Causal versus reflective specification. A methodological review of structural equation modeling in marketing

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Theoretical concepts can be operationalized in causal as well as in reflective form, but almost exclusively the reflective measurement models were prevalent in the literature for a long time. The fact that the covariance-based measurements and the reflective operationalization of latent variables have become widespread is explained with the dominant role of classical test theory in empirical research.

The present paper aims to present some of the most important methodological issues related to causal or reflective specification. As the authors are marketing professionals and due to the fact that in marketing literature specification related issues affect mainly SEM (structural equation modeling) applications, the paper presents the specification related issues through the SEM methodology.

Keywords: structural equation modeling (SEM), customer-based brand equity, causal specification, reflective specification.

JEL code: C30.

Introduction

Modeling built on structural equations has increased in popularity in marketing research (Yoo et al. 2000; Berács et al. 2003; Vázquez et al. 2002; Erdem et al. 2006; Netemeyer et al. 2004). Nowadays there is no significant marketing magazine issue without researches built on SEM (Baumgartner and Homburg 1996; Steenkamp and Baumgartner 2000; Babin et al. 2008). Despite its growing popularity, it has not become as widespread in marketing as in other sciences.

The meta-analysis of incorrect operationalization carried out by Jarvis et al. (2003) covers four significant marketing magazines (*Journal*

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of Consumer Research, *Journal of Marketing*, *Journal of Marketing Research* and *Marketing Science*). According to their results, 71% of the examined 1192 latent constructs were correctly modeled. The majority of the remaining 29% incorrectly operationalized latent constructs were formative[3] concepts modeled by the authors as reflective ones.

Our paper presents a methodological review of causal versus reflective specification. The problem of specification is a main issue in structural equation modeling (SEM) applications, thus we present the most important methodological problems of specification in the structural equation modeling framework. We exemplify SEM estimation with the help of a consumer-based brand equity model.

We use the terminology suggested by Bollen (2011). According to this, measurement models fall into three categories:

• Reflective models. Their indicators are determined by the latent variable. In their graphic illustration, the arrows are directed from the latent variable towards the indicators.

• Causal models. The latent variable is determined by the indicators. In their graphic illustration, the arrows are directed from the indicators towards the latent variable.

• Composite (Formative) measurement models. The composite variable is determined by the indicators. In their graphic illustration, the arrows are directed from the indicators towards the composite variable.

There are substantive differences between the causal and formative measurement models (Jarvis et al. 2003; Bollen 2011). In causal measurement, we can estimate a latent variable, while this is impossible in the composite measurement models where we can estimate composite (formative) notions. From a mathematical point of view, the substantive difference lies in the disturbance term estimated at the level of the latent indicator, which is not present in the composite models. As a consequence, in the latter model the researcher has to

[3] The authors do not make clear if they are referring to causal or composite indicators.

ensure the inclusion of all indicators explaining the notion in the analysis since he estimates the given composite notion without any error term.

At Bollen's suggestion (2011) we will try to avoid the use of the formative notion because it has often been used in the literature to denote (causal) measurement models with real latent variable and (composite) measurement models as well.

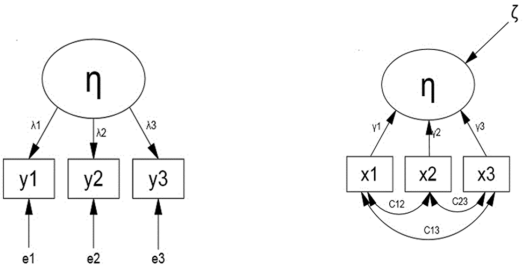
To estimate causal models with latent variable, estimators (maximum likelihood by default) ensured by covariance-based software (Amos, EQS and Lisrel) are suitable, while a popular way to estimate the composite measurement models is PLS (Smart PLS).

Causal versus reflective models

We are able to operationalize theoretical concepts in causal as well as reflective forms (Jarvis et al. 2003; Temme and Hildebrandt 2006), but almost exclusively the reflective measurement models were prevalent in the literature for a long time. While reflective models dominate the scientific literature of psychology and management, the causal and composite approach plays a greater role in economic sciences and sociology (Borsboom et al. 2003; Coltman et al. 2008). Typical examples of reflective measurement models are attitude or willingness to purchase (Jarvis et al. 2003). Both attitude and willingness to purchase are rightfully assumed to signal unobservable states that influence measurable phenomena. Typical example of composite measurement models might be "quality of life" (Bollen and Ting 2000). Quality of life could be measured by factors such as health, happiness, economic situation, but the assumption that they would be the effects of the quality of life is not theoretically grounded (Bollen and Ting 2000).

In the case of the reflective measurement models we assume that the causal processes are directed from the latent variable towards the indicators. That is, we assume that the change in the latent variable will also cause a change in the indicators (Bollen and Lennox 1991; Jarvis et al. 2003; Coltman et al. 2008). In the graphical illustration, the arrows

are directed from the ellipse standing for the latent variable towards the squares standing for the indicators (measured variables).



Reflective model Causal model

Source: Bollen and Lennox (1991)

Figure 1: Schematic illustration of reflective and causal measurement models

In the causal measurement models the direction of the causal process is the exact opposite to that of the reflective one. In this case we assume that the change in the indicators leads to change in the latent variable (Jarvis et al. 2003). In the graphical illustration, the arrows are directed from the indicators to the ellipse standing for the latent variable. We argue that the causal latent variable is created by the common variance of the indicators.

According to the above model, the equation of the reflective measurement model can be written as follows:

$$y_i = \lambda_i \eta + \varepsilon_i$$

where y_i is the *i*th indicator of the reflective η latent variable, ε_i is the measurement error belonging to the *i*th indicator, and λ_i parameter is the effect of the η latent variable on y_i.

