the general operation of enterprises in Hungary. Thorough analysis could go far beyond the scope of this article. However, in this study we focus on only one question: What is the connection between efficiency and the technical equipment of labour?

Based on data in production functions (see the last column in Table 1), it is clear that "over-industrialisation" has led to a dual economy in Hungary:

- Half of the GDP is produced by foreign companies that are more efficient than the domestic private companies. The value added per enterprise or the value added per employee in foreign companies is much higher than that of domestic companies.[3]
- The same is true even if the companies are grouped according to size. Foreign companies are more effective than domestic enterprises in both the group of companies employing more than 20 people and the group employing fewer than 20.
- The law of return to scale appears in that the efficiency of Hungarian enterprises employing more than 20 people is greater than that of those which employ fewer than 20.[4]

[3] *The per capita efficiency differences see in the F.2.1 appendix table.*

[4] *This statement is not valid for foreign companies. In that enterprise group, the per capita added value of small businesses is greater than that of the large ones. This suggests that small businesses in this group are not real small businesses. Behind them stands a large parent.*

*Table 1*
*The production functions of enterprises submitting tax declarations*

| | | t | N | cT | T | cL | L | cI | I | Y | cT | 1000*T/N | cL | 1000*L/N | cI | 1000*I/N | 1000*Y/N |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Year | Number of enterprises | Cost of usage of tangible assets | Tangible assets | Cost of usage of labour | Labour | Cost of usage of customer and organizational assets | Customer and organizational assets | Added value | Cost of usage of tangible assets | Tangible assets per company (HUF Mill./enterprise) | Cost of usage of labour | Labour force per enterprise (person/enterprise) | Cost of usage of customer and organizational assets | Customer and organisational assets per company (HUF Mill./enterprise) | Added value per enterprise (HUF Mill./enterprise) |
| | | Year | Piece | HUF/HUF | HUF Bn. | Mill HUF / person | Thousand persons | HUF/HUF | HUF Bn. | HUF Bn. | HUF/HUF | Mill.HUF/enterprise | Mill HUF / person | Person | HUF/HUF | Mill.HUF/enterprise | Mill.HUF/enterprise |
| 1 | Enterprisees altogether | | | | | | | | | | | | | | | | |
| 2 | Enterprisees altogether | 2009 | 385 723 | 0,03 | 155 464 | 4,2 | 2 339 | 0,06 | 80 718 | 19 828 | 0,03 | 403 | 4,2 | 6 | 0,06 | 209 | 51 |
| 3 | | 2014 | 422 760 | 0,03 | 161 284 | 5,2 | 2 313 | 0,05 | 126 160 | 23 547 | 0,03 | 382 | 5,2 | 5 | 0,05 | 298 | 56 |
| 4 | Foreign enterprises | 2009 | 27 400 | 0,03 | 101 587 | 7,4 | 624 | 0,06 | 54 118 | 10 980 | 0,03 | 3 708 | 7,4 | 23 | 0,06 | 1 975 | 401 |
| 5 | | 2014 | 24 208 | 0,02 | 98 656 | 8,6 | 602 | 0,05 | 84 767 | 11 379 | 0,02 | 4 075 | 8,6 | 25 | 0,05 | 3 502 | 470 |
| 6 | Hungarian private enterprises | 2009 | 355 482 | 0,03 | 46 836 | 3,0 | 1 484 | 0,07 | 23 172 | 7 519 | 0,03 | 132 | 3,0 | 4 | 0,07 | 65 | 21 |
| 7 | | 2014 | 395 654 | 0,05 | 50 019 | 3,9 | 1 495 | 0,08 | 31 412 | 10 508 | 0,05 | 126 | 3,9 | 4 | 0,08 | 79 | 27 |
| 8 | Enterprises with more than 20 employees | | | | | | | | | | | | | | | | |
| 9 | Enterprisees altogether | 2009 | 13 807 | 0,04 | 83 861 | 5,1 | 1 516 | 0,09 | 46 449 | 15 461 | 0,04 | 6 074 | 5,1 | 110 | 0,09 | 3 364 | 1 120 |
| 10 | | 2014 | 13 686 | 0,04 | 94 191 | 6,2 | 1 482 | 0,07 | 75 036 | 18 345 | 0,04 | 6 882 | 6,2 | 108 | 0,07 | 5 483 | 1 340 |
| 11 | Foreign enterprises | 2009 | 2 824 | 0,05 | 52 696 | 7,3 | 569 | 0,10 | 29 947 | 9 553 | 0,05 | 18 660 | 7,3 | 201 | 0,10 | 10 604 | 3 383 |
| 12 | | 2014 | 2 630 | 0,04 | 54 040 | 8,5 | 554 | 0,07 | 47 485 | 10 010 | 0,04 | 20 548 | 8,5 | 210 | 0,07 | 18 055 | 3 806 |
| 13 | Hungarian private enterprises | 2009 | 10 235 | 0,04 | 24 458 | 3,7 | 725 | 0,08 | 13 186 | 4 625 | 0,04 | 2 390 | 3,7 | 71 | 0,08 | 1 288 | 452 |
| 14 | | 2014 | 10 307 | 0,06 | 28 114 | 4,9 | 721 | 0,09 | 17 854 | 6 726 | 0,06 | 2 728 | 4,9 | 70 | 0,09 | 1 732 | 653 |
| 15 | Enterprises with less than 20 employees | | | | | | | | | | | | | | | | |
| 16 | Enterprisees altogether | 2009 | 371 916 | 0,02 | 71 602 | 2,6 | 823 | 0,03 | 34 269 | 4 367 | 0,02 | 193 | 2,6 | 2 | 0,03 | 92 | 12 |
| 17 | | 2014 | 409 074 | 0,02 | 67 093 | 3,3 | 831 | 0,03 | 51 124 | 5 201 | 0,02 | 164 | 3,3 | 2 | 0,03 | 125 | 13 |
| 18 | Foreign enterprises | 2009 | 24 576 | 0,01 | 48 891 | 8,1 | 55 | 0,02 | 24 171 | 1 427 | 0,01 | 1 989 | 8,1 | 2 | 0,02 | 984 | 58 |
| 19 | | 2014 | 21 578 | 0,01 | 44 615 | 8,8 | 49 | 0,02 | 37 282 | 1 369 | 0,01 | 2 068 | 8,8 | 2 | 0,02 | 1 728 | 63 |
| 20 | Hungarian private enterprises | 2009 | 345 247 | 0,03 | 22 378 | 2,2 | 759 | 0,06 | 9 986 | 2 894 | 0,03 | 65 | 2,2 | 2 | 0,06 | 29 | 8 |
| 21 | | 2014 | 385 347 | 0,03 | 21 905 | 2,9 | 774 | 0,06 | 13 558 | 3 782 | 0,03 | 57 | 2,9 | 2 | 0,06 | 35 | 10 |

Source: Corporate tax database of the National Tax and Customs Authority. The "enterprises altogether" in row 1 contains state-owned enterprises as well.

The differences in the average use of capital and labour of Hungarian private and foreign enterprises are so large that Hungarian figures are barely visible in a common coordinate system. Therefore the relevant part of Figure 9 has been magnified. The relations can, however, be easily seen from the gradients.

- In the most effective foreign-owned companies, the technical equipment of labour is higher (their line is steeper, with a gradient of 1.4). In the Hungarian private companies, the technical equipment of work is smaller (their line is less steep, with a gradient of 0.72).
- The ratio of intangible technical equipment to the tangible technical equipment of labour is better in the foreign enterprises. In foreign companies, -m(T+I)/-mT = 1.4 / 0.68 = 2.06. In Hungarian domestic companies, -m(T+I)/-mT = 0.72/0.37 = 1.95).

So we have shown that there is a close relationship between efficiency and the technical equipment of work.

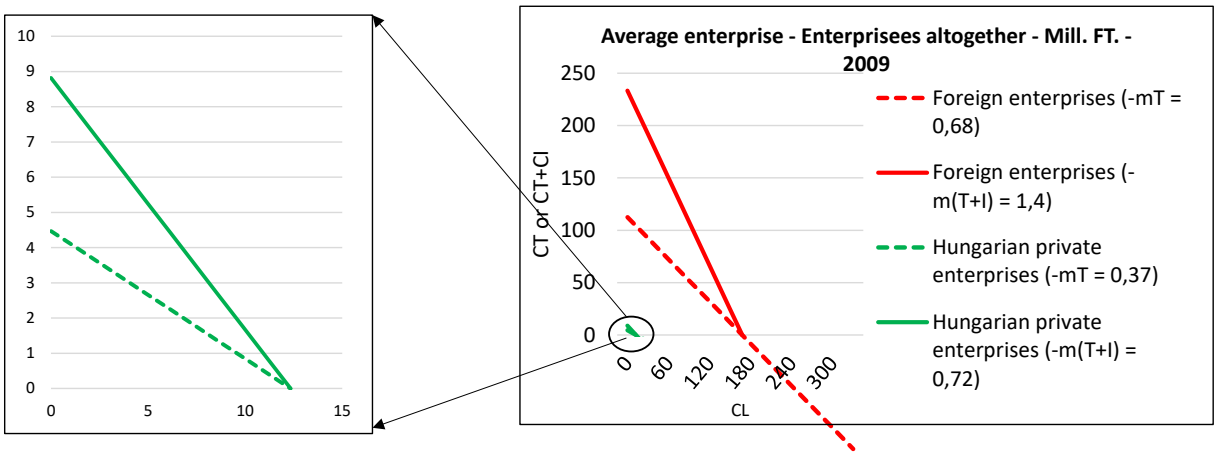



*Figure 9. Technical equipment of the observed enterprise groups in 2009*

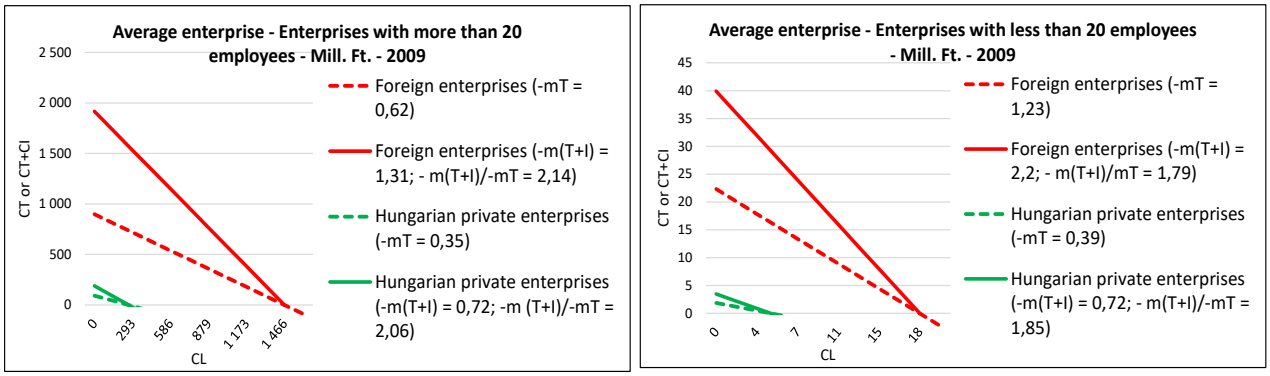



*Figure 10. Technical equipment of enterprises employing more than 20 persons, and then fewer than 20*

In foreign companies, whether large or small, the work is technically more equipped than in Hungarian companies (Figure 10). However, domestic private enterprises have the same technical equipment of labour, independent of size.

It is very important to note how these differences have changed over time, i.e., whether there was upgrading or not. This is presented in Figure 11.

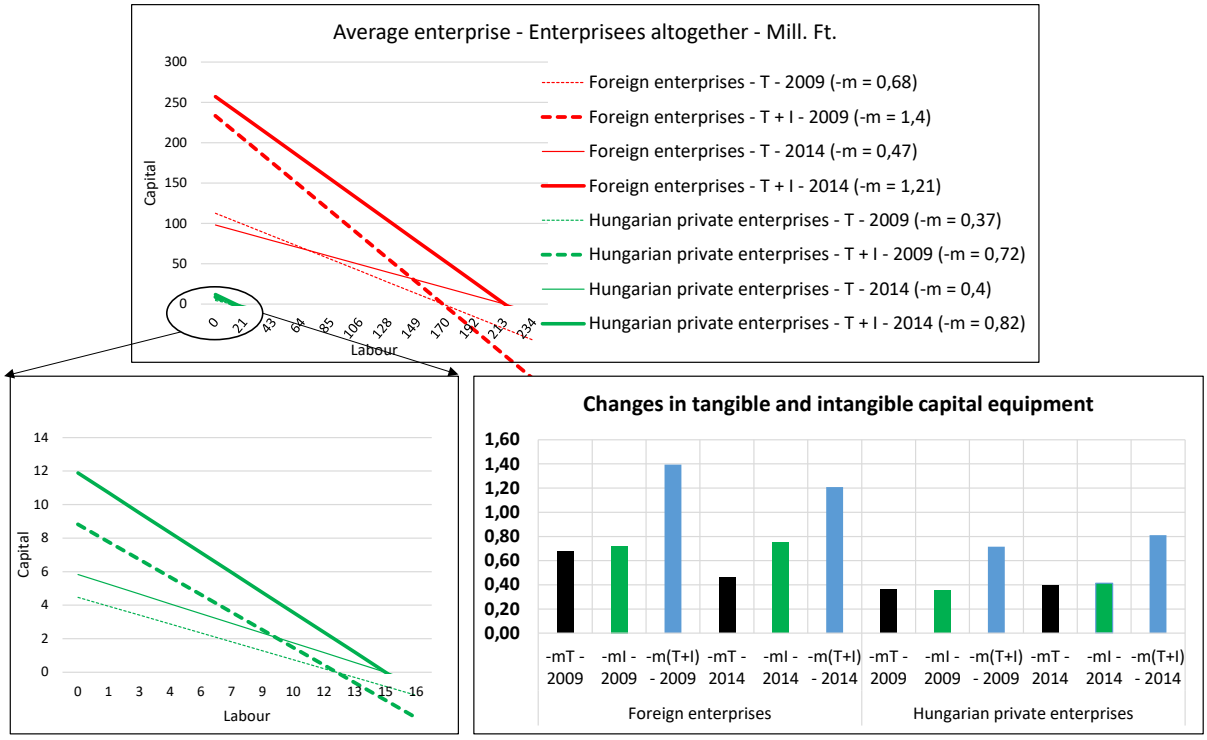



*Figure 11. Change in the technical equipment of observed enterprises between 2009 and 2014*

Figure 11 is technically difficult to understand because of differences in magnitude. For this reason, a separate part of the figure—the lines of Hungarian domestic companies—had to be magnified. A few words about the markings: The solid lines show the values of the year 2014, while the dashed lines indicate the 2009 values. The thicker lines represent the **E** values, the thinner ones the **T** values. Red lines indicate the values of foreign companies, while the green ones belong to the Hungarian domestic companies. To help the processing of the figures, the quotients are given in a separate table which briefly summarises the upgrading process.

For our chain of thought it is important to note that, after the crisis, the foreign companies upgraded only their intangible capital (in the form of maintaining their customer base and their organisation.) Their amortisation decreased by 10 percent, and their investment services activities halved. This suggests that, even if they have difficulties at home, they at least take care of maintenance in the assembler countries.

It is essential to notice that among Hungarian companies only the bigger firms – employing more than 20 people - could successfully upgrade. The favourable technical equipment of work in smaller enterprises has deteriorated compared to that of bigger ones.[5]

Overall, the Lin theorem partially works:

1. The technical equipment of work in the more efficient companies is bigger.
2. Also, the intangible technical equipment is bigger in the more efficient companies.
3. Hungarian domestic companies compete by utilizing the comparative advantages of a cheaper labour force. So they struggle with the higher capital potential of multinational companies.
4. Analysing the changes over time, we can say that, after the crisis, the foreign enterprises did not make developments at the former pace. In general, they sat on the fence.
5. The Hungarian domestic companies developed cautiously.
6. Points 1-5 describe a situation in Hungary which can be considered as only a temporary upgrading compared to the foreign enterprises, because it will immediately vanish when the developed countries finish their renewal and begin to transfer their outsourced technologies into the assembler countries.
7. This indicates that the assembler countries represent an additional reservoir next to the great pot of developed countries. If the soup overflows the big pot, then it will fall into the neighbouring little pots. There is no policy which coordinates the total amount of soup distributed among the pots.

Regarding the computations, we should call attention to several cautionary aspects:

1. Measurements at current prices reflect the upgrading process in a peculiar way.
   a. The increase in labour costs was accompanied only by minor growth in employment.
   b. Inflation is included in the cost increments and must be accounted for.
   c. In fact, the upgrading was small or stagnant. This is particularly important in the case of foreign companies, whose "degrading" is not actual, but only relative. They have maintained their earlier investments, and have made no intentional changes in their technical equipment of labour. They have increased wages to keep their positions in the labour market. We still have a lot to do before we can make a final evaluation of the upgrading process in Hungary.
2. The Central Statistical Office of Hungary significantly corrects the corporate tax declaration data at a higher level of aggregation. These corrections should be derived at the enterprise level if we would like the enterprise database to be more reliable. This requires further data processing. However, the Murai study and the GNI report (KSH 2009) of the Hungarian CSO[6] indicate that the above computations give a reliable picture of the production functions of the Hungarian economy since this database is one of the most important sources used by CSO to compile national accounts.

## STRATEGIC DILEMMAS

The realisation of comparative advantages so far discussed, however, raises a series of questions. Let us go back once again to Ricardo. It is not a coincidence that Ricardo, when investigating the law of comparative advantages, used an example of two countries, each of which had advantageous conditions for producing its own distinct product, and the two countries could exchange these products. He does not speak about a case where two countries produce the same product, with one having a comparative advantage over the other in production of that product. Wine and textiles may make their respective producing countries rich, and the corresponding comparative advantages will persist even if the two countries get to the same level of development. But the labour market does not work that way. If development levels equalise, the comparative advantage of labour disappears; it lasts only as long as development levels remain different. It follows that, if we want to reduce the differences in development, we need to find a product different from labour whose comparative advantages do not decrease as the development gap narrows.