We assume that measurement errors are independent from each other (that is, $cov(\varepsilon_i, \varepsilon_j) = 0$, and $i \neq j$), and they are independent from the latent variable (that is, $cov(\eta, \varepsilon_i) = 0$). Further on, in reflective models there must be a positive intercorrelation between indicators. This

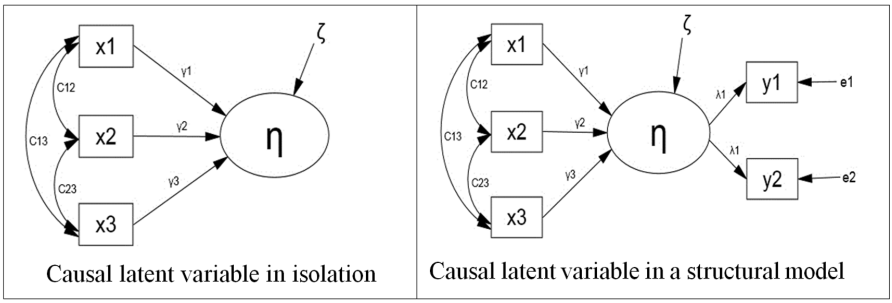
assumption was proved by Bollen (1984), starting from the conclusions of Curtis and Jackson's (1962) article.

The causal model can be illustrated with the following equation:

$$\eta = \sum_{i=1}^{n} \gamma_i x_i + \zeta$$

where x_i is the *i*th causal indicator, the γ_i parameter measures the effect of the *i*th indicator on the η latent variable, while ζ is the disturbance effect belonging to the latent variable. There is no correlation between the disturbance effect and indicators (that is, $\text{cov}(x_i, \zeta) = 0$). The meaning of the disturbance effect has been explained in several ways. According to Jarvis et al. (2003), the disturbance effect is the joint error of the measured variables, while according to MacKenzie et al. (2005) it may come from three sources: the measurement error of indicators, the interaction between indicators and it can also be a part of the construct not explained by the indicators.

Diamantopoulos (2006) proved that the disturbance effect cannot be explained with the measurement error, since the causal indicators per definition take part in the estimation without errors. The only acceptable explanation is that disturbance consists of the variance unexplained by the latent variable.



Source: own design (based on Bollen and Lennox 1991 and Diamantopoulos et al. 2008).

Figure 2: Causal latent variable in isolation and in a structural model

In the case of reflective models positive correlation between the indicators is a requirement (Diamantopoulos et al. 2008). We make it possible for causal indicators to freely correlate in the model, but they are also expected to share some content since they influence a latent variable together; consequently, we expect the correlation between indicators to be positive (Bollen 2011).

Causal indicators cannot replace each other, all of them measuring a specific area of the concept. If we leave any of the indicators out, we change the meaning of the concept as well (Jarvis et al. 2003; Diamantopoulos et al. 2008). As opposed to this, if we leave any of the indicators out of the reflective model, we do not risk modifying the meaning of the concept (Jarvis et al. 2003).

Reflective measurement models can be correctly estimated in isolation (Diamantopoulos et al. 2008), while causal measurement models cannot be used in isolation; therefore they cannot be estimated (Jarvis et al. 2003; Bollen and Lennox 1991; MacKenzie et al. 2005). In order to estimate disturbance at the level of the latent variable, we have to include the causal measurement model in a larger model. More exactly, we need a complete structural model for correct estimation. A widely accepted solution to the problem is to estimate the causal latent variable together with its consequences within a structural model. More precisely, in order to estimate disturbance at the level of the latent concept, it is necessary that two arrows be directed from the causal latent concept towards two reflective indicators or latent variables (Jöreskog and Goldberger 1975; MacKenzie et al. 2005).

Preparing, testing and fitting the structural equations

One could estimate structural equations with covariance (e.g. Amos, Lisrel, Mplus) or variance (e.g. SmartPLS) based methods. In spite of difficulties, covariance-based estimation procedures are more reliable and do not have the deficiencies of a PLS-PM. It is important to mention that an analyzing method similar to the structural equation models is the neural network whose possibilities are not dealt with by the present paper. The comparison between SEM and neural networks was carried out by Davies et al. (1999).

The advantage of the PLS-based models is that they give a stable estimation even when the requirements of the covariance-based models (Amos, Lisrel), such as the required size of the sample or normal distribution, are not met (Henseler et al. 2009).

Further on, the PLS-PM is equally suitable for estimating both the reflective and causal models (Wilson et al. 2007; Reinartz et al. 2009). Moreover, according to some authors, the estimation of causal (composite) measurement models are only possible under PLS conditions (Alpert et al. 2001). But since we do not estimate disturbance (error) in PLS, we practically measure composite variables rather than latent ones with the indicators.

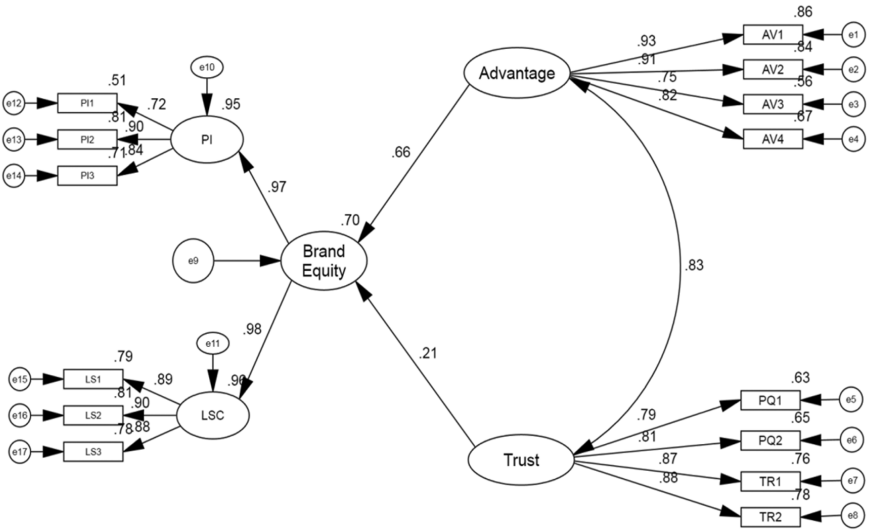
Covariance-based estimations (Amos, Lisrel, Mplus), as opposed to PLS, estimate parameters more accurately (Reinartz et al. 2009), so if assumptions of normality and large samples are met, the formers are proposed to be chosen. A deficiency of the PLS estimation is that it does not minimize any criterion (Goffin 2007). As the PLS does not impose any strict requirement towards data, it does not make any general test referring to the goodness of fit and it can exclusively be applied to recursive models, that is, reflexive and reciprocal effects cannot be estimated (Temme and Hildebrandt 2006).

Brief exemplification – Consumer-based brand equity

In the following part we exemplify the casual-reflexive discussion through a consumer-based brand-equity (CBBE) model, presented in Figure 3. Because this model is helping to understand whether a specification is reflective or casual, this time we do not report about data collection, sample and analysis. We present only the model, assessment of reliability and report proposed fit indicators.

We define consumer-based brand equity as a second-order latent variable. As a consequence, we assume that consumer-based brand equity is a concept caused by various factors. We assume that the dimensions of consumer-based brand equity have to be estimated in a reflective measurement model. Well-structured communication campaigns are able to induce trust in a brand. In this sense, measuring

trust with causal indicators may be well-grounded, since trust is the effect of experience, of convincing accounts of acquaintances, etc. (variables PQ1, PQ2, TR1, TR2). However, in survey based data collection we measure latent concepts by asking the interviewees about brand-related associations already present in their mind (variables AV1, AV2, AV3, AV4). When the respondents answer questions related to benefits or perceived quality, their already existent ideas about the benefits and quality will manifest. In this case, the only suitable method for measuring consumer-based brand equity dimensions is measuring with reflective indicators.



Source: own design

Figure 3. Causally measured consumer based brand equity (standardized version)

On the other hand, consumer-based brand equity is a theoretical term, thus consumers do not have already existing ideas about this concept and consequently CBBE can have no reflections. The substantive formulations essential from the viewpoint of the causal specification of consumer-based brand equity: brand adds value to the

product (Farquhar 1989; Achenbaum 1993), brand equity is defined as the totality of intangible brand assets (Aaker 1991). Consequently, theory regards brand equity as something that comes into being due to the associations linked to the brand name.

Our assumptions regarding the structure of the consumer-based brand equity and its consequences are tested using the basic fitting indicators of SEM, and the reliability and validity of the theoretical constructs are assessed following Hair et al. (2009).

Table 1 provides the results from the assessment of overall fit. The TLI and CFI exceed the conservative 0.95 boundary as well, the relative chi-square corresponds to the requirement Hair et al. (2009) formulates, the RMSEA value is good, and SRMR qualifies as outstanding (0.034).

Table 1. Fit statistics of the causally measured consumer based brand equity

Goodness of fit					
	$\chi 2$	DF	TLI	CFI	RMSEA
Brand	198	72	0.96	0.97	0.08

Source: own calculations

As the model operationalizes first order latent variables in reflective measurement models, the assessment of reliability and validity is possible with classical test theory. The standardized regression weights (SRW) and the squared multiple correlations (SMC) measure the reliability and validity of indicators, whereas the composite reliability (CR) and average variance extracted (AVE) measure the reliability and validity of latent variables. Amos does not print in the output the latter two indicators, but the formulas from Hair et al. (2009) enable to compute them. The squared multiple correlations for every indicator exceed the 0.5 value and the standardized coefficients all exceed the 0.7 value, all this indicates convergent validity. In the case of all the four latent variables, the CR exceeds 0.7 and similarly, the AVE exceeds 0.5, indicating that the variables of the model correctly map the contents of the dimensions.

Table 2. Convergent validity test

	CR	*AVE*	*SRW*	*SMC*
Advantage	0.91	0.73		
AV1			0.93	0.86
AV2			0.91	0.82
AV3			0.75	0.56
AV4			0.82	0.67
Trust	0.91	0.71		
PQ1			0.79	0.63
PQ2			0.81	0.66
TR1			0.87	0.76
TR2			0.88	0.78
Purchase intention	0.86	0.67		
PI1			0.71	0.51
PI2			0.9	0.81
PI3			0.84	0.71
Low search cost	0.92	0.79		
LSC1			0.89	0.79
LSC2			0.9	0.81
LSC3			0.88	0.78

Source: own calculations

The assessment of the model provides support for discrimination as all AVE are greater than the shared variance. From the perspective of the brand equity model a less important issue is the lack of discriminant validity between the consequences of the measured brand's brand equity. By including the consequences as composite variables the problem disappears, and the assessment of external validity offers other solution to this issue.

The validity assessment of causal measures is a controversial topic (Diamantopoulos et al. 2008). This study, contrary to skepticism related to the applicability of statistical procedures, stresses the importance of establishment of validity (Edwards and Bagozzi 2000). The study manages to assess the validity following the recommendations of Diamantopoulos et al. (2008) and Bollen (2011).

The present model determines the causal relationships at the level of structural relationships, as first level latent variables causally

determine the second level brand equity. The significant γ-s indicates the validity of the first level causal measures (Advantage and Trust (in quality)) (Diamantopoulos et al. 2008, Bollen 2011). Another test of validity is to examine the overall fit (Bollen 2011). Table 1 provides evidence for excellent fit.

The positive sign of high values of path estimates (Figure 3) supports external validity for every model (Bollen 2011). Moreover, testing the model with other latent variables as Loyalty and OBE provides further evidence of external validity, as the fit indices represent a very good fit (χ^2=244, df=88, TLI=.955, CFI=.963, RMSEA=.075). Following certain recommendations of Diamantopoulos et al. (2008) this study considers the disturbance term (ζ) one of the most important indicators of construct validity. The standardized value of the disturbance provides information about variance explained. The two-dimensional structure is able to explain 70% of the brand equity dimension variance supporting construct validity.

Conclusion

SEM is an outstanding tool in the cases when building the model takes place within a precisely defined theoretical framework and when the model is of medium complexity (Baumgartner and Homburg 1996). SEM is a less suitable tool for analysis in the first opening stage of model building, that is, it shows its real force when the researcher has properly clear ideas or theoretical assumptions regarding the relationships between the variables included in the analysis. Baumgartner and Homburg (1996) lay great stress on the prior analysis of data, identification of outstanding values, carrying out normality tests etc.

Since even literature knows little about testing causal models, there is a great need for the conscious building and use of causal models where it is theoretically grounded (Diamantopoulos et al. 2008).