Such a product does not appear overnight, just as textiles and wine do not magically turn up on our doorsteps. This problem requires strategic thinking, actions and projects according to a plan, and a processes of trial and error.

First of all, the Lin theorem must be extended. Upgrading is not satisfactory if it only takes up the assembling technology and outsourced production of the more developed countries. Finding the future carrier product should not start when the follower catches up to the frontrunner, but far earlier. Nokia and Samsung were not created *after* Finland and Korea significantly increased the GDP per capita; on the contrary, *their creation caused the increase*. The upgrading is not fully achieved simply by increasing the technical equipment of labour. We must

[5] *See Table F.1 in the Appendix.*

[6] *See Murai and the CSO GNI report.*

also renew the product portfolio with innovative, future carrier products. The development of China and South Korea show different examples. China rewards manufacturers when they upgrade, whether or not they export. In South Korea manufacturers get support only if the resulting product is exported. The latter is the really good example to follow.

This exportation of carrier products is the only way to escape the trap of relative wage and knowledge decrease. It leads to productivity growth in certain areas (i.e. those related to the new carrier products) and creates the conditions for wage increases. Of course it will drain manpower from elsewhere, and this induces wage increases in the traditional areas as well. This will diminish the low-wage-based comparative advantages in the general economy, which results in a loss of competitiveness and expels from the market producers who are unable to change. But it does not matter. The advances made in the competitive areas will compensate for it.

If we continue the overdevelopment of industry with assembly content and thus hinder the development of non-material services, then we will only decrease the innovative capacity of the country, and then we shall get deeper into the trap that Soskice, Nölke and Vligenhart call the DME model.[7] According to their classifications, they differentiate three types of capitalism relating to Central and Eastern European countries:

- **LME** = Liberal Market Economy (USA, UK)
- **CME** = Corporate Market Economy (Germany, Austria)
- **DME** = Dependent Market Economy (Visegrad countries)

## POLICY IMPLICATIONS

Hungary is now firmly in the DME category. According to Nölke and Vliegenhart, the dependency appears in the following areas:

1. Dependence on the most important investment resource
   The decisions defining economic growth are not made in DME countries. They are made in those headquarters where the FDI is coming from: Western Europe and the USA.
2. Pressure to follow the operation model of the biggest investors
   The most important corporate decisions are made not by local managers and shareholders, but by the local managers and the western corporate centres. This significantly affects the domestically owned small and medium-sized companies, because they are basically dependent.
3. Effect on the cooperation of social partners
   A typical phenomenon is the system of enterprise-level agreements that is widespread in Central and Eastern Europe, while in Western Europe the majority of agreements are made at the sectoral and national level. In Central and Eastern Europe, the system of social expenditures is not the result of unfolding social struggles involving the masses, but it is evolving rather on a selective basis through the appeasement of employees of multinational companies.
4. Effect on education and training systems
   The transnational companies require a relatively cheap labour force with intermediate-level technical skills because it yields the comparative advantage of the DME system. For this reason, it is not in the interests of the transnational corporations to invest in the potential for innovation, because they would prefer to bring their own innovation in from abroad. In addition, limited local innovation does not require an education system that provides general abilities based on significant R&D expenditures. Multinationals also do not require flexible labour markets like those in their home countries. It is sufficient for them to have a moderately flexible workforce, as this avoids major labour movements and prevents disturbances in the assembly plants' operations.
   The decline in educational investment, to which the governments are forced for a number of reasons, does not foster or maintain a strong public education system that could (if enabled) augment the limited vocational training with an Anglo-Saxon type high standard education that provides a high general knowledge level. This decline erodes the comparative advantages themselves. While Hungarian enterprises are worried about these processes and demand to reverse them, the Western enterprise centres are not very interested in these trends, because they can move their production elsewhere at any time if the local skill levels degrade too much.
5. Effect on innovation processes
   Transnational enterprises concentrate their innovation-intensive activities at headquarters, which they then disseminate within their own enterprise systems. To the DME countries they delegate the role of assembler—based on the innovations developed at home. All this creates possibilities to utilise just a special type of comparative advantage.
   We cannot say that there is no innovation in Central and Eastern Europe, or that the region produces only outdated products. On the contrary! The comparative advantage of the region is based precisely on their ability to adapt quickly to new trends in the production of durable quality goods. Still, most of the new trends come into the region from outside. The number of innovations developed in Central and Eastern Europe is small, and they appear mostly among supplier companies of the biggest multinationals.

[7] *See Nölke and Vliegnhardt (2009).*

6. Effect on society as a whole
   While the DME model is very coherent and has proven very successful in certain sectors, it has clearly failed in raising the standard of living of the general population. Instead, we can observe a growing dualism in these societies, with widening income disparities between those who are part of the export-oriented sectors and those who are excluded, plus others who have to bear the financial burdens of incentives offered abundantly by governments who continually try to attract foreign investments. This uneven development has led to increasing political populism and social tensions in Central and Eastern Europe.
   The points mentioned above were written in 2009 and unfortunately have proved to be prophetic. Given this situation, the following potential policy options emerge:

***1) Complete adaptation to the addiction***

   a. This course of action is very dangerous. It would not solve the problems of these societies, because that is not the intent of the power centres who have created the addiction (the LMD-CME countries). It would split these societies into "haves" and "have-nots." Those who are left behind—while generating substantial costs of deviation—will not be able to participate effectively in building up the country.
   b. In case of crises, social problems would immediately rise to the surface, since at such times the LMD-CME countries concentrate their resources at home to solve their own problems. This is easily seen in the analysis above. During the crisis of 2008, foreign companies had only a limited upgrading.
   c. There is a danger that the whole region might be devalued if better investment opportunities appear elsewhere.
   d. It surrenders self-determination.

***2) Getting rid of the addiction***

   a. This would be ridiculously expensive.
   b. It would trigger the resistance of the LME-DME countries.
   c. It delivers us into the hands of less progressive countries.

***3) Integration into the array of core countries by utilising the comparative advantages of the dependency (the Irish example).***

   a. This is the only reasonable alternative.
   b. It would require the allocation of additional social investments which would have only domestic sources of support.
      Those who want change must create the material conditions for that change. The difficulty is that already the people have frequently been asked to make sacrifices, and these have been wasted or misused; therefore, such efforts stir up deep mistrust of the authorities. But the problem must be solved. If there is no change, there cannot be improvement.
      The opportunities that might yield quickly visible results lie in the way of "low hanging fruit." Unfortunately, there are relatively few such options. Traditional methods of raising sufficient revenue take a long time, and they usually gain popular support only when social tensions are already dangerously strained.
      Renewal relies only on *national* productive forces. I deliberately avoid using the word *domestic*, since a major part of "domestic" production forces are owned by foreigners.
      The real latent resource of the Hungarian economy could be found in a "reconcentration" program that would strengthen small and medium-sized enterprises.[8] This would bring quick and visible social impacts in both income and employment, and it could also gain social support.
      The production calculations of this study indicate that greater efficiency can be expected only if there is a greater ability to accumulate national capital. To strengthen small and medium enterprises, it is necessary to maximize the ability of the middle classes to accumulate.
      This is possible only on a meritocratic basis. At present, the relevant social doubts are significant and justified.
   c. The process should be supported by state intervention to provide *productive* work to those who lag behind but are still able to work.
   d. We have to gain the support of LME and CME countries, since our integration of this kind is also in their long-term interests.

## CONCLUSION

To summarise, the priorities to be followed in all three cases listed above, are the following:

a. There should be investment in education by optimising the distribution of general, vocational, secondary, and higher education in order to maximally develop our ability to innovate.

[8] *This is a complex process that is described in a separate study. See the author's conference paper written for the AIB-CEE Conference in Warsaw (2015) under the title Job prospects at the periphery of the European Union (manuscript).*

b. If we are purposefully looking for sustainable comparative advantages, then some new areas should be selected. They will require high-level R&D activities which must be based on the development of the non-material sphere and by the development of enterprises that can produce sellable products from these R&D results.
c. The creation of favourable conditions for further foreign investments will remain an important priority.
d. Governments should develop policies that lead to every employable citizen working productively to contribute materially to building the country.

Hungary's shift into the DME category of nations exacerbated the transformation crisis, but it also slowed the pace of economic growth. Our task is to correct this situation by implementing a coherent system of public actions.

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## *Appendix*

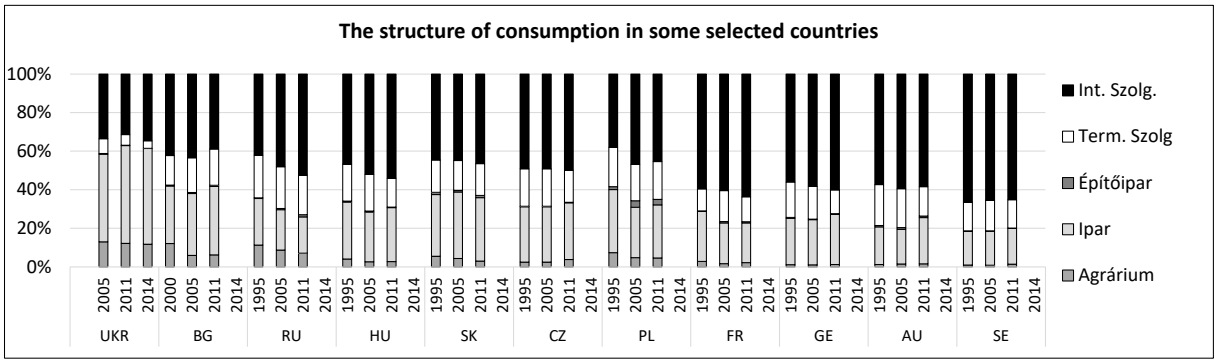


*Figure F.1.*

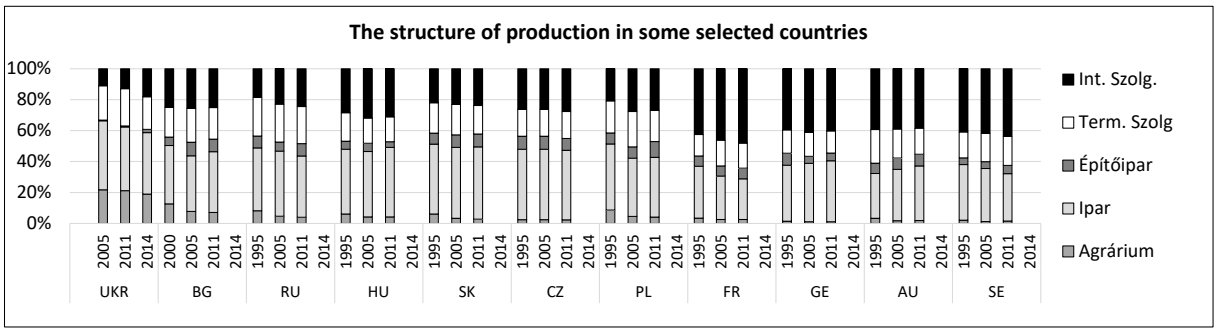


*Figure F.2.*

*Table F.1*
*Differences among enterprises based on value added per enterprise, or per capita value added according to enterprise categories*

| | 2009 | | | | | 2014 | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | Added value per enterprise (HUF Mill./enterprise) | Per capita value added (Mill. HUF/ person) | Tangible capital equipment | Intangible capital equipment | Total capital equipment | Added value per enterprise (HUF Mill./enterprise) | Per capita value added (Mill. HUF/ person) | Tangible capital equipment | Intangible capital equipment | Total capital equipment |
| Enterprisees altogether | | | | | | | | | | |
| Foreign enterprises | 401 | 17,6 | 0,67 | 0,72 | 1,39 | 470 | 18,9 | 0,68 | 1,04 | 0,87 |
| Hungarian private enterprises | 21 | 5,1 | 0,36 | 0,35 | 0,71 | 27 | 7,0 | 1,10 | 1,17 | 1,13 |
| Enterprises with more than 20 employees | | | | | | | | | | |
| Foreign enterprises | 3 383 | 16,8 | 0,61 | 0,70 | 1,31 | 3 806 | 18,1 | 0,69 | 1,00 | 0,86 |
| Hungarian private enterprises | 452 | 6,4 | 0,35 | 0,37 | 0,71 | 653 | 9,3 | 1,27 | 1,24 | 1,26 |
| Enterprises with less than 20 employees | | | | | | | | | | |
| Foreign enterprises | 58 | 25,9 | 1,23 | 0,97 | 2,20 | 63 | 28,1 | 0,71 | 1,36 | 1,00 |
| Hungarian private enterprises | 8 | 3,8 | 0,39 | 0,33 | 0,72 | 10 | 4,9 | 0,85 | 1,05 | 0,94 |

Source: Table 1 of the study

# Challenges in Measuring International Strategic Performance in Professional Team Sports – Two Case Studies from Hungary

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*SUMMARY*

*We analysed the key strategic challenges in measuring performance of professional sports clubs in international context by using the case study methodology. The analysis of the examined handball and football clubs revealed that domestic success is a weak indicator of international success. Also, the occasional surge in international revenues is challenging to translate into a sustainable flow of revenues. Moreover, through a strategically driven process the social benefits of clubs services can become relevant to international markets. We argue that the findings from the professional sports sector can be transferable to other business fields in terms of the complex relationships between the analysed performance drivers.*

*Keywords: sport, strategy, case study, performance measurement, internationalisation*
*Journal of Economic Literature (JEL) codes: M16, M49*
*DOI: http://dx.doi.org/10.18096/TMP.2017.01.07*

## INTRODUCTION

An overwhelming share of the global population can watch the highest level sports competitions and enjoy the show based on the quality performance that professional athletes provide. No football enthusiast could deny, for instance, watching a Champions League final with Real Madrid and Atlético Madrid playing. Most of us, however, while allured to follow these exceptional international events, have close relationship with the team representing our own home city or region. This is part of the fundamental characteristics of professional sports: it supports our affection to the team we identify with and, at the same time, allows the consumption of the intricate fine art performed by the best of the best on international stage. Indeed, however humble the performance of our local team may be, we all hope and trust that one day we can make it to the finale of a major international tournament. A success story is in the offing.

The research field of international business interprets the strategic challenge of achieving international success based on operations originally developed in domestic conditions. The business of professional sports is not different than any other businesses in terms of the relevance of addressing strategic questions such as if, when, how and why a local company may or should enter international markets, or be affected by internationalisation even if trying to focus on serving the local market. Professional sports clubs managing leading teams on a global scale have natural access to an ever increasing base of supporters resulting in annual club revenues growing in excess of EUR 500 million. In this context it becomes important to find out if there are identifiable patterns in how international success can be achieved, as well as what are the effects of international success for a professional sports club. Thus, several questions related to international operations of sports clubs arise:

- How can international performance be properly measured, given that sports clubs have strong roots to the local community and shape the identity and life of the citizens attached to it;
- How can this complexity of objectives and social embeddedness be reflected in measuring performance.

In our paper we analyse three major strategic challenges in measuring performance of professional sports clubs in international context. These reflect the intricate relationships between (1) domestic and international, (2) occasional and sustainable, and (3) economic and social goal achievement. In our exploratory research we apply the case study methodology with an

initial sample of two Hungarian professional clubs with international ambitions. The analysis of the examined handball and football clubs reveals that domestic success is a weak indicator of international success, with a number of moderating factors playing a role in that relationship. Furthermore, the occasional surge in international revenues characteristically prevalent in professional sports is challenging to convert into a sustainable flow of revenues, influenced by a range of factors we explored. Finally, despite the common assumption that the social benefits professional clubs can provide are only relevant to the local community of its home city or region, we learned that there is a strategically driven process that can bring social benefits relevant also to the international markets of a club. Our results indicate the possibility that the analytical findings from the professional sports sector are transferable to other business fields: how to measure the complex relationships between domestic and international, occasional and sustainable, and immediate and long term aspects of performance.

# LITERATURE REVIEW

In this section, a general description of the international background of professional sports operations defines the key contextual conditions of our research. Then we summarise how some of the standard strategic performance measurement approaches have been applied to the professional sports industry in previous research projects and how questions about internationalisation can be interpreted through these frameworks. Finally, we highlight the key issues in performance measurement in the international context, as reflected in international business literature. These areas of research provided reference points for us to position our current paper in the academic discussions of performance measurement.

## *International Processes and Strategies in Sport*

The core product of professional sports clubs as business entities is a series of matches played along a set of rules specified by the given sport's self-governing bodies (Beech & Chadwick 2013; Heinemann 1995). This set of rules is a key reason for the inherent international nature of professional sports, as the rules enable teams with different geographical and cultural backgrounds to play against each other, and also their diverse supporters to understand and enjoy international matches just as much as their local events (cf. Andreff 2008). While in this paper we focus on major European team sports, more specifically association football and handball, most of the fundamental characteristics of the internationalisation issues that we examine are similar in other team sports and also in individual sports, with some adjustments (Andras & Jando 2012). Internationalisation adds further excitement and higher stakes to the game, as it allows for comparing our team's performance with that of respected international opponents. Results are more unpredictable than local matches, and the range of audience interested in the event can be a multiple of the size of the local following (Andreff 2008). Internationalisation of sports, in effect, is a complex phenomenon that can be understood from different aspects.

On the input side of professional sports, players and coaches regularly sign from one club to another, reflecting the varying career opportunities offered by the changing fortunes of clubs (cf. Andras & Havran 2014). In football, the rights of players are bought and sold between clubs as valuable assets; in other sports there is no transfer fee for such transactions (Dobson & Goddard 2004). The demand and supply of professional players, and to a lesser extent coaches, define a transfer market, which is increasingly international (Andras & Jando 2012). Legal barriers to transfers have been gradually lifted, and with the support of technology, there is diminishing distance between professionals in one country and another, both in terms of travel time and access to information (Doczi 2007). Agents play an important role in the efficiency of the market, as a club manager today does not necessarily need to know anyone in a country far away; agents approach him with a portfolio of professional players to choose from, supported by promotional videos highlighting the player's strengths and full match videos to provide further evidence. The consequences of this liberalised market of player and coach transfers are far ranging: most notably access to valuable know-how and experience can be obtained by signing the required personnel. The time needed to build a squad with a reasonable chance of playing at international competitions has become shorter than ever before.