It is important to formulate that we have to pay special attention to one of the biasing factors of measuring brand related concepts in future researches. When measuring such concepts, we ask brand-related questions, and as a consequence of the *halo* effect and the common

method they might also share variances that are due to the brand and the method rather than the specific contents of the questions.

All this might have an important consequence, namely that when we use reflective specification, we will be able to fit several valid concepts on our model, since these will share common variance due to the halo effect and the common method. In a causal model we have to allow the exogenous variables to correlate, thus light is shed onto this problem in assessing fit; in the reflective specification, however, the dimensions are endogenous variables and they do not have to correlate freely; this way, several consumer-based brand equity models can be built without us knowing which of the dimensions are the ones that can cause something together.

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Measuring business performance in sports. How the Balanced Scorecard approach can help sports organisations in operating along strategic objectives?[1]

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While performance measurement in the sports industry has a traditionally strong focus on sports results, commercial success of sports clubs needs to gain more ground. Sports results should generate market revenues, by satisfying customer needs, and allow continued investment in the further improvement of sports success (i.e. more funds for player transfers and wages). Club managers need to understand the complex relationship between on-field and off-the-field success, and identify critical success factors for achieving strategic objectives. The Balanced Scorecard approach provides a plausible framework for such analysis. Our paper explains the challenges of and opportunities for implementing a Balanced Scorecard system in non-profit organisations, and provides insights into its application in professional sport through an in-depth case study of a handball club in Hungary. We conclude by providing a model for managing sports organisations in line with strategic objectives, balancing stakeholder expectations for both sports results and commercial success.

Keywords: Balanced Scorecard, performance measurement, sport, success, strategy, management.

JEL codes: M19, L83.

Introduction

There is a widely published academic debate about whether sports organisations have special objectives as opposed to economic entities in

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other industries. On one hand, there are certain characteristics of the business model of professional clubs in major sports that are not common in most other industries. E.g. in association football there are regional monopolies in cities/regions, many customers are very loyal to one club life-long, and cooperation between competitors is particularly strong at league and/or national level. On the other hand, no industry is fully in line with "typical standards" if such standards exist (Kynsburg 2011). The question remains whether the strategy development and implementation in the business of professional sports clubs should lie on fundamentally different basis than mainstream management approaches, or the differences can be reflected by a refined implementation of the same approaches.

This topic is further complicated in countries with smaller markets, as market mechanisms alone cannot provide a coordination model for sustainable operation of professional sports clubs (András 2003a, 2003b). Revenues from the market are simply not enough to cover the costs. While ticket sales, sponsorship, broadcasting fees and sundry items are more limited and less available as the spending power of customers is weaker, the cost side of the business is fairly globalised – player transfer fees and wages are inextricably intertwined across markets.

Nevertheless, there is growing interest in the role of sports in society, even in smaller markets. Governments play a crucial role in filling the financing gap to allow sustainable operations in sports. Hungary shows an extreme case in how government intervenes in a supposedly market-based economy. The central government has recently introduced a particularly resourceful support system that transfers a proportion of corporate income tax payments to financing the investments and operations of organisations in the most popular sports of the nation (association football, basketball, handball, water polo and ice hockey). This allows sports clubs to upgrade their facilities and build up a wider youth development scheme.

However, the source of government funding is naturally a topic of heated political debate, and it is in the sports organisations' interest to

consider the longer term implications of current investments (Laki and Nyerges 2006). To put it more bluntly, government funding may dry out in a few years, and the long term sustainability of operations require investments that add value from a business perspective. How to add value in a market where sports clubs have no tradition in business-driven operations and the spending power of customer is limited?

On top of this problem there is the traditional complexity of double-value creation (Chikán 2008). Customers are first and foremost interested in consistently good sports results, while the owners are normally responsible for the financial feasibility of the venture so that their initial investment pays off. In smaller markets, due to the circumstances explained above, performance measurement has a traditionally strong focus on sports results. Even the owners, typically public entities, have an *ab ovo* interest in sustained sports success, as it is understood fundamental from a political point of view. However, the commercial success of sports clubs needs to gain more ground. Sports results should generate market revenues, by satisfying customer needs, and allow continued investment in the further improvement of sports success (i.e. more funds for player transfers and wages).

In summary, the context of strategy development of sports organisations in smaller markets is complex and ambiguous in multiple ways. How traditional management approaches may actually help organisational officials in directing the sports clubs towards long term success is a challenging question worth exploring.

The Balanced Scorecard (BSC) concept for managing strategic performance was originally developed for profit oriented organisations (see Kaplan and Norton 1997). However, more and more non-profit organisations are interested in it. While several BSC applications have been implemented in governmental, healthcare, and other non-profit organisations (Inamdar et al. 2002; Carmona and Gronlund 2003; McDonald 2012), there is a relative scarcity of academic articles dealing with the application of Balanced Scorecard in sports organisations (Alonso et al. 2009; Becsky 2011; Delaney 2008; Jones 2006). One of the early evidences of the Balanced Scorecard approach successfully

applied in sports was at German top-tier football club VfB Stuttgart (IFUA Horváth & Partners 2004). The results of that implementation were claimed positive, in terms of supporting more informed and effective management decisions. However, Balanced Scorecard applications are still uncommon in sports organisations, and there are no synthesising studies on how successful the adaptation and implementation of the model has been.

Our paper aims to advance further in this excitingly daunting journey, by examining how the traditional Balanced Scorecard approach to strategic management may be applied in a Hungarian top-tier professional women handball club. In our case study analysis, we conducted in-depth interviews with club officials and assessed available factual information to cross-check the validity and reliability of findings. We also reviewed the available academic literature and secondary information from related applications in other markets. As a result, we drew up a suggested structure of the Balanced Scorecard for the club, and outlined the conditions by which the results may be generalized for other clubs in the region.

Methodology

In our current research project, we have used the case study method for analysing our subject of research. The case study method of research (Yin 2003) is suitable to explore relatively unknown fields of research, provide a rich description of empirical findings, as well as aim analytical generalisation from even a single case. In light of the inherent opportunities in applying this method, we are not willing to provide statistical generalisation of our analysis, but a more refined understanding of the initial propositions that come from previous research projects and relevant theories. This paper summarises the early results of a long-term research programme that aims to understand the performance measurement challenges of professional sports organisations in smaller markets, and make recommendations on improvement measures to support strategic goal achievement. The results of our initial research project are presented here, based on the

analysis of a carefully selected handball club. The sample of our research interest was selected according to the sampling tactics recommended by Miles and Huberman (1994). Our selection of a top-tier Hungarian women handball club was made because handball is an increasingly successful sport in Hungary with a growing fan base and a developing commercial background. Also, more and more handball teams involve professionals with economics background in their management team, providing a favourable setting for refined applications of strategic management tools. While there are a few clubs both in men and women handball in Hungary that belong to the best of the world, we chose to focus on a team that is more typical for the average top-tier club. While the identity of the club has been agreed to remain confidential, we can reveal that it is a provincial club with a chance for winning medals in the championship in most of the seasons. Conclusions made from this single case may provide the basis of further research if results will be controlled for the potential differences between the current and future cases of analysis.

Our original proposition was that BSC can be applied to the company operating the professional handball club, without major structural adjustments, but with refined elaboration of the measurement tool along all four perspectives. We aimed to understand better the operation of the club and how the company is managed, in order to conclude on a refined proposition that could form the basis of future research projects on the subject.

Having studied the relevant literature of business performance measurement, Balanced Scorecard applications and analyses on the business of sports in different markets, we showed to company management a list of proposed structural approaches to the performance measurement challenge and asked them for comments and suggestions. This exercise was part of a range of in-depth management interviews, and we cross-checked our findings with available business performance data provided by the management.

Our intended outcome of the research project was a proposed structure for a Balanced Scorecard for the company, with key aspects

identified for each perspective and a list of suggested performance indicators for further consideration. We did not, however, mean to prepare an actual Balanced Scorecard system, as this would reach beyond the scope of a scientific endeavour.

The framework for our current article does not allow the full description of the case study; hence the elaboration of the proposed Balanced Scorecard structure is explained in the following sections.

The role of the Balanced Scorecard in supporting strategic management

An appropriate performance measurement system plays a major role in management. It is essential for preparing decisions, provides information about operation and has a crucial role in motivation. It can only serve management effectively if it fits the external and internal environment (market environment, production system, leadership, corporate culture).

The impact of performance measurement on behaviour and strategy implementation has been studied since the 1970s (Skinner 1971, quoted in Neely et al. 1995). The need to deduce performance metrics from the strategy has been pointed out; however, this has not become typical in corporate practice for a long time. From the point of view of the strategy-implementation-supporting function of corporate performance measurement, another important milestone was the Balanced Scorecard (BSC) system, invented in 1990, under the leadership of Kaplan and Norton, and having become one of the best-known performance measurement systems by now (Kaplan and Norton 1997, 2002, 2004, 2005 and 2008). The French Tableau de Board performance evaluation system and the OVAR method and the SMART pyramid have principles similar to the BSC (Wimmer 2000). Let us mention the Business Navigator system of Skandia, developed in 1991, at almost the same time as the BSC, but which has not become so popular (differences between the two models are discussed in Ashton 2005).

The BSC is currently the most popular and well-known performance measurement system. According to the survey of the

Gartner Group (Neely and Bourne 2000) 40-50% of large companies in the US introduced the BSC. However popular the BSC system is, it has its shortcomings, and there are questions raised connected to the usefulness of the BSC in practice (Kenny 2003). The Gartner Group survey found that BSC execution is inadequate in 70% of companies, due to two main reasons: weak planning and problems of introduction. Often, the simplest indicator system which merely combines the financial and non-financial indicators is already called BSC, whereas the steps representing the "essence" of the method, such as the exploration of the causal relationships, are omitted. The implementation of the method will fail without resources, the information system and the commitment of managers. The conclusion is not that we have to forget this performance measurement system, but we have to understand the key elements of it more deeply and we have to apply adaptation in some cases.

The primary objective of BSC is to support strategy implementation. Organisations have to identify those steps which are crucial to achieve strategy goals; they have to identify the value drivers. Strategy goals and value drivers have to be linked to performance metrics, which are grouped in four perspectives: financial, customer, internal processes and learning and growth. These four perspectives are to be considered as a guideline and not a compulsory framework. No model has proved that these four perspectives are necessary and sufficient. The most important role of the four perspectives is to avoid the problems deriving from concentrating on only one measure or only one perspective. The decisive feature of the system is its balanced nature: it strikes a balance between short- and long-term objectives, it includes financial as well as non-financial indicators, external and internal indicators, objective indicators that are easy to quantify and subjective elements forecasting future performance. Most importantly, it balances the outcomes the organization wants to achieve and the drivers of those outcomes. When designing the system, one must always keep in mind that BSC is a tool promoting strategy implementation and not an operational control system.

More than a thousand measures are used to control the company processes; BSC, on the other hand, must include only the key performance indicators, that is how a strategic focus can be created. Based on experience, 20-25 measures are enough. The proportion of measures in internal processes is about 34%, the rates of other three perspectives are about equal (Kaplan and Norton 2002. 448), but filling the framework with the appropriate number of measures is not the correct approach - measures must be deduced from strategy.

The development of BSC does not end with the assignment of metrics to the objectives and key value drivers; cause-and-effect relationship are to be established to explain the relationship between lagging (backward looking) and leading (forward looking) indicators. This last step is often omitted (Ittner and Larcker 2004). Neely and Bourne (2000) noted that if companies do not work out the cause-and-effect relationships and gather measures with brainstorming, the logic between measures will remain hidden, the relationships cannot be seen and the trade-offs cannot be handled. Therefore more attention has to be paid to developing a strategic map. According to Kaplan and Norton (2002. 24) the strategic map is a logical and comprehensive scheme for the description of the strategy, in which the causal relationships show how intangible assets are being transformed into tangible (financial) performance. Samples of strategy maps (Kaplan and Norton 2005) provide help, but they substantiate a source of danger if managers omit the important steps of discussing strategic goals and identifying key value drivers, and they only take over a sample of strategy map which best suits their organisation.