On the output side of professional sports, international events are gaining strategic weight and making increasingly global impact (Westerbeek et al. 2007; Helmenstein & Kleissner & Moser 2007; Andreff 2008). Notwithstanding the original purpose of a sport club to entertain its local supporters, the team's ability to play in international competitions is in the interest of all key stakeholders, including fans, sponsors, local municipalities, owners, as much as the players and coaches involved. Winning international matches and trophies is the ultimate achievement for any professional; most notably, however, there are substantial financial benefits the club receives in terms of prize money allocated to participating clubs (Kozma & Kazai 2014). In football, probably the most commercialised of all major European sports, these amounts can be a multiple of the club's recurring annual revenues; in handball and other sports, however only those clubs receive substantial prize money that reach the last few stages of international competitions. In addition to the direct financial gains from competition prizes, the fact that a team has been recently successful internationally would normally bring new commercial opportunities that can be exploited by competent management (Beech & Chadwick 2013). With more and more people watching the international competitions through a range of broadcasting platforms, the size of the

market a club can address through playing internationally has grown considerably, bringing the opportunity of internationalisation to the centre of club strategies.

The international strategies of professional clubs in the Central-Eastern European region have been typified by Kozma and Andras (2016), based on the relevance of international pull factors of resources and the relevance of international market pull factors (Czakó 2010). Along these two dimensions of internationalisation, three distinct types of strategies may be relevant to any particular club with international ambitions. In the centre of attention are clubs following premium service strategies. They put strategic emphasis on utilising their exceptional coaching skills, and make intensive efforts to commercialise the opportunities of their exposure to international attention. On the other hand, they are under constant pressure to keep their key players who are subject to offers from a range of competing clubs willing to take advantage by alluring them away. Clubs with more modest chances of international success may follow challenger strategies. They are investing into intensive relationship building in international markets, and obtaining coaching know-how, while operating under financial pressure to survive that difficult period of investment. Ultimately, they aim to challenge the best teams and manoeuvre themselves into leading strategic positions. The third international strategy type pursued by clubs in the CEE region is called supported investment strategy. These clubs receive intensive government support, typically through the provision of modern facilities and funds for talent development. Operating under severe financial pressure and investment into international relationship building are also key emphases in their approach. The three of these strategy types shape the context in which the performance measurement of professional sports clubs involved in internationalisation occurs.

## *Measuring Performance in Professional Sports*

In professional sports, achieving sport success seems to be all that matters. And to many casual observers, this belief holds true, in terms of no professional club can be considered successful without winning sport trophies and valuable competition points. However, closer economic analysis shows a sharply different pattern (Kynsburg 2011; Laki & Nyerges 2006; cf. Taliento & Silverman 2005; McDonald 2010). An increasing list of examples confirms that clubs receiving substantial financial support and run by business-minded management are likely to become successful in terms of trophies as a consequence, while the reverse of this causality, i.e. clubs winning trophies would become financially strong, is strikingly falsified by factual experience (Szymanski & Kuypers 1999). All the more, the actual patterns of strategic considerations for professional clubs are convoluted by a third dimension: European sports clubs are originally social entities that were established to shape the identity of a local community, add valuable content to local life and represent the citizens in national, and later international, competitions (Andras & Kozma & Kynsburg 2014). This original social purpose of sports clubs has been amalgamated with commercial interests introduced by modern media in sports more recently (Andras 2003; Beech & Chadwick 2013). Intriguingly, while achieving sports success may often be the common denominator for different stakeholders, business scholars aim to know more about the drivers of sport achievement that may involve factors from both worlds: issues about proper commercial management and network effects within local and international communities that reach far beyond direct business interests (Andras & Kozma & Kynsburg 2014).

Various studies have analysed the potential strategic and performance management frameworks that could be relevant to professional sports organisations (Alonso et al. 2009; Becsky 2011; Coskun & Selman 2013; Delaney 2008; Jones 2006; Kriemadis et al. 2008). In a synthesising effort to apply the Balanced Scorecard approach to professional sports clubs, Kozma and Kazai argued that "in a publicly sensitive environment, the ultimate purpose of sports organisations is... attracting the continuous attention of key stakeholders in a financially sustainable way" (2014: 29). They noted that central government, local municipalities and sports' governing bodies often provide financial and other support to the teams representing the community. Sports performance is naturally in the centre of attention, hence bringing public benefits of a sense of pride and the feeling of belongingness in the community. From a public management point of view, financial sustainability is needed as public support may not be guaranteed in the long run. Consequently, while not recommending a change in the overall structure of the Balanced Scorecard, they argued that sports organisations tend to prioritise the customer perspective – and through this, sports performance – and not the financial perspective, as is normally the case in more directly business oriented sectors.

Because there is strong government involvement in the infrastructure development of sports in the Central Eastern European region, strategic performance may be more appropriately measured with frameworks that explicitly cater for public support hence public expectations about performance (cf. Moullin 2009). From that aspect, previous research efforts assessing the application of strategic management and performance measurement frameworks in the non-profit sector (Inamdar et al. 2002; Zelman et al. 2006; McDonald 2012; Kaplan & Norton 2002) reveal relevant conclusions on how the original tools may need to be modified for effective use also in the sport sector. Referring to survey results addressing managers with experience in both for-profit and non-profit sectors, Taliento and Silverman (2005) concluded that it seems to be more challenging to reach goals and measure outputs in non-profit organisations. Even deciding on the strategic direction to pursue is often challenging due to a lack of consensus among key stakeholders. In this environment,

they argued, performance measurement is difficult, hence the need for innovative measures.

In an empirical study Kozma and Kazai found that "the primary strategic objective of a professional sports club is winning sports trophies. However, this is to be supported by additional expected outcomes, namely increased stakeholder participation and sustainable financial management". (2015: 314) This can be interpreted as the triadic structure of strategic objectives for professional sports organisations. They identified three types of key processes that support goal achievement: "preparation for matches and orchestrating winning on-field performances, providing exceptional service to a range of key users (supporters, the media, and sponsors), developing young talent from the region, and fostering meaningful relationship with local communities." (ibid. p. 314) This triadic approach to performance management reflects the three key stakeholders of contemporary sports clubs: customers, owners and supporting public institutions ultimately representing the general public. All three of them play an important role in the strategic opportunity for club management to establish a sustainable operating model and run the club accordingly.

The general strategic performance management framework of professional sports organisations may be complex enough through the triadic structure of objectives, the aspects of internationalisation raise further analytical questions performance measurement needs to respond to. Going international, i.e. playing in international competitions is a strategic option that offers an almost unique opportunity for professional sports clubs in the Central Eastern European region to establish a financially sustainable operating model. The way to achieve that a sustainable strategic position however should be supported by a performance measurement system that offers lead indicators to guide management. It needs further analysis to explore whether and how domestic sports performance can indicate the prospects of international sports performance. It is also intriguing to analyse if and how international revenues can be obtained and what the strategically driven solution could be to ensure those international revenues will be sustainable. Furthermore, however concerned club management may be about the club's role to contribute to communities and the general public, the process how this general public becomes internationalised, and how this can be translated into creating appropriate performance measurement tools are still challenging issues. These higher-level questions then can be broken down to more operational-level questions that provide ample opportunities for international business scholars to be studied empirically.

## *Selected Challenges in Measuring International Performance*

Before specifying our research objectives and methodology, we looked for comparable scholarly work in the related international business literature. We found that investigating the connection between internationalisation and company performance is a focal topic in the international business research field (Contractor et al. 2003; Loacker 2005; Fryges & Wagner 2008; Bekes & Murakozy 2011; Grazzi 2012; Reszegi & Juhasz 2014).

According to Robertson and Chetty (2000) there is no consensus about an appropriate definition and the measurement of export performance. Leonidou et al. (2002) collected different metrics used by researchers, namely: export-intensity, export sales growth, export profit level, export sales volume, export market share, export profit contribution, return on investment, export satisfaction, perceived success, perceived export growth, perceived profitability and perceived market share. The most frequently used metric was export-intensity, followed by export sales growth and export profit level. Halkos and Tzeremes (2009) investigated the top 10 non-financial transnational corporations from South-Eastern Europe. They measured the internationalisation level of companies' inputs as well as outputs. They used the value of foreign assets, number of foreign employees (these are metrics for inputs) and value of foreign sales and transnationality index (TNI) (these are metrics for outputs). The transnationality index is calculated by the ratio of foreign assets to total assets, the ratio of foreign sales to total sales and the ratio of foreign employment to total employment. These indicators can be used to measure the company's internationalisation level for managers' purpose, if internalisation is a strategic goal and makes a significant contribution to increasing corporate value.

We could not find explicitly international performance measurement focused papers in the sport related literature; therefore we looked for comparable research areas to learn from. Our sport focused study raises education as a comparable research field of applying general internationalisation theories; hence our interest in what kind of performance metrics are used for measuring internationalisation in education.

Stankevičienė & Vaiciukevičiūtė (2016) investigated the value creation for stakeholders in higher education management. Their focus was on key performance indicators related to employees and internationalisation. The connection between employees' performance and the internationalisation process was analysed. They highlighted that internationalisation is one of the most visible factors that influence the overall performance of employees as well as university education. They measured the internationality of professors, lecturers, researchers, administrative staff and university budget. They identified metrics for internationalisation: the number of professors having spent at least one study semester abroad, the proportion of lecturers with international work experience relative to the total number of lecturers, the proportion of administrative staff who have taken part in international administration exchange programmes relative to the total number of administrative staff, and the proportion of the

budget for international cooperation in relation to the total budget.

Green (2012) argued that measuring internationalisation is important in education, because it is "a component of overall institutional performance to judge the effectiveness of an institution's internationalisation strategy or its components, to benchmark it with other institutions, and to improve internationalization programs and practices" (2012: 4). Green (ibid.) grouped indicators according to two dimensions. The first dimension was the goal, for example strengthening the international and global dimensions of the curriculum, or enhancing the international competence and experience of faculty and staff. The second dimension was based on the taxonomy of inputs, outputs, and outcomes. Examples he identified for inputs for the first goal: the number of courses with an international focus, number of foreign language courses, number of joint or dual degree programs. Examples for the second goal: the number and proportion of faculty and staff with international experience and expertise, number and proportion of faculty and staff educated outside the United States. He identified outputs for the first goal: the number and proportion of students enrolled in courses with international focus, number and proportion of students enrolled in language courses at various levels. Examples for outcomes for the second goal: demonstrated higher language proficiency, enhanced reputation and recognition for the institution's international character and work.

Brandenburd & Federkeil (2007) identified 186 indicators to measure the internationality and the internationalisation of higher education institutions. They categorised indicators into two groups. They listed 162 indicators related to input and process, for example: staff structures, curricular questions, allocation of resources. 24 indicators were defined for the output, for example: the number of graduates or research findings. They emphasised the priority of strategic thinking to avoid the trap of applying indicators that are easily available. For selecting the appropriate set of indicators, they recommended institutions first clarify their international goals and draw up a strategy to achieve them.

## RESEARCH PROPOSITIONS AND METHODOLOGY

The review of academic literature highlighted that investigating the internationalisation aspects of performance measurement constitute an area that attracts both academic and practical interests, and provides an ample source of questions to be analysed. The decision to focus our investigation on the professional sports industry drives attention to a particularly rich field of study, most notably because of the triadic structure of objectives these organisations have. Apart from understanding the challenges of performance measurement in that inherently international context, our research objective was to propose possible approaches to measuring different aspects of performance. Our overall research question was "how could sport, economic and social objectives be reflected in measuring international strategic performance of professional sports clubs?". Based on our initial analysis and feedback from industry professionals, we broke down this exploratory research question into three propositions to focus our analysis on relevant specific issues:

**Proposition #1:** *Domestic sport performance is a weak indicator of international sport performance.*

Our first proposition focuses on the most critical sport objective of winning trophies in sport. The question underlying the proposition is whether winning domestic trophies can or will lead to successful international performance. While it is clear that the way for a team to qualify to international competitions is exactly through winning the domestic league or cups, it remains to be answered whether strong domestic performance can indicate the possible quality of international performance, apart from the fact that the team will participate in international competitions. The implicit assumption behind the proposition is that there may be other factors that influence international performance that our study is aimed to explore.

**Proposition #2:** *Occasional international revenues are a weak indicator of sustainable international revenues.*

Our second proposition is related to the economic aspect of performance. The inherent nature of sport competitions brings ultimate sport success only occasionally to any particular professional club, hence international revenues from competition prizes tend to flow in irregularly. The strategic question from an international business point of view is if and how the club can stabilise its international revenues through some strategic solutions. Are occasional international revenues an important factor that allows, through proper commercial management, the development of a business model with sustainable international revenues, or their role is much less important in what is necessary for that strategic achievement. Even without much analysis, it is clear that occasional international success raises the expectations of all stakeholders, and this could create a different room for strategic manoeuvring.

**Proposition #3:** *There is no measurable international aspect of social performance.*

Our final proposition addresses the performance measurement issues related to the third fundamental goal of professional sports clubs: social contribution. Our initial investigation revealed that in most cases social performance of a club is not measured by management. Usually it is implicitly assumed that sports performance is actually social performance, hence no special measurement for the latter. Even if social contribution to the public is considered in decision making, the relevancy of such contribution is interpreted only in terms of the effects on local communities or on the nation. Our proposition aims to reveal if and how social contribution

to communities beyond national border can be understood, and, if at all, managed.

Regarding research methodology, we applied the case study methodology (Yin 2003) in our exploratory research, involving two pilot cases. Our aim with the pilot cases was to understand the performance measurement challenges of our topic better, in order to allow more focused, larger scale research efforts to follow. While our propositions were formulated as strong claims, the real purpose behind them was not confirming or falsifying them, but to open new ways of thinking about the subject and explore potential independent variables that can have an effect on international performance. In our pilot case studies, in-depth interviews were conducted with members of club management, as well as coaches and managers of competing teams in the same division. The text of the interviews was subjected to content analysis to reveal potential answers to our questions we did not explicitly foresee when the interview questions were constructed. Results from interviews were cross-checked with available statistics about club and league performance. Our findings from the first case study were compared and contrasted with findings from the second case study, hence our effort to limited generalisation. The generalisation applied was analytical generalisation, rather than statistical generalisation, as the qualitative case study methodology allows for that approach. Whether and how the variables identified through our exploratory study are transferable to additional cases remains to be analysed and confirmed through subsequent research efforts.

Our sample was constructed based on qualitative sampling criteria (Miles & Huberman 1994) to facilitate the exploration effect of our research. The most commercially developed major sport in Hungary is association football, hence a natural choice for our first case. Our second choice was women handball, as Hungary has probably the most competitive national championship in the world. Both clubs selected (they asked to remain anonym for the purposes of our research) have strategic ambitions to regularly play in European competitions. Internationalisation is part of their understanding of sport success, and it is also part of what their stakeholders expect of the clubs. Both are country-side clubs, in cities with 100-200 thousand population, and receive support from the local municipality. Both clubs have started to employ foreign head coaches to instil tactical and cultural elements of management to the squad in order to support internationalisation. Both clubs have extensive youth development system in the host city and the surrounding region. There are, on the other hand, significant differences between the two clubs. The football club played in the European Champions League and also the Europa League a few years ago, and received windfall prize revenues from participation. The handball team won the EHF Cup over 10 years ago, and occasionally managed to get close to repeating that feat in the years that followed. The football club received a brand new, publicly financed stadium two years ago, while the handball team plays in a publicly owned arena that was built over 30 years ago. Football is the most significant and successful sport in the host city of our first case team, while handball is ranked third or fourth in popularity in the city of the selected handball team.

# RESULTS

Our research propositions highlighted key areas of concern about the performance measurement challenges of professional sports clubs in an international context. This section reveals what we have learned about the intricate relationships between a range of measurable factors that possibly influence clubs' international performance.

## *Relationship between Domestic and International Sport Performance*

Our first proposition was constructed to address the potentially complex issue of the relationship between domestic and international performance. By domestic sport performance we mean the team playing in the national championship and cups in its home country. International sport performance means that the team qualified to and participated in an international competition, normally through earning that opportunity by achieving good results in the domestic championship or cup. In our qualitative study we did not really aim at quantifying what weakness means in terms of the power of the indicator, still wanted to understand whether the independent variable (domestic sport performance) is worth examining further in terms of its potential influence on the dependent variable (international sport performance). Moreover, we expected that in our case study other potentially powerful independent variables, including strategic assets or processes could be explored.

A starting point in our analysis was to remind ourselves that professional sport holds the uncertainty of results as a key value that matters for the audience. If the results of most of the matches were predictable and little surprise would come, there would be lower level of interest from supporters in following the events of the competition. In fact, the self governing bodies or professional sports set their regulations with the intention to support the balance of competition among the participating teams. For example, if the league signs a contract with a major broadcaster, the proceeds of the deal are distributed across the clubs not based on which team attracts the most media attention, but more equally to support the less competitive clubs. With a higher level of uncertainty about any matches and the final results of the championship, the league itself will be more marketable to a wide range of audience. Our point here is that no professional sports club can reasonably count with winning the domestic championship in a predictable fashion. No club can dominate a competition for such a long time as it is considered quite normal for a company to dominate its market outside the realm of professional sports.

For a local club to gain the opportunity to even occasionally enter international competitions, they need to show consistently good performance in their domestic championship. Consistency is a key factor in qualifying for international competitions. Unpredictable it may be, if a team shows consistently good performance they tend to win the domestic league, hence qualification for international competition. If they play well in the international competition, they earn the trust of the stakeholders as a credible team capable to achieve success internationally. This trust then is very valuable when club management in their effort to establish their regular participation in international competitions opt to sign coaches and players with more significant international experience. These human resources and the skills they bring to the team are key assets in the club's strategy to internationalise.