The BSC is more than just another indicator system: it offers a systematic process for the implementation of corporate strategy and for feedback. The process of BSC development forces managers to clarify the strategy and to reach consensus. It fosters concentration on the most important business processes. It offers managers at various levels of the company hierarchy an easily understandable “language” for communicating the strategy. It links the strategic objectives with annual planning and resource allocation. Also, it provides an appropriate

framework for the systematic review of the strategy, for feedback, strategic learning and continuous development.

Applying the Balanced Scorecard in non-profit organisations

The original concept was developed for profit oriented organisations, but more and more non-profit organisations are interested in it, because they also have limited resources, increasingly need control and face stronger competition. Since 1996, several BSC applications have been implemented in governmental, healthcare, and other non-profit organisations; for example, in the local government of Charlotte in the USA, in some federal agencies in the USA (Kaplan and Norton 2002), the court in Singapore, the Swedish Police (Carmona and Gronlund 2003), the United Way of South-Eastern New England (UWSENE), an organisation which collects and distributes donations (Kaplan and Atkinson 2003; Kaplan and Norton 2002), New Profit charitable venture capital fund (Kaplan and Norton 2002), as well as several healthcare organisations (Kaplan and Norton 2002; Zelman et al. 2006; McDonald 2012). Applying the Balanced Scorecard concept in the non-profit sector is widespread. Since there are not enough surveys of BSC application in sports organisations, reviewing the experiences of BSC adaptation in non-profit organisations can be useful.

Inamdar et al. (2002) conducted a survey in healthcare organisations, which concluded on the below benefits deriving from BSC applications:

1. The BSC development process forced executives to clarify and gain consensus on corporate strategy;

2. It increased the credibility of management. Board members were clearer about the measures and target results for which the CEO and other top executives would be held accountable;

3. The four perspectives of the method provided a framework for decision making. The cause-and-effect logic forced executives to think in ways that led to better decisions;

4. The BSC helped executives to focus on core business processes and launch initiatives to support these processes. The strategy was

brought down to the level of the front-line workers who could understand the value of their work and how it related to the organization's strategic objectives. It improved employees' morale;

5. The BSC linked strategy with resource allocation. It helped in balancing short-term financial goals with long-term investments for growth;

6. It supported greater accountability, especially when it was linked to managers' incentive plans. The Scorecard development process unfolded the strengths and weaknesses of the performance measurement system, pointed out the conflicts in priorities concerning costs, quality and services;

7. It enabled learning and continuous improvement.

Taliento and Silverman (2005) conducted surveys with executives with experience in both non-profit and for-profit organisations. They concluded that reaching goals and measuring output is more difficult in non-profit organisations. Clarifying strategy and the lack of consensus on strategic goals was often challenging. Measuring the organisations' performance was also challenging and innovative measures were needed. We can observe differences in the framework of BSC applied in non-profit organisations compared to profit oriented organisations. The four perspectives can be used, but in case of most non-profit organisations the financial perspective could not be on the top of the measures' hierarchy. It could not represent the basis for developing BSC, because achieving financial success was not their primary goal. An often used solution is that the customer perspective is placed on the top of hierarchy, but in some organisations identifying customers was also challenging. For example, who are the customers of donations distributors: donators, supported communities or the intermediary agencies?

The survey of Inamdar et al. (2002) in healthcare organisations identified the below barriers and challenges in connection with BSC implementation:

1. It was an incredible challenge for them to gain and sustain support for the long and difficult development and implementation processes;

2. Obtaining executive time and commitment was crucial. It caused a major shift in the way of thinking about strategy. Accepting the four-perspective framework was not easy, because the "culture did not value looking at measures in a balanced way." Measuring the learning and growth objectives was difficult to accept. Using a cause-and-effect logic was also difficult, because managers and employees were not accustomed to think about strategy in such a careful way;

3. Conflicting values existed and handling trade-offs was difficult. They realized that they did not have enough information about customer preferences, which situation could only be improved by conducting market research projects;

4. Extensive time (six months to one year) and effort was needed for planning the system; obtaining consensus about what was strategically important was especially time consuming;

5. Many organizations had previously attempted to implement business tools, but had not taken them to completion, so the workforce was sceptical and viewed the BSC as "just another fad". Fear of being measured caused serious resistance;

6. Organizations had to teach the workforce how to gather, analyze, and use data for the measures;

7. BSC has to be simple and understandable. It should be continually evolving and adjusting to new strategies.

Recommendations for the development of a Balanced Scorecard tool in sports organisations

There is a relative scarcity of academic articles dealing with the application of Balanced Scorecard in sports organisations. We have identified the following list of relevant materials: Alonso et al. 2009; Becsky 201; Delaney 2008; Jones 2006; IFUA Horváth & Partners 2004 and Kriemadis et al. 2008.

Based on the available literature and our discussions with company management, the initial question to ask is whether the management of sports organisations need a balanced performance measurement system to be developed. One of the early evidence of Balanced Scorecard in

football was implemented in German top-tier football club VfB Stuttgart (IFUA Horváth & Partners 2004). The results of that implementation was claimed to be clearly positive, in terms of supporting informed and effective management decisions. However, Balanced Scorecard applications are still uncommon in sports organisations, and there are no studies on how successful the adaptation and implementation of the model has been. Presumably, a key obstacle to the proliferation of the model is the lack of information about the system and its potential benefits, and also the lack of commitment from management.

To answer the initial question about the aim of Balanced Scorecard implementation in sports organisations, the following arguments arise:

1. It puts pressure on management to clarify the strategic orientation and goals of their organisation, and to identify the steps to reach those goals;

2. It stimulates a multi-aspect approach to performance measurement;

3. Drawing up the cause-effect relationships requires an emphatic strategic mindset, and the operational interrelationships of organisational activities and processes are to be clarified. Different goals need to be interlinked;

4. It provides a common goal and communication tool for the management;

5. It can be linked to the annual planning and budgeting process;

6. Balanced Scorecard provides a formal framework for monitoring organisational performance;

7. The strategic learning process is fostered;

8. It can be used for motivational purposes.

Once the primary motives for implementing Balanced Scorecard are clarified, the next question is to clarify whether the fundamental structure of the concept needs to be adjusted for sports organisations. The standard Balanced Scorecard structure is generally applicable in any organisation, unless there are good reasons to add additional perspectives that drive management's attention to the strategically important aspects, without creating an overly complex tool. Based on

our case study analysis, we have found a particularly important aspect that may be worth a separate category in BSC: sports performance. However, we have learned to understand that good sports performance is neither a goal in itself, nor an aspect to be separated from the core perspectives. We will explain its role in the sections that follow.

The ultimate purpose of sports organisations

Based on our case study and research of secondary sources, we understand that the ultimate purpose of sports organisations differs depending on the market environment. In large markets where there is strong commercial potential both domestically and globally, the ultimate purpose of sports organisations is similar to traditional businesses: satisfying customer needs by generating profits (Chikán 2008). However, this is only valid for a short list of sports leagues and clubs in the world: the major leagues in the US, English football, and a few significant leagues in Germany (football, handball, and possibly ice hockey). In most other cases, the traditional business considerations are intertwinned with strong public considerations, represented by the central or local government that generally support the investments and operations of sports. This is also the case in Hungary, as reflected by our case study.

In this publicly sensitive environment, the ultimate purpose of sports organisations is rather attracting the continuous attention of key stakeholders in a financially sustainable way. Attention is normally attracted by good sports performance, potentially supported by local traditions of long history. Perceived sports success (to be defined later) brings public benefits, in terms of the strengthened pride and feeling of belonging within the wider or local community. Financial sustainability, partly through exploiting commercialisation opportunities, is then needed so that the public support of operations may be limited to a level that can be relied upon regardless of the actual political regime.

As a consequence, the financial perspective of Balanced Scorecard may not be the ultimate perspective in the hierarchy of the measurement structure in sports organisations. Non-profit entities

normally prioritise the customer perspective, and this is also our recommendation for sports organisations, based on our case study analysis.

Customer perspective

For professional sports organisations, there are different customer groups in different markets: on-site supporters, media consumers (television viewers or readers of on-line/printed newspapers), broadcasting companies, and commercial sponsors. Strategically, supporters are probably the most important, as their presence and active support positively influences demand from other customers (i.e. a livelier atmosphere in the arena creates a more marketable product for the media and sponsors). However, in smaller markets, like Hungary, the majority of the income of sports organisations originates from sponsors, whose interests in providing support may be both political and commercial.

There are fundamental aspects of the sports organisation's performance from the customer perspective that are indifferent to most other businesses: market share (in the relevant geographical area), attendance, average consumer spend etc. These aspects reflect the general success of the organisation on each of its markets.

A specific aspect to the performance of sports organisation for the customers is sports success. It has special characteristics, with regards to it perceptual nature (Irwin et al. 2003; Bovinet 2004; Hanlon 2002). What matters for supporters is not just the number of titles per se, but how the team performs compared to pre-season expectations, the quality of the opponents, the current form of the team, traditions of the team, and quite a few other factors. This aspect is critical from a management point of view, not only because it is difficult to manage, but also because it is so fundamental to the ultimate purpose of the sports organisation: driving attention to the team. No other dimensions of the organisation's performance can off-set customers' disappointment with on-field performance.

The traditional service quality aspects of the customer experience may add value by e.g. providing more comfort in the arena on and off

match days. Non-match day programming may provide significant addition to the business, both in terms of direct revenues and elaboration of the customers' bonds with the sports organisation and its brand. E.g. family events at weekends may bring women and children to the arena who would otherwise remain absent on match days. With positive impressions about the facility and the staff, they may be attracted to follow-up events, or, at least, they may follow media coverage of the team.

Relationship with the customers is a key driver of success itself. Regarding on-site supporters, the media and sponsors, sports organisation need to be equally conscious about developing long-lasting relationships that are robust enough to stand the test of the inevitable fluctuations in sports performance. Emotional bonds are considered normal between the team and its followers; sponsors however are less loyal (Doherty and Murray 2007), while the media is quite focused on following the best performing teams or the teams attracting the most attention.

Finally, the reputation and the brand name of the sports team also need to be managed, as they are among the key drivers of commercialisation. The intended and perceived image of the sports team may drive more attention to the organisation even when other factors of performance are below expectations.

Measuring the customer perspective elements of performance may include: attendance of the team's events in proportion of the total attendance of sports events in the city and its catchment area, annual increase in attendance, increase in average consumer spend, number of renewed sponsorship contracts, number of broadcasted matches in national media, customer feedback about the different aspects of match-day experience, number and attendance of non-match day events, customer activity on the electronic platforms of customer interaction (web page, social media sites etc.), feedback from image surveys.

Financial perspective

While customer perspective is prioritised in the Balanced Scorecard of sports organisations, the financial perspective also needs

to gain emphasis, as the ultimate purpose of sports organisation may only be reached if the long-term support of financing sources and operational efficiency are ensured.

Revenue sources related to customer groups are the starting point of assessing the financial performance of sports organisations. Efforts to increase income from these sources are a most natural task of management. A more specific type of income source is grant received from central and/or local municipalities. These may appear in various forms ranging from sponsorship income, members' loans or non-refundable grants, and regardless of their accounting treatment, sports organisations normally interpret these as "income". In smaller markets, like Hungary, these payments (if accounted as income) may form a major part of total income for the sports organisation.

Other income sources, related to key customer groups, include income from ticketing, additional match-day spending, sponsorship, broadcasting, potentially merchandising and income from non-core events, like cultural events or concerts.

In traditional businesses, a key consideration for management is increasing the return on investment or the return on equity. However, these measures are problematic for sports organisations as most of them are loss making, while profit generation is not even considered a key strategic objective for them. All the more, their success can only partly be measured by financial indicators, as they have wider social objectives, as well as universal objectives like "attracting attention".

Another traditional aspect of financial performance measures are related to efficiency ratios. These normally apply also to sports organisation, as exploiting their resources to the fullest possible extent is in their strategic interest. The specific nature of efficiency measures applied in sports organisations arises from the diverse nature of their strategic objectives: not all their performance outcome has a market price (e.g. social benefits); hence aggregation of all measures may not be possible. More focused measures can be applied, e.g. gross margin on events, sports success related to total spending on players (Stocker 2012).