Financial strength of the professional club is another key factor necessary to support consistent performance leading to international success. The single most important driver of consistently good performance is the quality of the playing squad. Good players, particularly players with international experience demand high wages which the club needs to finance. Even in efficient transfer markets, it takes time to sign players through a process starting with scouting for talent, then contacting the targets, negotiating the terms of the agreement and registering the rights of the player. Players cannot even be signed any time only during specific periods of the season (transfer windows). Therefore, keeping the good players a club already has is of strategic importance. Players tend to be quite unhappy when, even temporarily, they do not receive their wages for any financial difficulties the clubs may run into. Consistency, again, is a key performance criterion, also in terms of liquidity and the general financial health of the club.

Commercial know-how of management is a rare but very valuable asset for a club with international ambitions. Club finances are under constant pressure by the relatively fixed costs of professional players' wages and the fluctuation of revenues generated in line with the systematically unpredictable sports results the team performs. Management has no option but to look for opportunities to stabilise the flow of revenues through utilising commercial opportunities related to the team's performance. These opportunities include providing ancillary services on match days, like cheerleading before the match or in the break, programmes for children, interactive experience in the club shop, freshly made food in the buffet, live displays in the premises to allow visitors to move freely in the service areas even during the match. These services aim to increase visitors' average spending. Furthermore, additional services may lead to more consistent attendance of the matches by supporters, resulting in an increase of season ticket sales with positive effects on cash flow, and also the enhanced match experience may attract new types of supporters who would not come strictly for their interest in the sport event. Another option is to arrange events in the facility even on non-match days. These events may or may not be related to the core service of the club but are meant to generate additional revenues from utilising the idle capacity of the facility.

From the aspect of social objectives, most professional clubs are expected to run an elaborated youth development scheme that attracts children to play at a young age and nurture them gradually to allow a selected few to play in the professional squad over time. Investment in developing and operating these talent development schemes do not necessarily pay off from a strict financial point of view, as the quality of youth players arising from the system may not be enough for international requirements. However, the public stakeholders of the clubs see these activities as a valuable contribution to the life of the community, hence the clubs' interest to maintain them.

Finally, an important asset that influences whether the club can deliver the consistent performance necessary for international success is the sporting facility matches are played in. In most European countries, these facilities are fully or partly in public ownership, typically under the purview of the local municipality. The construction, but even the operation of a sport facility incurs costs that would make it very difficult, in most cases even impossible for clubs to operate sustainably if the full costs of development and operation would be financed by them. All the more, even if a club could afford paying for those costs, that would channel funds away from investment into the playing squad, which in turn would adversely affect the team's sport performance. However, if the clubs receive support from the local municipality also because of the stadium or arena they use, that will add further weight to the public stakeholders and their expectations in the club's strategic considerations. Contribution to the local communities, who partly finance the club's operations, even if they do not necessarily attend matches, becomes an even more important part of the triadic structure of objectives professional sports clubs have.

Based on what we have learned from the interviews and data analysis of the clubs' key performance statistics, we understand that strong domestic sports performance is a necessary but not sufficient factor in the clubs' international performance. Having identified additional factors described above, we also suggest the following lead indicators could be used to highlight if aspects of operations need to change in order to achieve sustainable international success. (1) Number of players with international experience. (2) Coaching staff with international experience. Both of these human resources can have a very positive effect on the club's chances for international success. (3) Strategic priorities for utilising international prize money for investments, i.e. a concept for sustainable long term performance. The existence of such a concept could indicate whether or not the club could potentially use any prize money they may receive from occasional international participation for the benefit of sustained, long term international success. (4) Size of the

youth base involved in the club's talent development scheme. More specifically, this could be measured by the number of youth players actively and regularly playing in the youth teams of the club. (5) Available playing fields, or more specifically the club's capacity in terms of the number of (youth) teams that have access to training grounds. Both the youth base and the training facilities indicate the strength of the club's relationship with the local government and its embeddedness in the local community.

### *Relationship between Short Term and Long Term International Revenues*

Our second proposition addresses how occasional international revenues from participation in international competition can be transformed into sustainable international revenues. Proposition #2: Occasional international revenues are a weak indicator of sustainable international revenues. The assumption underlying that proposition is that club management is keen to ensure that the substantial amounts that can flow in from a good run in international cups will be available in a relatively regular fashion. This would involve the club being able to develop a sustainable competitive advantage on its international markets. Again, we did not aim to quantify what weakness means in terms of the power of the indicator, but were keen to understand how much relevant the independent variable (occasional international revenues) is in its effect on the dependent variable (sustainable international revenues). We were quite open to explore what other factors may have an impact on the club's sustainable economic success on international markets.

Clubs with international ambition consider signing players with international experience as a strategic step towards their goal of achieving international sports success. Our interviewees confirmed that as the players are performing the core operations of professional sport clubs, their role is naturally substantial in goal achievement. As prize money from participation in international competitions is linked to how well the team performs (matches won, points earned, promotion to the next stage etc.), achieving international sports success normally incurs additional international revenues for the clubs, the amount of which is highly dependent on the sport (football pays more) and the specific international competition. In all cases, there are positive consequences of a good run in international cups, as more interest is attracted to the club that could be exploited both in terms of signing better players and also financially negotiating more favourable deals with sponsors, and public institutions. Even season tickets sell better if supporters believe the international participation may be repeated soon. In case of football, the prize money allocated to the club can be so significant, that even if there is no real sport achievement internationally, the proceeds may allow substantial investments to support continued success.

With or without substantial prize money received from occasional international success, club management faces increasing expectations from stakeholders as a result from the occasional involvement in international competition. A key solution to establish an operating model that supports the opportunity of sustainable international performance is investment into the commercial infrastructure of the club. This involves investment into tangible assets that facilitate commercial revenue generation, and also intangible assets including the know-how of managing the enhanced commercial operations. Tangible assets may include e-ticketing system, e-payment system within the facility, enhanced online service offering using the club's web page or web shop, an expanded and upgraded club shop in the facility, as well as catering services for different customer groups. Most advanced international examples reveal a sophisticated internet-based set of services that support more interaction between the club and supporters in the facility. In terms of the commercial management know-how to be obtained, either the club's current members of management can attend international conferences and trade shows to develop their personal network to facilitate learning and access to information, or additional personnel can be contracted (full time or on an assignment basis) to support the productive utilisation of the new technology installed.

Even if new commercial revenue generating assets are installed and a knowledgeable management runs them, there appears another challenge for clubs in their effort to establish a sustainable stream of revenues from international involvement. The team becomes visible when playing in international competitions not only to the home supporters but also to a much larger European or even global audience. This creates a tempting opportunity for the club to utilise their access to new markets. A strategic achievement can be if the club can address the new stakeholders and turn them into relatively regular users of the club's services. Typically this is manifested in the new stakeholders following the team's international matches but also they can purchase the club's merchandise or sign new sponsorship contracts taking advantage of the increased interest in the club. In effect, the larger supporter base itself, if management carefully, can lead to additional sources of revenue in multiple ways, hence the primary objective of establishing an international supporter base. As explained in the next section, international supporters will also play a key role in achieving the club's social objectives.

A related success factor has also been identified. In the management's effort to attract more supporters through the increased interest towards the team playing in international competition, they may choose to invest into an expanded and upgraded youth development scheme. First, there are direct social benefits this entails by reaching out to the communities through more and more children. Secondly, the further consideration behind this solution is that the more children feel related to the club the more family members and friends will follow the professional team of

the club playing in domestic and especially international competitions. Ultimately, this is another way that leads to an enlarged supporter base, the derived economic benefits of which have been confirmed by our interviewees.

We suggest the following lead indicators to be used to measure how much management is intent on generating sustainable international revenues to the club. (1) Player transfer balance: this reflects whether better players have been signed to the club in a certain period compared to previous periods. The enhancement of the quality of the playing squad is understood to be a good indicator of future international sport success, hence international revenues. (2) The range and number of international sales channels effectively used: this may reflect the quality and applicability of commercial management know-how employed for international revenue generation. (3) Operating leverage, revealing how much management understands the need and is able to implement solutions to turn fixed costs to variable costs, in order to allow additional investments into revenue generating opportunities. (4) Customer development, more specifically the size and range of supporter groups actively addressed in relation to the club's international involvement. (5) Active cooperation with public institutions the support of which can provide substantial support for the club's international efforts, mainly related to youth development and the upgrading of sports facilities. National government (ministries), the local municipality, community groups, schools, and additional NGO's can be addressed.

## *Measuring Social Performance*

The third proposition was defined in our effort to address how the third major strategic orientation of professional sports clubs can be analysed from an international business point of view: the social contribution the club aims to make to local communities and the general public. A key point here is that the "public" in that context is not limited to the active supporters of the club but includes those citizens who do not directly relate to the club in any way. Proposition #3: There is no measurable international aspect of social performance. In fact, social performance is often understood strictly in relation to the population of the host city and the nearby region of the club. We presumed that the nation becomes a relevant community for the club when it goes international. Whether any people outside the nation can be understood as relevant members of "the public" for the club was yet to be explored. Also, how clubs target the interests of these public stakeholders we were keen to learn about. Based on our initial understanding we did not expect much measurement to be in operation related to the social aspect of clubs' performance.

In our interviews, when asked about the social aspects of performance, club managers started by confirming that they believe the fundamental purpose of professional sport clubs includes a strong social element. They need to demonstrate to the public institutions that their support is justified by the club's efforts to explicitly contribute to realising the public benefits local municipalities and non-governmental organisations pursue. This, most notably, is not just an ancillary factor to consider for club management, as in many cases corporate social responsibility programmes run by profit oriented companies. For professional sports clubs, giving back to the communities is one of their primary strategic goals. The reason behind this is clear: local municipalities, or the national government, provide the sport facilities to the club, and often facilitate the club's networking efforts with potential sponsor companies. Interestingly, the key motivation for sponsor companies is their willingness to tighten their relationship with the local municipality and the citizens through supporting the club they love. In that sense, the social and economic aspects of the club's performance are interrelated.

On the other hand, achieving sports success is the first idea that springs to mind for managers when trying to operationalise how exactly they can contribute to the public. The fact that an underperforming club cannot be relevant and interesting to the public is a key point in the strategy of professional sports clubs. Sport performance is relative in the eyes of the public, i.e. it does not necessarily mean winning trophies. What seems to matter, though not strictly analysed with a focused survey, is that the public is looking for positive surprises compared to their initial expectations at the beginning of the playing season. Interestingly, when a club can manage to qualify for international competitions and brings well-known opponents to the city, repeating that feat in the following years may not be accepted so positively again as it quickly becomes part of the public's expectations. Consequently, there is pressure on management to take advantage of the increased attention the team attracts through occasionally playing at the international scene and invest into the squad and commercial facilities. Those investments, in return may lead to further improvement in sport achievement.

The club's involvement in developing young talent is a key area of activity related to social contribution. While the original purpose of most youth development schemes was to nurture talent until some of them can join the professional team and contribute to sport performance, clubs and their public stakeholders realised how valuable benefits these schemes contribute to the community. They source children also from disadvantaged regions and families, and provide them a clear opportunity for career. Even for those who may not eventually become professional players receive education and learn values like teamwork, determination, a focus on continuous learning and improvement, a disciplined lifestyle etc. Those values are not only relevant to future professional athletes but can be the basis of the socialisation of and young individual before making important decisions about their life as an adult in society. This line of thought explains why clubs keep investing into their youth development scheme even if, strictly financially, this

investment may not be recovered any time soon. To be fair, there are also public funds available for the development of youth development schemes.

The international aspect of youth development comes to the spotlight when professional clubs make the decision whether to sign young talent from abroad, in addition to sourcing talent from the host city and its neighbourhood. The interpretation of a positive decision regarding recruiting foreign talent is not unanimously supported by local public opinion leaders. On one hand, this measure may be justified by the expectation that exceptional talent will improve the chances of the professional team to winning major competitions in the future. On the other hand, reflecting all the social benefits of youth development schemes explained above, the taxpaying citizens may expect the clubs to direct their efforts to helping local children in their socialisation and bringing them closer to a potentially international career. Are foreign youth players "crowding out" local talent from the youth development schemes? The other side of the story is that it is quite difficult for a club to attract foreign talent unless the club is already internationally well-known. The practical difficulties and additional costs incurred when bringing foreign talent to Hungary usually prevent clubs from employing but a few youth players as exceptions.

Most social benefits the club can contribute to the public are inherently local. They invite school groups to see their matches (usually free of charge), recruit a number of talented children from the neighbourhood, integrate the sport trainings of children intro their public schooling, organise leisure sport events to bring local citizens closer to each other and to the club or support social programmes that are important for the community. However, there is a perspective that with the club's increased involvement in international competitions the scope of the audience following the team is enlarged and more international. Professional players, particularly the most successful ones, serve as role models for children. An international supporter base means that the players will become role models not just for their home city and region but to a much wider range of population domestically and abroad. Consequently, the focus of the club's social contribution is likely to organically change from strictly local to partly international, as the club can establish its regular presence at international competitions.

The following lead indicators have been identified as potentially useful when trying to measure how well the club performs in relation to its social contributions. (1) Regular or occasional survey of stakeholder expectations. Conducting survey incur costs and efforts to be spent on understanding the expectations of stakeholders including supporters, players, parents, financiers/donors, communities, at home and also (if relevant) at international level. This is a good indicator how much attention management pays to meeting their expectations. (2) Contribution to national team through developing youth players who may not stay at the club but will play in the national team later. (3) A strategic concept for adding value to communities. In such a complex activity as it normally is for a club to run a youth development scheme, it is essential to have the key objectives, principles and resource requirements set in a carefully developed strategic concept. Ideally, this concept includes the milestones for measuring the implementation of such strategy, including the organic growth of the club to international relevance.

## CONCLUSIONS AND FURTHER RESEARCH OPPORTUNITIES

In our exploratory study about the relevance of international considerations in the triadic goal structure of professional sports clubs, we have identified three major strategic challenges in measuring performance. We learned that domestic sport performance is a weak indicator of international sport performance, as there are a number of moderating factors that can be measured to support strategic goal achievement, including the number of players and coaches with international experience employed by the club, a strategic approach to utilising prize money for supporting long term sport performance, and the size of the youth development scheme and the training capacities available for the club.

Furthermore, occasional international revenues are a weak indicator of sustainable international revenues. Moderating factors have been identified, including investment into the quality of the playing squad, commercial management know-how deployed at the club, a decreased level of operating leverage, effective customer development efforts, and active cooperation with public institutions supporting the club.

Finally, we explored a process that can bring social benefits relevant to the international markets of professional sports clubs. This involves regular surveys of the relevant stakeholders, a contribution to the national team by developing local talents, and a strategic concept for adding value to communities. While social contribution is primarily relevant to the host city of the club and its neighbourhood, there is a perspective that through the increased international involvement of the club, its social contribution will also be more relevant to the international community of sport enthusiasts.

The management implication of our analysis is that the management of professional sport clubs needs to develop a strategic framework to enable proper measurement of their achievements along the triadic goal structure they pursue, as complexity prevails in every aspect of their performance. The potential policy implication is that public funding should be linked to goal achievement by the club, as in spite of the complex and relative nature of domestic and international performance, the social contribution made by the professional sport club can be understood and measured.

There are strategic questions arising from our sport-focused study that are potentially transferable to business

fields unrelated to sports. How to measure the complex relationships between domestic and international performance is a relatively advanced area of study in sports, due to the quite measurable nature of sport performance. The lessons learned here could inspire investigations in other businesses by providing patterns of analysis. Also, how occasional international revenues and be transferred into a sustainable stream of revenues is a general problem most businesses face in varying degrees of importance. Finally, the approach to measuring social performance and the process of how this organically becomes relevant to a larger, international group of stakeholders could be used for benchmarking purposes by academics investigating other business fields.

Our current exploratory study is planned to be followed by preparing more case studies with a varied focus in terms of clubs, sports, and countries involved to strengthen the explanatory power and the analytical generalisability of our results. Furthermore, we plan to apply additional methodologies, including quantitative analysis of sport databases and stakeholder survey responses. We conclude that based on our initial investigation, the international business aspect of performance measurement in professional sports is a research topic worth further scholarly examination.

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# Internationalisation of Polish and German Furniture Manufacturers – Comparison of Different Internationalisation Paths

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*SUMMARY*

*The papers aims to analyse the key drivers for internationalisation in furniture industry by taking into consideration the cross-border activities of selected furniture manufacturers in Poland and Germany in comparison. The results show some similarities in internationalisation strategy design of selected furniture manufacturers in both countries. Export tends to be the predominant foreign market entry mode, and major motives to internationalise tend to have a reactive nature. There are some differences with regard to manufacturing location decisions, whereby the general assumption is confirmed that certain manufacturers are in a more advantageous position by concentrating their production at home.*
*Keywords: internationalisation, firm performance, furniture industry, firm behavior, cross-country comparison*
*Journal of Economic Literature (JEL) codes: F23, D22, L22, L25, L68*
*DOI: http://dx.doi.org/10.18096/TMP.2017.01.08*

## INTRODUCTION

Diminishing barriers to international trade, cross-country variations in production costs and the widening scope of production fragmentation at national, regional, and global level have unequivocally reshaped global value chains (Grossman & Rossi-Hansberg 2006). In various sectors production activities have increasingly been extended and/or re-located abroad, prompted by emerging or diminishing opportunities related to changing comparative advantages of various economies or changing needs and capacity of those involved in the production chains.

In some production sectors though a predominance of export or, in general cross-border market transactions, in internationalisation strategy design is to observe. Indeed, foreign production locations are subject to a great variety of risk factors, meaning that manufacturing location decisions have become inherently complex. In fact, relocating production abroad has repeatedly been subject to reconsideration, as many companies had, at best, mixed results (Tate et al. 2014). In addition, a considerable part of companies, that once offshored production, failed to attain the financial benefits they expected to. Needless to say, companies, while expanding internationally, must understand and prepare for dynamic changes at different locations that strategically necessitate a change of scenery with regard to their cross-border transactions.

Despite intense competition, increasing consolidation and toughening regulations, the furniture manufacturing has continuously been subject to changing consumer interests as demand for furniture has increasingly been driven by fashion trends. This necessitated the ability to react to short-term order placements and to manage seasonality. The geographical location of production therefore largely determines to what extent a company is able to do just that, in addition, to sustaining enormous price and cost pressures.

This paper aims to analyse the key drivers for internationalisation in furniture industry by taking into consideration the cross-border activities of selected furniture manufacturers in Poland and Germany in comparison. Thus, the study strives to answer two research questions (RQ):

RQ1) What are specific features of internationalisation in furniture manufacturing sector?

RQ2) Are there any differences and/or similarities in design of internationalisation strategies of selected furniture exporters in Germany and Poland in comparison?

The first part of the paper contains a literature review. Firstly, a classification of major foreign market entry modes is provided. Secondly, advantages of non-equity entry modes, specifically export, are discussed in the light of main theories of internationalisation strategies.

The second part of the paper contains an empirical study focussed on selected furniture manufacturers in Poland and Germany. The study contains an industry overview for manufacturing sector in both countries. A direct comparison, enabled while implementing the same performance indicators for each country (e.g. number of companies, number of employees, total sales) is provided. For an in-depth comparative analysis of selected furniture manufacturers in Poland and Germany a case study method, supported by a qualitative survey – conducted in form of a standardised questionnaire and subsequent expert interviews with manufacturers' representatives - is employed. The empirical results identify some similarities in internationalisation strategies pursued by selected furniture manufacturers in Poland and Germany. The results, furthermore, confirm the assumption, that export is a predominant foreign market entry mode in furniture manufacturing sector in both countries, whereby establishment of wholly owned subsidiaries in attractive foreign markets is envisioned by some furniture manufacturers in a long-term perspective.

The third part of the paper contains the discussion of the research results as well as authors' final remarks. The results of empirical study are consistent with major arguments for selected market entry modes discussed in literature.

The novelty of the paper is comparative cross-country analysis of furniture industry and some representative manufacturers in light of their internationalisation strategies in two selected countries, enabled through implementing identical case study research method supported by a qualitative survey. The research results and final remarks may trigger a further discussion with regard to internationalisation strategy design, choice of appropriate market entry mode and further considerations in the context of cross-country and/or cross-industrial comparison. Furthermore, the results confirm the assumption that more detailed in-depth research on the aforementioned matters is needed.

# LITERATURE REVIEW

By the early 1990s of the last century throughout the first decade of the twenty-first century manufacturing activities in various sectors were redesigned in being no longer geographically concentrated at just one location, but, instead, being split up into production stages located, where the advantage to be gained was greatest (Martinez-Mora & Merino 2014).

Outsourcing and offshoring production constituted one of the most significant changes made by most globally operating companies. In fact, the nature of manufacturing shifted rapidly from producing goods from start-to-finish to outsourcing tasks that were formerly internalised, thereby adding value at various production stages across many different locations. In addition, transportation and communication posed no longer any barriers to the separation of tasks, given the revolutionary advancements in technology facilitating a historic break-up of the production process (Grossman & Rossi-Hansberg 2006). Generally speaking, offshoring production gave companies the possibility to exploit location and cost advantages stemming from significantly lower wages elsewhere, thereby cutting their labour costs in half. According to a survey by the Fraunhofer Institute in 2009, saving labour costs was found to be a major reason for offshoring production in the first place (Kinkel & Maloka 2009).

Greater flexibility to respond to changing market conditions had likewise been brought up, allowing German producers, for instance, to take advantage of foreign labour by laying off workers and creating new jobs smoothly and thus being able to adjust their labour usage (Farrell 2005). This offshoring trend went on for decades, sending both blue-and white-collar jobs to countries, where labour, engineering, and managerial costs were significantly lower. Recently, however, the tendency to offshore production had topped out and a reversal of the trend started to unroll in the U.S. and Europe (Heim, Matiz & Ehrat 2014). Reasons for this reverse trend vary, often the fact that the wage differentials between high- and low-wage countries are decreasing and disadvantages of offshoring, such as high transportation costs and the loss of an agile supply chain thus cannot be out-weighed (Heim et al. 2014). According to the Fraunhofer Institute (2013), however, the key drivers for keeping manufacturing process at home, which were deemed critical by more than 50% of the companies surveyed, comprised missing flexibility and problems in running reliable production processes at a foreign location that frequently result in below-average performance in quality factors (Fraunhofer Institute 2013). Further motives relate to unsatisfying capacity utilisation rates, high transportation and coordination costs, whose significance is rated at 28% and 21%, respectively.

It could be assumed, that in some manufacturing sectors a pre-existing production infrastructure combined

with a high level of know-how render a home country as an advantageous manufacturing location, without compromising the process of internationalisation (Peters, Reinhardt, & Seidel 2006). Specialist knowledge can hardly be fully regained at an off-shored production site, most of which are typically relocated to lower wage countries. Mostly, the consequent costs of a relocation abroad are often recognised at a much later point in time, usually when first fluctuations in quality levels occur, given the initial lack of expertise. It is assumed that knowledge-based factors are typically subordinated to cost-related considerations. The highly integrated infrastructures and a strong presence of specialised knowledge, accumulated and groomed over many decades, allows for manufacturing at similar competitive levels in spite of higher labour costs, in particular, if production is highly automated.

Based on the assumption that certain manufacturers are in a more advantageous regime, while concentrating their production at home, a question regarding their internationalisation strategy design arises. After a favourable country has been identified, companies can choose between particular modes of entry, which are mainly distinguished by their degree of commitment, investments, and risks involved. Correspondingly, choosing the right entry mode is a challenging task. Hence, many companies regularly decide "to start small" at first. Thus, the authors Johnson, Scholes and Whittington refer to the so called "staged international expansion model". It "proposes a sequential process whereby companies gradually increase their commitment to newly entered markets, as they build market knowledge and capabilities" (Johnson et al. 2012). The model includes various entry modes: exporting, licensing and franchising, strategic alliances and joint ventures, and wholly owned subsidiaries (Dess et al. 2007) In general, it can be stated that the risk of a market entry is in correlation with the amount of investment set in place; meaning that the higher the investment is, the higher is the risk involved (Lasserre 2012).

Exporting is the first determined mode of entry in the staged international expansion model which requires least investments and bears the lowest risk. Accordingly, it is often used by companies as a first step in the internationalisation process. By exporting, a company produces goods and services at the home base and then sells these to customers in a foreign (host) country. Investment volume required to start exporting is moderate, which is beneficial for the exporter. Another argument in favour of exporting are cost advantages through economies of scale while centralising production at home. However, exporting is often associated with the consideration, that host countries could prefer other entry modes that bring along investments into the country by which, for instance local employment is created (Dess et al. 2007). Thus, trade protectionism, restrictive trade policy instruments, and access to local distribution channels could be classified as major crucial factors of exporting. Distribution in host markets is often dominated by local intermediaries, industrial associations or local partnerships essential to export and sell sufficiently in a foreign country (Lymbersky 2008). As already stated, many companies start stepwise with exporting in order to gain sufficient international experience before they increase their commitment (Dess et al. 2007).

Depending on which of type of internationalisation advantages were identified, an appropriate mode of entry is to be chosen, by which a company is more likely to be successful abroad. These mainly range from selling goods and services in a foreign market, over non-equity agreements with other firms, to equity investments in either an already existing facility or in a new venture (Dunning 2000).

Some of these considerations are put in focus of analysis of internationalisation strategies pursued by selected furniture manufacturers in cross-country comparison.

## METHODOLOGY AND DATA

The objective of the conducted research is to analyse opportunities arising from development in foreign markets as well as to present the involvement of German and Polish furniture manufacturers in internationalisation strategies in comparison. The study consists of two parts. The first one deals with the analysis of the furniture industry, while the second one concerns the analysis of selected companies.

In the first stage of the research the available industry reports and source data of the Central Statistical Office – CSO (GUS) and the Federal Statistical Office – were used. Furniture industry in Europe, and then in Poland and Germany, was analysed with the use of the desk research method.

The second part of the study contains the analysis of selected furniture manufacturers. In order to achieve its aims, unobtrusive research was conducted. The method adopted in the investigation includes qualitative expert interviews with selected furniture manufactures, content analysis involving the examination of the information recorded in sources such as: books, magazines or websites (Babbie 2005). The study also involves an analysis of *Lista 2000. Polskie przedsiębiorstwa. (List 2000. Polish Enterprises)* as well as *Ranking eksporterów (Ranking of Exporters)* prepared by the newspaper *Rzeczpospolita* for Polish furniture manufacturing, and analysis of industry reports and data provided by the Federal Statistical Office – *Statistisches Bundesamt* – for German furniture manufacturers. The study places particular attention to furniture manufacturers and their operations in foreign markets. Preliminary observations concern their involvement in international operations.

Furthermore, the paper presents an in-depth analysis of selected Polish and German furniture manufacturers conducted on the basis of the qualitative research results obtained by the authors. The analysis of the enterprises is

designed in a form of case studies allowing to draw conclusions concerning the advancement of furniture manufacturers with regard to international activities in cross-country comparison respectively. The collation of the representative Polish and German furniture exporters exemplifies the processes connected with internationalisation of enterprises. Moreover, this type of description of the research results allowed for formulating general conclusions.

# MAIN FINDINGS

## *Furniture Industry Worldwide*

When analysing the size of the world market it should be noted that 40% of the world production of furniture takes place in Europe. The biggest European furniture manufacturers are Germany, Italy, Poland and France. What is particularly important here is that the total share of the four European countries in the world production of furniture is 13% (The EU Furniture Market 2014).

As for the size of production (in billions USD), in 2011 the largest world manufacturers of furniture were China (73.8), the USA (69.3), Italy (30.1), Germany (22.8), Japan (19.2), Brazil (13.9), the UK (10.9) and Poland (10.2). When one looks into export activities of furniture manufacturers, it can be noticed that Poland's share in the world market amounts to 4.5%. The respective share of Germany is equal 5.9%. It should be also emphasised that among all the branches of industrial processing furniture manufacturing in both countries – Germany and Poland - achieved high level of specialisation in a global sense (Wiktorski & Adamowicz 2014).

The above data shows that Germany holds the forth and Poland the eighth position in the world with regard to their production size of furniture. Thus, both countries are recognised as locations specialising in furniture manufacturing.

The importance of German and Polish furniture industry in the worldwide context is stressed by the fact that in the world ranking of exporting countries the countries were located at the second and the fourth position respectively since 2004. Moreover, in 2012 German furniture export was worth €8,483m and Polish worth €6,513m, respectively. These numbers in the ranking signify that both Germany and Poland play an important role in the global furniture market qualifying them as a representative selection for empirical cross-country comparison. The main segments of the furniture market in Poland are: furniture and interior furnishings, flat pack furniture, institutional furniture, upholstery, dining room and living room furniture, bedroom furniture, kitchen furniture, office furniture, armchairs and chairs. The furniture manufacturing range in Germany is more consolidated – as compared to Poland – and represented mainly by the following three positions: kitchen furniture, office furniture and mattresses. The world ranking of countries exporting furniture in the years 2003–2012 is presented in Table 1.

*Table 1*
*World furniture trade in the years 2003-2012 (€million)*

| | 2003 | 2004 | 2005 | 2006 | 2007 | 2008 | 2009 | 2010 | 2011 | 2012 |
|---|---|---|---|---|---|---|---|---|---|---|
| **China** | 6,503 | 8,270 | 10,967 | 13,800 | 16,357 | 18,481 | 18,337 | 25,165 | 27,524 | 38,387 |
| **Germany** | **5,279** | **5,776** | **6,109** | **6,897** | **7,855** | **8,131** | **7,015** | **7,605** | **8,505** | **8,483** |
| **Italy** | 8,553 | 8,698 | 8,442 | 8,944 | 9,591 | 9,320 | 7,285 | 7,761 | 8,064 | 8,131 |
| **Poland** | **3,313** | **3,867** | **4,394** | **4,898** | **5,485** | **5,767** | **4,921** | **5,701** | **6,404** | **6,513** |
| **United States** | 2,131 | 2,198 | 2,400 | 2,620 | 2,689 | 2,869 | 2,380 | 2,919 | 3,064 | 3,816 |
| **Vietnam** | 761 | 1,070 | 1,447 | 1,776 | 2,158 | 2,320 | 2,239 | 2,820 | 2,791 | 3,494 |
| **Canada** | 3,639 | 3,469 | 3,591 | 3,586 | 3,073 | 2,530 | 1,734 | 2,064 | 2,057 | 2,255 |
| **Malaysia** | 1,416 | 1,512 | 1,613 | 1,783 | 1,839 | 1,809 | 1,586 | 1,904 | 1,840 | 2,060 |
| **Sweden** | 1,239 | 1,324 | 1,411 | 1,589 | 1,704 | 1,705 | 1,433 | 1,590 | 1,751 | 1,783 |
| **France** | 2,014 | 2,041 | 2,030 | 2,176 | 2,369 | 2,384 | 1,948 | 1,746 | 1,733 | 1,704 |

Source: CSIL processing of United Nations, Eurostat and national data Specifically other national sources include: US Census Bureau, Ministry of International Trade and Industry (Malaysia) in: *The EU Furniture Market Situation and a Possible Furniture Products Initiative – Final Report,* by Centre for European Policy Studies, Brussels, November 2014, p.30).

## *Furniture Manufacturing in Poland*

The analyses conducted so far reveal that Polish furniture manufacturing belongs to the narrow group of the largest furniture manufacturers and exporters in the world. According to the source data published by the CSO, at the end of 2008 1,249 firms were classified under the code 31.0 – furniture manufacturing in the Polish Classification of Activities (PKD is an equivalent of EKD - The European Classification of Activities) used for statistical purposes in the Polish Classification of Activities), while 1,251 business entities were recorded there in 2013. Furniture manufacturers classified according to the number of employees in the years 2008–2013 are shown in Table 2.

*Table 2*
*Furniture manufacturing in Poland –number of companies, number of employees in the years 2008-2013*

| **Furniture manufacturers** **Years** | 10-49 employees | 50-249 employees | 250 and more employees | **Total number of companies in furniture manufacturing (PKD 31.0)** |
|---|---|---|---|---|
| 2008 | 804 | 333 | 112 | **1,249** |
| 2013 | 845 | 310 | 96 | **1,251** |

Source: Authors' own research on the basis of *data published by the Central Statistical Office.*

The data quoted above concerns enterprises employing 10 people or more. Three groups of enterprises can be distinguished with regard to the number of employees working in the furniture industry. In 2013 the largest group (845 companies) consisted of firms employing between 10 and 49 people. Employment of 50 to 249 people was recorded in 310 companies, while the least numerous group was the one including companies employing 250 people or more (96 firms) – see Table 2. It is worth noting here that despite the economic crisis the total number of enterprises in the analysed period remained stable. Changes in particular employment groups require deeper analyses.

In the context of internationalisation of furniture manufacturers one ought to pay attention to the number of exporters. The changes in the number of exporters in the years 2008–2013 and belonging to the three aforementioned groups are presented in Table 3.

The analysis of the data in Table 3 shows that in 2008 the number of exporters was 457, while 496 firms operated in foreign markets in 2013. The quoted data confirms the growing interest in conducting business activities in foreign markets. The changes observed in particular employment groups are caused by the emergence of new enterprises (in groups of businesses employing 10–49 and 50–249 people). It can be assumed that the changes in the number of exporters in particular groups are a consequence of downsizing which classifies a given company in a different group with regard to employment size.

*Table 3*
*Furniture manufacturing in Poland – number of exporters, number of employees in the years 2008-2013*

| **Furniture manufacturers** **Years** | 10-49 employees | 50-249 employees | 250 and more employees | **Total exporters in furniture manufacturing (PKD 31.0)** |
|---|---|---|---|---|
| 2008 | 117 | 237 | 103 | **457** |
| 2013 | 142 | 259 | 95 | **496** |

Source: Authors' own research on the basis of *data published by the Central Statistical Office.*

In the course of analysis of furniture manufacturing in Poland it is worth mentioning the data concerning sales revenues as well. The values of total sales revenues and the values of export revenues are expressed in Euro €.[1] The table below presents the changes in total sales revenues generated in the years 2008–2013 by furniture manufacturers of different sizes.

[1] *The National bank of Poland (NBP) exchange rate was applied to convert the values of sales revenues from PLN to EUR. For the 2008 data: 1 EUR = 4.1724 PLN, rate of 31.12.2008. For the 2013 data: 1 EUR = 4.1472 PLN, rate of 31.12.2013.*

*Table 4*
*Furniture manufacturing – sales revenues (€million) in the years 2008-2013, number of employees*

| **Furniture manufacturers** **Years** | 10-49 employees | 50-249 employees | 250 and more employees | **Total sales revenues in furniture manufacturing (PKD 31.0)** |
|---|---|---|---|---|
| 2008 | 501.0 | 1,279.7 | 4,171.9 | **5,952.6** |
| 2013 | 670.1 | 1,528.9 | 4,611.8 | **6,810.8** |

Source: Authors' own research on the basis of *data published by the Central Statistical Office.*

The above table shows that sales revenues in furniture manufacturing amounted to €5,952.6m in 2008, while in 2013 it increased to €6,810.8m.

In the analysis of internationalisation of furniture manufacturers it is also worth turning attention to export revenues. Table 5 below presents the changes in export revenues generated in the years 2008–2013 by furniture manufacturers of different sizes.

*Table 5*
*Furniture manufacturing in Poland – export revenues (€million) in the years 2008-2013, number of employees*

| **Furniture manufacturers** **Years** | 10-49 employees | 50-249 employees | 250 and more employees | **Total export revenues in furniture manufacturing (PKD 31.0)** |
|---|---|---|---|---|
| 2008 | 69.0 | 491.2 | 2,353.2 | **2,913.4** |
| 2013 | 104.2 | 720.8 | 3,370.6 | **4,195.6** |

Source: Authors' own research on the basis of *data published by the Central Statistical Office.*

The data shown in Table 5 depicts the furniture enterprises' involvement in export. It should be noticed that the largest export revenues are generated by big companies (employing 250 or more people). Their export revenues totalled 2,353.2 and 3,370.6 in 2008 and 2013 respectively. The second largest revenues were generated by medium-sized companies (50–250 employees). The firms employing between 10 and 49 people are least involved in export.

The analysis of data included in Tables 4 and 5 draws one's attention to the share of export in total furniture sales revenues. The presentation of the export share makes it possible to attempt to estimate furniture companies' involvement in foreign markets. In 2008 furniture export made up 48.9% of total sales. In 2013, however, the share rose up to 61.6%, which is an average annual increase of over 2.5%. The observed rise points to the growing role of export in the activities of furniture manufacturers.

## *Furniture Manufacturing in Germany*

According to data published by the Federal Statistical Office, there were 1,056 in year 2008 and 1,039 companies in year 2013 registered as German furniture manufacturers respectively. German furniture manufacturers classified by the number of employees are indicated in Table 6.

*Table 6*
*Furniture manufacturing in Germany – number of companies, number of employees in the years 2008 and 2013*

| **Furniture manufacturers** **Years** | Below 50 employees | 50-249 employees | 250 and more employees | **Total number of companies in furniture manufacturing** |
|---|---|---|---|---|
| 2008 | 499 | 470 | 87 | **1,056** |
| 2013 | 519 | 449 | 71 | **1,039** |

Source: Authors' own research on the basis of *data published by the Federal Statistical Office.*

The manufactures are divided in three classes regarding the number of employees. Below 50, 50 to 249 and 250 and more employees. In 2013 the largest group with a count of 519 was the class below 50, 449 manufacturers were recorded in the class of 50 to 249 employees and the smallest group with 71 manufacturers are within the class of 250 and more employees. It is worth mentioning that while the first two classes have deviations of about 4 percent positive and negative, the class of the bigger sized companies (250 and more employees) has a reduction of 18,4 percent (from 87 in 2008 to 71 in 2013).

The biggest share are the manufacturers of other furniture with 53.06%, the second are the manufacturers of office furniture with 33.5% and with 7.61% and 5.83% the kitchen and the mattress manufacturers have the two smaller shares of all manufacturers, all measured in 2015 (Federal Statistical Office 2015).

The data in Table 7 shows the total sales of German furniture manufacturers in 2008 and 2013 classified by the number of employees.

*Table 7*
*Furniture manufacturing in Germany – Total sales (in €million) in the years 2008 and 2013, number of employees*

| **Furniture manufacturers** **Years** | Below 50 employees | 50-249 employees | 250 and more employees | **Total sales revenues in furniture manufacturing** |
|---|---|---|---|---|
| 2008 | 1,769.5 | 8,201.3 | 9,203.3 | **19,174.5** |
| 2013 | 1,842.1 | 7,689.5 | 8,236.7 | **17,768.2** |

Source: Authors' own research on the basis of *data published by the Federal Statistical Office.*

It shows that the total sales decreased from 19,174.5 to 17,768.2 million euros, which is a total decrease of 7.2 % over the years of 2008 to 2013. Although there is not much data given, there is a certain relation between the changes of the amount of companies in each group to the change of the total sales in each group measured in 2008 and 2013. In the first class, where the number of companies increased about 4 percent, there is also an increase in total sales of about 4 %. The other two classes had a decrease in the number of companies and the changes in total sales are also negative (6.2% in class two and 10.5% in class three) whereas the decrease in the third class is also the biggest like in table 6.

Noticeable is that the number of employees in the kitchen furniture manufacturers is comparatively high with respect to the number of kitchen manufacturers.

The data shown in Table 8 shows the total sales of German furniture manufacturers in the years 2008 and 2013 divided in national and international sales and as a result of these two numbers, the export rate.

*Table 8*
*Furniture manufacturing in Germany – Total sales divided in national and international sales (in €million)*

| **Sales** **Years** | National | International | **Export rate** |
|---|---|---|---|
| 2008 | 14,076.8 | 5,097.7 | 26.59% |
| 2013 | 12,784.2 | 4,984.0 | 28.05% |

Source: Authors' own research on the basis of *data published by the Federal Statistical Office.*

While, like mentioned above, the total sales decreased, the national and international sales decreased both but while the national sales decreased around 9.2% the international sales just decreased about 2.2% so that the export rate increased about 1.46 percent points from 26.59% to 28.05%.

The export rate of German furniture manufacturers and export rates for each segment within these furniture manufacturers. The German mattress manufacturers are the only ones with a continuous decrease in export rates and they have with an average of 14.5% measured from 2011 to 2015 the lowest export rate. Manufacturers of other furniture are round about the same regarding the overall furniture manufacturers, the office furniture manufacturers are a little bit below that and the kitchen furniture manufacturers segment is with 5.5 percentage points in 2015 the segment with the highest export rate.

## *The Analysis of Furniture Manufacturers in Poland and Germany in Comparison*

The results of the aforementioned research served as a basis for further analysis concerning internationalisation of furniture manufacturers. In case of Polish furniture

manufacturers the analysis was started with the *Lista 2000. Polskie Przedsiębiorstwa (List 2000. Polish Enterprises),* which presents the largest 2000 companies in Poland. This list of firms contains 24 business entities operating in the furniture industry. Their annual sales in 2013 ranged from €29m to €964.5m. A preliminary observation of furniture companies conducting their activities in foreign markets was carried out on the basis of *Ranking Eksporterów* (The Ranking of Exporters). The analyses revealed that out of the 300 companies listed in the ranking in 2013, 11 firms were furniture exporters *(Lista 2000 polskich przedsiębiorstw,* 2014).

The next step of the analysis was selecting enterprises whose export revenues exceeded €100m out of the 11 furniture exporters. The top four furniture manufacturers in terms of export revenues are: *Swedwood Poland sp. z o.o., Grupa Nowy Styl sp. z o.o., Black Red White SA GK, Fabryka Mebli Forte SA GK.*

*Swedwood Poland sp. z o.o.* is a Polish furniture manufacturer established in 1997 and operating within IKEA Industry group. The corporate group *Nowy Styl sp. z o.o.* started in 1990 as a chair and armchair manufacturer offering also office furniture. Then diversified into production of wooden floors. It offers now complex solutions for offices and public spaces. The corporate group *Black Red White SA* is the biggest Polish furniture corporate group that was started in 1991. It is engaged in the production and distribution of all types of furniture and home furnishings. The corporate group *Fabryka Mebli Forte SA GK.* was established in 1992. It specialises in production of furniture for self-assembly.

The annual export of the above mentioned firms in 2013 ranged from €130.7m to €858.2m. Interestingly, further 7 enterprises generated revenues reaching the level of only €100m. The top furniture exporters in Poland and the share of export in their total sales revenues is shown in Table 9 below.

*Table 9*
*Top exporters in Poland (furniture manufacturing)*

| Code | Company | Share capital | Export revenues in 2013 (€million) | Export in sales (percentage share) | | | | Sales revenues in 2013 (€million) | No. of employees in 2013 |
|---|---|---|---|---|---|---|---|---|---|
| | | | | 2013 | 2012 | 2011 | 2010 | | |
| *C1* | *Swedwood Poland* | foreign | 858.2 | 88.00 | 90.00 | 91.00 | 90.60 | 975.2 | 9,030 |
| *C2* | *Grupa Nowy Styl* | mixed | 240.9 | 86.18 | 84.00 | n.a. | n.a. | 279.5 | n.a. |
| *C3* | *Black Red White SA, GK* | domestic | 160.1 | 42.10 | 41.60 | 41.80 | 31.80 | 380.2 | 7,851 |
| *C4* | *Fabryka Mebli Forte SA, GK* | mixed | 130.7 | 81.33 | 80.43 | 76.30 | 78.53 | 160.7 | 2,163 |

Source: Authors' own research on the basis of *Ranking eksporterów* in *Lista 2000 polskich przedsiębiorstw i eksporterów.* Special Supplement in *Rzeczpospolita,* 28 October 2014. p. 8.

Then the top four Polish furniture exporters were subjected to in-depth analysis.

In case of German furniture manufacturers the analysis was based on data provided by the Federal Statistical Office. A preliminary observation of furniture manufacturing companies was carried out with regards to their international operations. Firstly, the companies already active in foreign markets and having operations in more than 2 different foreign countries and an export rate greater than 30% were selected. Secondly, out of the remaining list, companies that were founded with domestic capital, and representing major fields of specialisation in German furniture manufacturing – namely, kitchen and office furniture – were selected. The short- listed companies were classified as representative for the purpose of this research and contacted for expert interviews.

For qualitative case-study-based analysis in Germany expert interviews with selected representative furniture manufacturers were conducted. The companies are respectively: *Nobilia, Himolla, Häcker Küchen.*

*Nobilia* is a German furniture manufacturer founded in 1945 specialised in kitchen furniture. *Nobilia* produces about 630.000 kitchens per year. Its estimated domestic market share is about 30%. *Himolla* is a German furniture manufacturer founded in 1948 specialised in upholstery furniture. *Himolla* produces over 1,600 items of furniture per day. The oldest firm, *Häcker Küchen* was founded in 1898 and like Nobilia, specialises in kitchen furniture.

Key data of the German furniture manufactures selected for case study analysis are shown in Table 10.

*Table 10*
*Top exporters in Germany (furniture manufacturing)*

| Code | Company | Share capital (domestic, foreign, mixed) | Export revenues in (€ million) | Export in sales 2015 (percentage share) | Sales revenues in 2015 (€ million) | No. of employees in 2015 |
|---|---|---|---|---|---|---|
| *C5* | Nobilia | domestic | 427.7 | 42% | 1.018,4 | 2800 |
| *C6* | *Himolla* | domestic | n.a. | n.a. | 200 | 1100 |
| *C7* | *Häcker Küchen* | domestic | 177.1 | 38% | 466 | 1300 |

Source: Authors' own research on the basis of corporate data

The findings of empirical case-study-based analysis of the top German and Polish exporters are classified with regard to their operational activities locations (manufacturing, sales) and summarised in Table 11 and Table 12 respectively.

*Table 11*
*Location of operational activities of the top Polish furniture exporters*

| **Company** | **Production location** | | **Sales location** | |
|---|---|---|---|---|
| | domestic | foreign | domestic | foreign |
| POLAND | | | | |
| ***Swedwood Poland*** | Wooden furniture or furniture elements<br>Production department in Goleniów | | Furniture distribution IKEA chainstore | IKEA network of worldwide distribution |
| ***Grupa Nowy Styl*** | Office and institutional furniture<br>Manufacturing plant in Krosno | Office and institutional furniture<br>Manufacturing plants in Germany, Ukraine and Russia | Network of sales and distribution around the country | Network of distribution in over 100 countries<br>Markets: Europe, the USA, Australia, China, Russia, Middle East<br>Branches in: the UK, France, Germany, United Arab Emirates and the USA |
| ***Black Red White SA, GK*** | Furniture and interior furnishings<br>Manufacturing plant in Biłgoraj | Furniture and interior furnishings<br>Branches in: Ukraine, Belarus, Slovakia, Hungary, Russia, Bosnia and Herzegovina | Logistics centre (Mielec)<br>Regional wholesale outlets, furniture stores, retailers Wrocław, Cracow, Lublin, Zabrze, Będzin, Chorzów, Łódź, Bydgoszcz, Poznań, Warsaw, Gdańsk and about 800 trade partners | Products available in over 40 countries.<br>Location of wholesale outlets and furniture stores: Ukraine, Belarus, Slovakia, Hungary, Russia, Bosnia and Herzegovina<br>Other markets: The Czech Republic, Romania, Latvia, Lithuania, Estonia, Germany, Austria, Belgium, Bulgaria, Croatia, Serbia, Greece, Scandinavian countries, Kazakhstan, Kyrgyzstan, Mongolia, New Zealand, the UK, Canada. |
| ***Fabryka Mebli Forte SA, GK*** | Flat pack furniture<br>Manufacturing plants Ostrów Mazowiecka, Suwałki, Białystok, Hajnówka | | Furniture distribution retail chain, furniture stores around the country | Products available in over 30 countries.<br>Sales departments, retail chains and furniture stores around Europe.<br>Key markets: Germany, France, the UK |

Source: Authors' own research.

*Table 12*
*Location of operational activities of the top German furniture exporters*

| Company | Production location | | Sales location | |
|---|---|---|---|---|
| | domestic | foreign | domestic | foreign |
| GERMANY | | | | |
| ***Nobilia*** | Two manufacturing plants in Verl, Germany;<br>One product catalogue worldwide, different market niches in different countries. | No production plants abroad at the moment;<br>Foreign production is envisaged in order to reduce delivery times (e.g. in China and/or the USA). | Network of sales and distribution around the country. | Network of distribution in 85 countries;<br>Direct sales to purchasing associations or franchise chains;<br>Prices are negotiated centrally but fractured and delivery to specific traders;<br>Processing of orders in 17 languages;<br>Delivery by own trucks in Europe, container shipment worldwide;<br>External companies engaged for exhibitions assembling for foreign customers. |
| ***Himolla*** | Manufacturing plant in Taufkirchen, Germany;<br>Customised product offering abroad to meet quality standards and customer preferences. | No production plants abroad at the moment;<br>Foreign production is not envisaged. | Network of sales and distribution around the country. | Network of distribution in 43 countries whereas the international core business is in Europe (Great Britain, France, Austria, Switzerland, Netherlands, Belgium);<br>Direct sales via own export division to furniture stores, furniture retailers or commission agents. |
| ***Häcker Küchen*** | Four manufacturing plants in Rödinghausen, Germany;<br>Customised product offering abroad to meet quality standards and customer preferences. | No production plants abroad at the moment;<br>Foreign production is not envisaged. | Network of sales and distribution around the country | Network of distribution in over 60 countries;<br>Direct sales to furniture stores, furniture retailers or commission agents;<br>Delivery by own trucks (criteria for foreign market selection). |

Source: Authors' own research.

The research showed that in the process of undertaking and conducting export activities the analysed companies in many respects behaved in a way similar to the one described in the literature. Although the motives for expansion into foreign markets were formulated in a slightly different way, they still do correspond to those presented in the literature. The chosen results of the case studies provided a basis for the following general conclusions:

a. Manufacturing location

*Similarities:*

- The representative German and Polish furniture manufacturers are companies existing in the market for many years.
- Manufacturing is mainly based domestically and tends to have a certain focus of specialisation (e.g. kitchen furniture manufacturing).

*Differences:*

- In the process of gradual growth, the Polish companies develop their production base, expand the range of their products and set up their plants abroad. Foreign branches are set up in countries ensuring access to materials and where production costs can be kept at a low level. Such countries include: Ukraine, Belarus, Russia or Bosnia and Herzegovina. Other locations of the plants such as e.g. Germany, Slovakia or Hungary are chosen due to the proximity of markets.
- The German companies keep their production at home ensuring themselves high level of control, e.g. with regard to quality issues, and strategic planning out of headquarters location.

b. Distribution network design

*Similarities:*

- The furniture and interior furnishings are sold under manufacturer brands. *Swedwood Poland* and *Häcker Küchen* are exceptions, as it sells its products under the IKEA brand (for *Swedwood Poland*) and local furniture retailer brands (for *Häcker Küchen*).
- Domestic sales are conducted through complex distribution networks, logistics centres, regional wholesale outlets, furniture stores and retail stores located home countrywide respectively.
- Foreign sales are realised in form of B2B exporting to furniture stores, furniture retailers and

commission agents. Both German and Polish furniture manufacturers have a wide business geography offering their products in at least 30 foreign markets respectively.

*Differences:*

- The German manufacturers tend to exercise higher level of control about their distribution process abroad. This is realised in delivery mode by own trucks to their major markets, esp. in Europe. Logistical reachability of foreign customers by own truck fleet serves as a criteria for foreign market selection while expanding internationally.

c. Internationalisation strategy motives and modes

*Similarities:*

- In both cases the predominant motives to internationalise are reactive and could be summarised as: domestic market saturation, growing demand from international customers, necessity to reduce market power of purchasing associations and similar.
- Exporting is a predominant foreign market entry mode. A strong export orientation of business is confirmed in all cases and reflected in high export rates.

*Differences:*

- Polish manufacturers show greater dynamics in establishing own production plants abroad. This strategy enables them a market insider status leading to elimination of risks of trade restrictions and protectionism.
- German manufacturers tend to customise their product offering for selected foreign markets in order to meet quality standards (e.g. requirement to use fireproof materials for the UK and US markets) or different customer needs. This strategy results in a different market positioning of same manufacturer in different markets – usually, mass market in Europe and luxury market segment in emerging and developing markets.

# CONCLUSION

Both Germany and Poland hold globally top positions with regard to their production and exports of furniture. Although top German and Polish furniture exporters are large companies classified within the same range of revenues the German producers have higher productivity per employee then the Polish ones. The Polish furniture manufacturing sector seems still to be more labour-intensive. Besides that authors can hardly see any major differences between the two industries.

More can be said about the differences between the individual firms. The German manufacturers are much older companies then their Polish counterparts. They started their internationalisation processes a few decades ago and were building their international customer base incrementally. The Polish furniture producers are relatively young companies but they seem to be catching up with their German counterparts pretty quickly using external development modes that help them to secure access to cheaper raw materials and labour force in some countries as well as direct access to markets in other countries. Definitely German and Polish furniture manufacturers are using different business models and the Polish ones seem to be more innovative.

German manufacturers tend to produce at home controlling the whole process and thus obtaining high quality products that can be the basis for differentiation strategy. Polish manufacturers seem to be having a cost advantage and thus they can follow best-cost provider strategy.

One of course has to remember that this article is merely a first rough attempt to compare Polish and German top furniture manufacturers, thus this matter requires further study. The individual in-depth interviews have to be carried out in order to collect more actual data to make the proper comparisons as well as to verify the authors' assumptions concerning furniture manufacturers' drivers for internationalisation and their internationalisation strategies.

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# De-Internationalisation Patterns in Hungary

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*SUMMARY*

*The debate on firm internationalisation has predominantly focused on different aspects connected to growth. However, the notion of de-internationalisation is not as popular, although it could also contribute significantly to our understanding of internationalisation. This paper focuses on de-internationalisation, its different modes and patterns followed by companies in the Hungarian context. Three hypotheses are tested: that de-internationalisation is a mass phenomenon, after de-internationalisation most companies are terminated, and de-internationalisation does not mean the end of international exposure. To test these hypotheses the Hungarian Corporate Tax Database was used with which the whole population of Hungarian companies in the years from 2009 to 2014 was analysed. The database consists 385,723 companies in 2009 and 422,500 companies in 2014, which is the whole Hungarian private sector. Among these companies 73,442 companies were registering export revenues, but this seems to be stable only for a smaller amount of companies. De-internationalisation is uncovered in this paper with different patterns followed by companies in the Hungarian context.*

*Keywords: de-internationalisation, mortality of de-internationalised companies, de-internationalisation patterns, foreign market entry, exits and re-entries*
*Journal of Economic Literature (JEL) code: F23*
*DOI: http://dx.doi.org/10.18096/TMP.2017.01.09*

## INTRODUCTION

There is a lively debate in international business literature about firm internationalisation which focuses on several aspects connected to growth. A distinct aspect of de-internationalisation, or the reverse of internationalisation, is not as popular, however, although it could also contribute significantly to our understanding about internationalisation. This paper aims to focus on de-internationalisations, its different modes and patterns followed by companies in the Hungarian context. The Hungarian Corporate Tax Database is used in the present study, whereby the whole population of Hungarian companies in the years between 2009 and 2014 was analysed. The database consists of 385,723 companies in 2009 and 422,500 companies in 2014, which is the whole Hungarian private sector. Among these companies significant amount is conducting international trade, but this seems to be stable only for a smaller amount of companies. De-internationalisation however seems to be a – so-far hiding – natural process. The aim of this paper is to uncover de-internationalisation and show its patterns followed by companies in the Hungarian context.

## LITERATURE REVIEW

Although foreign market entry seems to be much more fancy (and therefore more researched) in the literature, but it has to be reconsidered in the light of foreign market exit knowledge as exporting longevity is far from ideal. Bonaccorsi (1992) examined Italian exporting companies in the 70's and the 80's and found that only a small portion of companies were stable exporters. In the seven-year period of 1978-1984 45.2% of exporting companies, namely 104,910 companies exported for only one year, and only 28.5% exported for at least four years in the given seven year period.

*"One third of firms exporting in one year did not export the previous year. There is therefore a very high turnover of exporting companies" (Bonaccorsi, 1992: 617)*

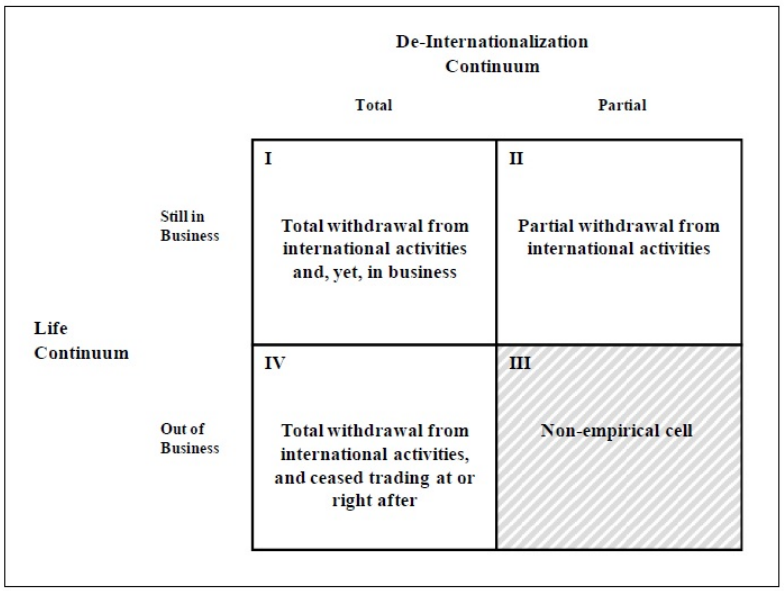
As entering foreign market is frequent, exiting foreign market is also a mass phenomenon, which opens the floor for de-internationalisation research. Benito and Welch (1997) defined de-internationalisation in their seminal paper as:

*"any voluntary or forced action that reduce a company's engagement in or exposure to current cross-border activities. In extreme case, of course, a company*

*may withdraw completely from international operations – what may be termed full or complete de-internationalisation". (Benito and Welch, 1997: 9)*

Turcan (2011) focused on the different modes of de-internationalisation and created a typology as it can be seen in Figure 1. According to modes of de-internationalisation Turcan (2011) distinct total and partial withdrawal from export market. Total withdrawal can be because of ceasing trading (i.e. dissolving the company) or focusing on home market, whereas partial withdrawal can be because of optimising number of markets, reducing operations or changing entry mode. Benito and Welch (2007) are not focusing as much on termination, but they also list different forms of de-internationalisation, such as

- "reduction of operations, in whatever form, in a given market or withdrawal from that market;
- switching to operation modes that entail a lower level of commitments;
- sell-off or closure of foreign sales, service or manufacturing subsidiaries;
- reduction of ownership stake in a foreign venture;
- seizure by local authorities of assets owned by a foreign company" (Benito and Welch, 1997: 9)




Source: Turcan 2006 in Turcan 2011 pp. 21

*Figure 1. Typology of de-internationalisation*

## DATA AND METHODS

In this paper the de-internationalisation patterns of Hungarian companies are analysed, according to their business performance. The whole Hungarian private sector was analysed with the full Hungarian Tax Database from the Hungarian Tax Authority for six years (2009-2014). This database include data from basic financial statements and some additional tax data for all companies following the double-entry bookkeeping system. The period taken for analysis is 6 years (from 2009 to 2014).

All companies which recorded exporting revenues in the period of analysis were included in the research. The population of the Hungarian private sector and the number of exporters can be seen in table 1. It has to be noted however that internationalisation is not only about exporting relationships, different methods (licensing, franchising, joint-venturing and strategic alliances) should have been taken into account as well as importing relationships. Financial data are, however, only available from export revenues, therefore in this level of explorative research only these data could have been considered. In a latter phase with more in-depth analysis other methods can be analysed as well.

According to Bernard et al. (2007), while 4% of the companies are exporters in the US, this figure is doubled in the Hungarian context, which can be explained by the openness and the integration of the Hungarian economy into the European Union.

*Table 1*
*Population of Hungarian firms in the private sector and number of Exporters*

| | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 |
|---|---|---|---|---|---|---|
| Private Sector (N) | 385 723 | 392 670 | 409 007 | 424 815 | 425 739 | 422 500 |
| Exporters (n) | 28 336 | 30 117 | 32 192 | 32 862 | 34 346 | 35 095 |
| | 7.35% | 7.67% | 7.87% | 7.74% | 8.07% | 8.31% |

Source: Author's calculation

Companies are registered with an ID number in the database which can be tracked in each and every year of the database, therefore longitudinal analysis is conducted according to several aspects.

## DISCUSSION OF KEY FINDINGS

The number of exporters in Hungary is steadily growing with around 4.37% CAGR in the period of analysis which strongly outperforms the growth of the number of companies (1.84% CAGR) which can be seen in Table 2. As in 2013 the government has made stricter regulations for founding new firms the negative growth in 2014 is understandable. Even more important that new registry and authorised share capital regulations hit small and/or non-functioning SMEs the hardest, therefore more exit is expected from 2014-2017. Numbers of exporting companies are rising, however, and the mentioned effects are not expected to take their toll on exporters.

*Table 2*
*Growth in number of companies and exporters in Hungary*

| | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 | CAGR |
|---|---|---|---|---|---|---|---|
| Growth in Nr of companies in Private Sector (%) | | 2% | 4% | 4% | 0% | -1% | 1.84% |
| Growth in Nr of exporters (%) | | 6% | 7% | 2% | 5% | 2% | 4.37% |

Source: Author's calculation

*Hypothesis 1: De-internationalisation is a mass phenomenon*

It is interesting to see that although the number of exporters is rising, their fluctuation is serious. It can be seen in Table 3 that from the 28,336 companies which were exporting in 2009 only 19,163 were exporting in 2010 and 13,429 in 2014. This pattern is very similar throughout the different starting years.

*Table 3*
*Number of companies exporting in different years in the period of analysis*

| Nr. of Exporting Companies | | Exporting to year …. | | | | | | From given year to 2014 |
|---|---|---|---|---|---|---|---|---|
| | | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 | |
| Exporting from year … | 2009 | **28 336** | 19 163 | 17 129 | 15 302 | 14 269 | 13 429 | 9 533 |
| | 2010 | 19 163 | **30 117** | 20 626 | 17 831 | 16 479 | 15 312 | 11 571 |
| | 2011 | 17 129 | 20 626 | **32 192** | 21 428 | 19 184 | 17 667 | 14 281 |
| | 2012 | 15 302 | 17 831 | 21 428 | **32 862** | 22 691 | 20 226 | 18 004 |
| | 2013 | 14 269 | 16 479 | 19 184 | 22 691 | **34 346** | 23 848 | 23 848 |
| | 2014 | 13 429 | 15 312 | 17 667 | 20 226 | 23 848 | **35 095** | 35 095 |
| | 2009 | 100,0% | 67,6% | 60,4% | 54,0% | 50,4% | 47,4% | 33,6% |
| | 2010 | 63,6% | 100,0% | 68,5% | 59,2% | 54,7% | 50,8% | 38,4% |
| | 2011 | 53,2% | 64,1% | 100,0% | 66,6% | 59,6% | 54,9% | 44,4% |
| | 2012 | 46,6% | 54,3% | 65,2% | 100,0% | 69,0% | 61,5% | 54,8% |
| | 2013 | 41,5% | 48,0% | 55,9% | 66,1% | 100,0% | 69,4% | 69,4% |
| | 2014 | 38,3% | 43,6% | 50,3% | 57,6% | 68,0% | 100,0% | 100,0% |

Source: Author's calculation

Benito and Welch (1997) stated that in extreme cases companies can even withdraw from international operations. Based on the evidence from Hungarian exporters, after each and every year in the period of analysis around 30-33% of the exporting companies are ceasing their exporting operation, which is not including the partial withdrawal scenarios.

Only 33.6% (9,533) of the 28,336 exporting companies from 2009 were exporting throughout the six year period of analysis. From the exporters of 2010, 38.4% (11,571) were exporting in every year of the five year period. 44.4% of the exporters from 2011 were able to export throughout their four year period, 54.8% of 2012's exporters were exporting in the three year period and only 69.4% of 2013's exporters were exporting in 2014 as well.

The fluctuation in Table 3 can be viewed from a different perspective as well. In 2009 28,336 companies were exporting, out of which only 19,163 companies were exporting in 2010, but an additional 10,954 companies were exporting as well in 2010. Most of these companies were newcomers to export, but some of them were already de-internationalised exporters coming back to export markets.

In 2014 there were 13,429 companies exporting from the 28,336 exporters of 2009, but only 9,533 were exporting in each and every year of the given period, which means at least 3,896 companies (13,75% of 2009's exporters) had a pause in export revenues in the six year period of analysis. In addition to that it can be seen in Table 4. that from 5 to 14 thousand companies had different pauses in export sales.

Bonaccorsi (1992) coined those companies stable exporters who were exporting for at least 4 years in the analysis period (which was 7 years by this argument).

It can be seen in table 4 that in the period of this analysis 73,442 companies were conducting export in Hungary. 40% of them 29,453 companies were adventurer exporters only exporting for one year (although because of the period of analysis, it cannot be seen from the database if a company ceased export in 2010, but was an exporter in 2008 or earlier neither the number of second time exporters in 2015 could be forecasted).

*Table 4*
*Number of companies exporting by years of conducting export*

| | Nr. of exporting years | | | | | | |
|---|---|---|---|---|---|---|---|
| | 1 | 2 | 3 | 4 | 5 | 6 | 1+ |
| Nr. of exporters | 29 453 | 14 061 | 8 778 | 6 244 | 5 373 | 9 533 | 73 442 |
| Percentage | 40.10% | 19.15% | 11.95% | 8.50% | 7.32% | 12.98% | 100.00% |

Source: Author's calculation

19.15% of companies were exporting for two years in the period of analysis, 11.95% for three years, 8.5% for four years, 7.32% for five years and 12.98% for six years. With the most amicable definition (Bonaccorsi's four year) stable exporters are only 28.8% of exporters, however I would rather stick to stricter definition of stable exporters and only use it for the 9,533 (12,98%) companies exporting in each and every year of the analysis.

Several authors like Bernard and Jensen (1999), Greenaway and Kneller (2007), Grazzi (2012) and Stocker (2014) made comparisons between exporting and non-exporting companies across different performance metrics. From Table 3 and 4 however it can be claimed that exporting companies has to be segmented, as there are huge, different segments of the exporting companies. Stable exporters could be much more different from adventurer exporters than the latter group from most of the non-exporters (not to mention that surely non-exporter groups can be also very different).

De-internationalisation is the reason behind the shrinking number of companies exporting in the long term. Table 5 shows the number of companies de-internationalised in the given years of the period of analysis. It is very interesting that the number of de-internationalisation is increasing year by year, although the number of foreign entry overcompensate the increasing number of de-internationalisation annually.

*Table 5*
*Number of de-internationalised in the period of analysis*

| De-internationalisation | | |
|---|---|---|
| Nr. of companies | % | Year |
| 5 911 | 8,0% | 2009 |
| 6 329 | 8,6% | 2010 |
| 7 660 | 10,4% | 2011 |
| 7 949 | 10,8% | 2012 |
| 10 498 | 14,3% | 2013 |
| 38 347 | 52,2% | 2009-2013 |
| 35 095 | 47,8% | exports in 2014 |

Source: Author's calculation

*According to these data the first hypothesis is supported as de-internationalisation – even in its strictest*

*definition – is a mass phenomenon concerning more than 52% of the exporting companies in the period of analysis.*

*Hypothesis 2: After de-internationalisation most companies are terminated*

As foreign market entry is usually connected with the positive notion of growth, foreign market exit is usually connected with the negative notion of decline or defensive strategy.

According to Turcan's typology of de-internationalisation (which was shown in table 1) there are three valid segments of de-internationalisation, total withdrawal from international activities, and yet, in business, partial withdrawal from international activities and total withdrawal from international activities, and ceased trading at or right after (Turcan, 2011).

In table 6 the number of previously exporting companies terminated can be seen in the period of analysis. 16.8% of the exporting companies (namely 12,337 company) were terminated in the period of analysis (however it cannot be decided from the database which companies were terminated in 2014, therefore this number is supposed to be even higher). Number of termination is a significantly high number, however it can be seen that de-internationalisation is not strictly connected with the terminus of the company.

*Table 6*
*Number of previously exporting companies terminated in the period of analysis*

| Termination of previously exporting companies | | |
|---|---|---|
| Year | Nr. of companies | % |
| 2009 | 1 582 | 2,2% |
| 2010 | 1 996 | 2,7% |
| 2011 | 3 082 | 4,2% |
| 2012 | 2 646 | 3,6% |
| 2013 | 3 031 | 4,1% |
| 2009-2013 | 12 337 | 16,8% |
| exists in 2014 | 61 105 | 83,2% |

Source: Author's calculation

In table 7 and table 8 the number (and percentage) of companies can be seen who were terminated in the period of analysis from the de-internationalised companies with focus on the year of de-internationalisation and terminus.

In 2009 5,911 companies de-internationalised, which is 15.4% of the total number of de-internationalised companies. 1,582 companies out of the 5,911 de-internationalised companies were terminated in 2009 whilst 585 companies terminated in 2010, 452 companies in 2011, 321 companies in 2012 and 250 companies in 2013. Altogether 3,190 companies, 54% of those de-internationalised in 2009 were terminated in the period of analysis and 2,721, 46% were still existing in 2014.

In 2010 6,329 companies de-internationalised, which is 16.5% of the total number of de-internationalised companies. 1,411 companies out of 6,329 went out of business in the year of their de-internationalisation, 687 companies in 2011, 419 in 2012 and 330 in 2013. Altogether 2,847 companies, 45% of those de-internationalised in 2010 went out of business in the period of analysis, whilst 3,482 (55%) were still in operation in 2014.

*Table 7*
*De-internationalisation in 2009 and 2010 and terminus of de-internationalised companies*

| De-internationalization | | | Terminus from De-int 2009 | | |
|---|---|---|---|---|---|
| Year | Nr. of companies | % (of all De-int) | Nr. of companies | % | Year |
| **2009** | **5 911** | **15,4%** | 1 582 | 26,8% | 2009 |
| | | | 585 | 9,9% | 2010 |
| | | | 452 | 7,6% | 2011 |
| | | | 321 | 5,4% | 2012 |
| | | | 250 | 4,2% | 2013 |
| | | | **3 190** | **54,0%** | **2009-2013** |
| | | | **2 721** | **46,0%** | **still exists** |
| | | | 5 911 | 100,0% | SUM |
| De-internationalization | | | Terminus from De-int 2010 | | |
| Year | Nr. of companies | % (of all De-int) | Nr. of companies | % | Year |
| **2010** | **6 329** | **16,5%** | 0 | 0,0% | 2009 |
| | | | 1 411 | 22,3% | 2010 |
| | | | 687 | 10,9% | 2011 |
| | | | 419 | 6,6% | 2012 |
| | | | 330 | 5,2% | 2013 |
| | | | **2 847** | **45,0%** | **2009-2013** |
| | | | **3 482** | **55,0%** | **still exists** |
| | | | 6 329 | 100,0% | SUM |

Source: Author's calculation

In 2011 7,660 companies de-internationalised, which is 20% of the total number of de-internationalised companies. 1,943 companies out of 7,660 went out of business in the year of their de-internationalisation, 606 in 2012 and 412 in 2013. Altogether 2,961 companies, 38.7% of those de-internationalised in 2011 went out of business in the period of analysis, whilst 4,699 (61.3%) were still in operation in 2014.

In 2012 7,949 companies de-internationalised their activities, which is 20.7% of the total number of de-internationalised companies. 1,300 companies out of 7,949 went out of business in the year of their de-internationalisation and 627 in 2013. Altogether 1,927 companies, 24.2% of those de-internationalised in 2012 went out of business in the period of analysis, whilst 6,022 (75.8%) were still in operation in 2014.

*Table 8*
*De-internationalisation in 2011 to 2013 and terminus of de-internationalised companies*

| De-internationalization | | | Terminus from De-int 2011 | | |
|---|---|---|---|---|---|
| Year | Nr. of companies | % (of all De-int) | Nr. of companies | % | Year |
| **2011** | **7 660** | **20,0%** | 0 | 0,0% | 2009 |
| | | | 0 | 0,0% | 2010 |
| | | | 1 943 | 25,4% | 2011 |
| | | | 606 | 7,9% | 2012 |
| | | | 412 | 5,4% | 2013 |
| | | | **2 961** | **38,7%** | **2009-2013** |
| | | | **4 699** | **61,3%** | **still exists** |
| | | | 7 660 | 100,0% | SUM |
| De-internationalization | | | Terminus from De-int 2012 | | |
| Year | Nr. of companies | % (of all De-int) | Nr. of companies | % | Year |
| **2012** | **7 949** | **20,7%** | 0 | 0,0% | 2009 |
| | | | 0 | 0,0% | 2010 |
| | | | 0 | 0,0% | 2011 |
| | | | 1 300 | 16,4% | 2012 |
| | | | 627 | 7,9% | 2013 |
| | | | **1 927** | **24,2%** | **2009-2013** |
| | | | **6 022** | **75,8%** | **still exists** |
| | | | 7 949 | 100,0% | SUM |
| De-internationalization | | | Terminus from De-int 2013 | | |
| Year | Nr. of companies | % (of all De-int) | Nr. of companies | % | Year |
| **2013** | **10 498** | **27,4%** | 0 | 0,0% | 2009 |
| | | | 0 | 0,0% | 2010 |
| | | | 0 | 0,0% | 2011 |
| | | | 0 | 0,0% | 2012 |
| | | | 1 412 | 13,5% | 2013 |
| | | | **1 412** | **13,5%** | **2009-2013** |
| | | | **9 086** | **86,5%** | **still exists** |
| | | | 10 498 | 100,0% | SUM |

Source: Author's calculation

Interestingly in 2013 were the largest number of de-internationalised companies in the period of analysis with 10,498 companies, registering 27,4% of all de-internationalisation. 1,412 companies, 13.5% of them went out of business in the year of their de-internationalisation and the remaining 86.5%, 9,086 were operating in 2014.

From these data the total de-internationalisation part of Turcan's de-internationalisation typology can be calculated, as it can be seen in table 9.

*Table 9*
*Total De-internationalisation of Hungarian companies in numbers*

| | | Total De-internationalization | Year | Nr. of companies | % |
|---|---|---|---|---|---|
| Life continuum | Still in Business | I. Total Withdrawal from international activities and, yet, in business | 2009 | 3 744 | 63% |
| | | | 2010 | 4 231 | 67% |
| | | | 2011 | 5 111 | 67% |
| | | | 2012 | 6 022 | 76% |
| | | | 2013 | 9 086 | 87% |
| | Out of Business | IV. Total withdrawal from international activities, and ceased trading at or right after | 2009 | 2 167 | 37% |
| | | | 2010 | 2 098 | 33% |
| | | | 2011 | 2 549 | 33% |
| | | | 2012 | 1 927 | 24% |
| | | | 2013 | 1 412 | 13% |

Source: Author's calculation based on the typology of Turcan (2011)

Table 9 is in harmony with table 7 and 8 as they show that most of the de-internationalised companies are still in business.

*Although with total de-internationalisation tens of thousands of companies were losing their export markets, the vast majority of them survived total de-internationalisation, therefore hypothesis 2 is rejected.*

*Hypothesis 3: De-internationalisation does not mean the end of overall international exposure.*

As most of the companies are surviving the exit from their export market it is interesting to examine with which pattern do they export and de-internationalize. Exporting and de-internationalisation patterns of stable exporters can be seen in table 10 and table 11. The most stable exporters were exporting in each and every year, therefore there is no de-internationalisation pattern for them.

In table 10 the different patterns (and number of companies following these patterns) can be seen of companies who are exporting for 5 years out of the six years of analysis period. Pattern one is obvious as these companies were entering foreign market in 2010 and are exporting from that date. This pattern is followed by 2,038 companies which is 38% of the whole group of companies exporting for 5 years in the period of analysis. Pattern six is also obvious, which shows that after five years of exporting these companies are de-internationalising with ceasing export sales, this pattern is followed by 1,235 companies (23% of the group). Pattern two, three, four and five are much more interesting as those companies following these patterns had one year pause in their export sales. These companies were ceasing their export sales only for one year but after that they were re-entering foreign market accordingly. Altogether 2,100 companies are following these patterns (39% of the group) which means these companies could become rich soil for de-internationalisation research, according to their situation, capabilities, business performance and re-entry to foreign market.

*Table 10*
*Exporting and De-internationalising patterns of stable exporters (exporting in 5 years out of 6)*

| Exporting patterns (5 export years) | | Exporting in year … | | | | | | Nr. of Companies |
|---|---|---|---|---|---|---|---|---|
| | | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 | |
| Patterns | 1 | Not exporting | Exporting | Exporting | Exporting | Exporting | Exporting | 2038 |
| | 2 | Exporting | Not exporting | Exporting | Exporting | Exporting | Exporting | 639 |
| | 3 | Exporting | Exporting | Not exporting | Exporting | Exporting | Exporting | 477 |
| | 4 | Exporting | Exporting | Exporting | Not exporting | Exporting | Exporting | 495 |
| | 5 | Exporting | Exporting | Exporting | Exporting | Not exporting | Exporting | 489 |
| | 6 | Exporting | Exporting | Exporting | Exporting | Exporting | Not exporting | 1235 |

Source: Author's calculation

In table 11 those patterns can be seen which are followed by the companies exporting in 4 years in the period of analysis. Pattern one is the most obvious, those companies are following this pattern who entered foreign market in 2011 and are stable exporters from that point. The 2,071 companies are 33.2% of the whole group. Pattern fifteen is the most obvious de-internationalisation pattern as these companies were ceasing their export operation in 2012 and were not re-entering foreign market the year after. 1,145 companies were following this pattern which is 18.3% of the whole group.

*Table 11*
*Exporting and De-internationalising patterns of stable exporters (exporting in 4 years out of 6)*

| Exporting patterns (4 export years) | | Exporting in year … | | | | | | Nr. of Companies |
|---|---|---|---|---|---|---|---|---|
| | | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 | |
| Patterns | 1 | Not exporting | Not exporting | Exporting | Exporting | Exporting | Exporting | 2071 |
| | 2 | Not exporting | Exporting | Not exporting | Exporting | Exporting | Exporting | 349 |
| | 3 | Not exporting | Exporting | Exporting | Not exporting | Exporting | Exporting | 254 |
| | 4 | Not exporting | Exporting | Exporting | Exporting | Not exporting | Exporting | 243 |
| | 5 | Not exporting | Exporting | Exporting | Exporting | Exporting | Not exporting | 540 |
| | 6 | Exporting | Not exporting | Not exporting | Exporting | Exporting | Exporting | 259 |
| | 7 | Exporting | Not exporting | Exporting | Not exporting | Exporting | Exporting | 121 |
| | 8 | Exporting | Not exporting | Exporting | Exporting | Not exporting | Exporting | 117 |
| | 9 | Exporting | Not exporting | Exporting | Exporting | Exporting | Not exporting | 170 |
| | 10 | Exporting | Exporting | Not exporting | Not exporting | Exporting | Exporting | 185 |
| | 11 | Exporting | Exporting | Not exporting | Exporting | Not exporting | Exporting | 116 |
| | 12 | Exporting | Exporting | Not exporting | Exporting | Exporting | Not exporting | 180 |
| | 13 | Exporting | Exporting | Exporting | Not exporting | Not exporting | Exporting | 244 |
| | 14 | Exporting | Exporting | Exporting | Not exporting | Exporting | Not exporting | 250 |
| | 15 | Exporting | Exporting | Exporting | Exporting | Not exporting | Not exporting | 1145 |

Source: Author's calculation

Pattern five is a sad pattern as these companies entered foreign market in 2010 but were ceasing exporting in 2013, hopefully most of them will be registering export sales later. This pattern is followed by 540 companies, which is 8.6% of the whole group.

The remaining 39.8% (2,488 companies) are much more interesting from de-internationalisation point of view, as one or two years after their de-internationalisation they re-entered the foreign market. Together with the re-internationalising companies of the 5 year exporter group, there were 4,588 companies out of the "stable" exporters who were re-entering foreign market after de-internationalisation.

*Table 12*
*Exporting and de-internationalising patterns of companies exporting in 3 years out of 6*

| Exporting patterns (3 export years) | | Exporting in year … | | | | | | Nr. of Companies |
|---|---|---|---|---|---|---|---|---|
| | | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 | |
| Patterns | 1 | Not exporting | Not exporting | Not exporting | Exporting | Exporting | Exporting | 2638 |
| | 2 | Not exporting | Not exporting | Exporting | Not exporting | Exporting | Exporting | 449 |
| | 3 | Not exporting | Not exporting | Exporting | Exporting | Not exporting | Exporting | 328 |
| | 4 | Not exporting | Not exporting | Exporting | Exporting | Exporting | Not exporting | 744 |
| | 5 | Not exporting | Exporting | Not exporting | Not exporting | Exporting | Exporting | 206 |
| | 6 | Not exporting | Exporting | Exporting | Not exporting | Not exporting | Exporting | 178 |
| | 7 | Not exporting | Exporting | Exporting | Exporting | Not exporting | Not exporting | 627 |
| | 8 | Not exporting | Exporting | Not exporting | Exporting | Not exporting | Exporting | 107 |
| | 9 | Exporting | Not exporting | Not exporting | Not exporting | Exporting | Exporting | 190 |
| | 10 | Exporting | Not exporting | Exporting | Exporting | Not exporting | Not exporting | 218 |
| | 11 | Not exporting | Exporting | Exporting | Not exporting | Exporting | Not exporting | 180 |
| | 12 | Exporting | Not exporting | Not exporting | Exporting | Not exporting | Exporting | 84 |
| | 13 | Exporting | Not exporting | Not exporting | Exporting | Exporting | Not exporting | 137 |
| | 14 | Exporting | Not exporting | Exporting | Not exporting | Exporting | Not exporting | 78 |
| | 15 | Exporting | Not exporting | Exporting | Not exporting | Not exporting | Exporting | 83 |
| | 16 | Exporting | Exporting | Not exporting | Not exporting | Not exporting | Exporting | 176 |
| | 17 | Exporting | Exporting | Not exporting | Exporting | Not exporting | Not exporting | 268 |
| | 18 | Exporting | Exporting | Not exporting | Not exporting | Exporting | Not exporting | 154 |
| | 19 | Not exporting | Exporting | Not exporting | Exporting | Exporting | Not exporting | 165 |
| | 20 | Exporting | Exporting | Exporting | Not exporting | Not exporting | Not exporting | 1768 |

Source: Author's calculation

In table 12 the exporting and de-internationalisation patterns of those companies can be seen which are exporting in 3 years in the period of analysis. Pattern one, four, seven and twenty are obvious patterns again, pattern one shows new exporters which is followed by 2,638 companies (30% of the group). Pattern twenty shows those companies exporting in the early period but completely de-internationalising in 2011, this pattern is followed by 1,768 companies (20% of the group). Pattern four (744 companies, 8,5%) and seven (627 companies, 7,1%) is about companies entering foreign market in the period of analysis but de-internationalising in 2013 and 2012 respectively. All other patterns which is followed by a combined of 3,001 companies (34,2% of the group) are very interesting as they shows patterns of companies entering end exiting foreign markets in any conceivable way. Pattern eight and fourteen seem to be the most interesting patterns as companies following these patterns were opportunistic exporters, exporting and de-internationalising in even and odd years (vice versa for pattern fourteen).

In table 13 the patterns of those companies can be seen which were exporting only for two years in the period of analysis.

*Table 13*
*Exporting and de-internationalising patterns of companies exporting in 2 years out of 6*

| Exporting patterns (2 export years) | | Exporting in year … | | | | | | Nr. of Companies |
|---|---|---|---|---|---|---|---|---|
| | | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 | |
| Patterns | **1** | **Exporting** | **Exporting** | **Not exporting** | **Not exporting** | **Not exporting** | **Not exporting** | **2448** |
| | 2 | Exporting | Not exporting | Exporting | Not exporting | Not exporting | Not exporting | 544 |
| | 3 | Exporting | Not exporting | Not exporting | Exporting | Not exporting | Not exporting | 235 |
| | 4 | Exporting | Not exporting | Not exporting | Not exporting | Exporting | Not exporting | 166 |
| | 5 | Exporting | Not exporting | Not exporting | Not exporting | Not exporting | Exporting | 221 |
| | 6 | Not exporting | Exporting | Exporting | Not exporting | Not exporting | Not exporting | 1407 |
| | 7 | Not exporting | Exporting | Not exporting | Exporting | Not exporting | Not exporting | 319 |
| | 8 | Not exporting | Exporting | Not exporting | Not exporting | Exporting | Not exporting | 238 |
| | 9 | Not exporting | Exporting | Not exporting | Not exporting | Not exporting | Exporting | 222 |
| | 10 | Not exporting | Not exporting | Exporting | Exporting | Not exporting | Not exporting | 1291 |
| | 11 | Not exporting | Not exporting | Exporting | Not exporting | Exporting | Not exporting | 387 |
| | 12 | Not exporting | Not exporting | Exporting | Not exporting | Not exporting | Exporting | 385 |
| | 13 | Not exporting | Not exporting | Not exporting | Exporting | Exporting | Not exporting | 1516 |
| | 14 | Not exporting | Not exporting | Not exporting | Exporting | Not exporting | Exporting | 738 |
| | **15** | **Not exporting** | **Not exporting** | **Not exporting** | **Not exporting** | **Exporting** | **Exporting** | **3944** |

Source: Author's calculation

Pattern one and fifteen are the most obvious patterns in this group. Pattern one is followed by 2,448 (17,4%) companies showing those which were completely de-internationalising in 2010. Pattern fifteen is followed by 3,944 (28,1%) companies which were entering foreign market in 2013. All other patterns are showing different types of foreign market entry and exit and are followed by a combined of 7,669 companies which is 54,5% of this group. Pattern five can be the most interesting here, the 221 company in this group were exporting in 2009 then had four year brake in exporting and re-entered export market in 2014.

*Table 14*
*Exporting and De-internationalising patterns of companies exporting in a single year in the period of analysis*

| Exporting patterns (1 export years) | | Exporting in year … | | | | | | Nr. of Companies |
|---|---|---|---|---|---|---|---|---|
| | | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 | |
| Patterns | **1** | Exporting | Not exporting | Not exporting | Not exporting | Not exporting | Not exporting | 5911 |
| | **2** | Not exporting | Exporting | Not exporting | Not exporting | Not exporting | Not exporting | 3881 |
| | **3** | Not exporting | Not exporting | Exporting | Not exporting | Not exporting | Not exporting | 3941 |
| | **4** | Not exporting | Not exporting | Not exporting | Exporting | Not exporting | Not exporting | 3846 |
| | **5** | Not exporting | Not exporting | Not exporting | Not exporting | Exporting | Not exporting | 4358 |
| | **6** | Not exporting | Not exporting | Not exporting | Not exporting | Not exporting | Exporting | 7516 |

Source: Author's calculation

In table 14 the exporting and de-internationalisation patterns of those companies can be seen which were only exporting in one year in the period of analysis. Altogether 29,453 companies were exporting for only one year which is 40% of the 73,442 companies conducting export in the period of analysis. It can be supposed however that some

of the 5,911 companies who were last registering export sales in 2009 were exporting in 2008 or before and it can be hoped as well that the majority of the 7,516 companies who were entering foreign market in 2014 will export in 2015 and further, as well.

*According to the Hungarian exporting and de-internationalising companies hypothesis 3 is supported, as de-internationalisation not only does not mean the end of international exposure, but by thousands of companies it is followed by re-entry to foreign market.*

# CONCLUSION

Based on the 73,442 Hungarian companies which were registering export revenues in at least one year from 2009 to 2014, it can be observed that de-internationalisation – even in its strictest definition – is a mass phenomenon concerning more than 52% of the exporting companies in the period of analysis.

Although de-internationalisation is often connected with the negative notion of decline or even termination of business, the vast majority of the tens of thousands of companies getting through total de-internationalisation with the loss of their export markets survived total de-internationalisation.

Thousands of companies not only survived de-internationalisation, but were re-entering foreign markets with more or less success.

Based on the several different exporting and de-internationalisation patterns and the significant number of companies following these patterns, it is important to use a better segmentation in the literature than the popular exporter vs. non-exporter distinction, since stable exporters, opportunistic exporters and adventurer exporters are very different groups of the exporting companies.

From the de-internationalisation patterns, policy makers should derive the conclusion that it is not enough to support entry to foreign markets, but those capability building processes has to be supported, which will enable the companies to compete in the international market for the long run, and if for some external reasons they have to abandon some of their markets they can utilize these capabilities and even the earned experience to enter different markets or even re-enter the given market with stronger proposals.

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