Finally, utilisation measures of the key assets are strongly linked to overall financial performance. The arena hosting the sport events is

probably the most valuable asset to be utilised by sports organisations. These are normally not directly owned by the sports organisations, rather by the local municipality or related entities. While primary sports events, like championship matches, enjoy a clear priority when filling up the event calendar, arranging additional events, even of primarily commercial nature (e.g. cultural festivities or concerts) can contribute to the financial sustainability of sports organisations.

Internal business processes

This perspective considers fundamental operations that affect sports success and customer satisfaction. Furthermore, these processes impact the cost considerations of the financial perspective.

There are core activities in sports organisations that underlie all operations. First and foremost the production of sports performance has to be organised. This involves ensuring that the physical condition, mentality and technical skills of athletes are kept to a level providing the sound basis for on-the-field success. Furthermore, effective activities in the player market (except football, this normally does not involve transfer fees), and the establishment of youth development schemes may ensure the continuous supply of talent to support sports performance of the team.

Just as much as sports performance is crucial, sports organisations aim to ensure that their operations are sustainable through the successful commercialisation of their attention-driving potential. Services to be provided at the facilities where games are held, including, but not limited to consistently good quality of products, variety of options, safety and security for the supporters and their family.

The above perspective of strategic performance may be measured through a range of techniques that are to be developed in line with the specific strategy of each organisation. Examples include: goals scored, matches won, active wage ratio (i.e. the ratio of wages earned by players actually playing compared to the total wages of the squad), youth inclusion ratio (number of youth players coming through the ranks to play in the first team in the given season), as well as number of security

incidents per game, average lead time at the food&beverage desks, customer satisfaction score from regular surveys.

Learning and growth

In order to instil a constant drive for innovation that supports the commercialisation of core activities, sports organisations need to develop their employees. The most critical role in a sports team are professional players – their performance (goals scored, matches and titles won etc.) lies at the heart of the core sports activity of the team and also the main driver of customer and public attention. How successful they are and how happy they are with their job are critical success factors for the organisation. Nevertheless, other employees, including the management, the coaching team, services and back office staff also play a role (e.g. seamless customer support, catering services, informing the supporters) with direct links to organisational success. If these links are clarified, communicated and the relevant performance measured, the organisation will be more efficient in goal achievement.

Innovations are based on people who are happy, trained and developing. How activities are organised (e.g. quicker access to the seats in the arena), how new service ideas (e.g. new programmes in the arena) and efficiency improving solutions (e.g. electronic ticketing) are implemented are major factors that differentiates more commercialised sports organisations from the rest.

For good decisions, management needs access to the relevant information about the sports organisation's activities, and any changes in the external environment of the business. How are other teams performing? How much revenues have we earned in the current season so far? How are our new signings performing? If management knows the answer to these and similar questions, the business of the sport organisation can grow more quickly (through changes in the line-up, adjusted pricing etc.) and any mistakes can be corrected in a timely manner (Késenne 2002).

Measuring the above elements of performance vary depending on the strategy of the given organisation. Examples include: number of renewed contracts, length of employment of service staff, customer

feedback related to service experience, time needed to implement innovation projects, number of new programmes in a season, time needed for collecting relevant information for major management decisions.

Interrelationship of different perspectives

It is a typical mistake in implementing Balanced Scorecard that cause-and-effect relationships between measures remain undefined. In order to avoid this mistake, the business model of the company has to be understood, as well as the relationships between the four perspectives. Sports organisations need managers to pay special attention to how sports performance may be converted to revenues that provide finance for producing sports success in the future. There is no clear empirical evidence for a direct relationship between on-field and off-the-field success, hence the need for particular care with commercialisation.

Cause-and-effect relationships, hypothetical as they may be, are based on an understanding of the business model. E.g. if the sports organisation can manage to move up the championship table (customer perspective), this improves the satisfaction of sponsors (customer perspective), which in turn may induce an increased number of renewed sponsorship contracts (customer perspective). Ultimately, this will increase the level and proportion of market revenues (financial perspective). Perceived sports success (customer perspective), though subjective, implies improved customer satisfaction (customer perspective), which is expected to result in higher gate receipts (financial perspective) and sponsorship fees (financial perspective) (Wicker et al. 2012; MacDonald 2010 and Rascher et al. 2007).

What is needed for sports success? Evidence suggests that the quality of the playing squad (measured by market wages) is the most crucial success factor. Good players possess the required technical skills (internal processes perspective and through training also linked to learning and growth perspective) and are sufficiently motivated (learning and growth perspective). Players may be attracted from other clubs through improved payment terms (financial perspectives) or

come through the ranks from the grass-roots system (internal processes perspective).

Competence in sports affairs (learning and growth perspective) is essential for sports success. However, commercial management competences (learning and growth perspective) are also necessary. This has an impact on services quality (internal processes perspective) and customer satisfaction (customer perspective), which normally translates into increasing gate receipts (financial perspective). Furthermore, sports success may be commercialised through additional market channels, e.g. broadcasting, sponsorship, commercial events, which also necessitate management competence.

Exploring cause-and-effect relationships is never easy. Sensitivity analysis, scenario analysis and model testing are often applied. These analyses are all the more challenging for sports organisations, in light of the non-market coordination aspects of operations and the various interlinks between value drivers. Exploring these complex interlinks may substantially help managers focus on the actual critical success factors. Ittner and Larcker (2004) recommend setting up a cause-and-effect model, as well as the collection of data to test the efficacy of the assumed model (e.g. through correlations, regression analysis). Also, regular refinement of the model is always needed.

Concluding remarks

Despite the fact that empirical studies have confirmed the relevance of the Balanced Scorecard tool for non-profit organisations, relatively few research articles have dealt with its application in sports organisations. Meanwhile, there is a growing need for management efficiency in the professional sports industry, as financial sustainability needs to be achieved in an ever-more competitive global marketplace. Our case study analysis confirmed the potential of Balanced Scorecard in the clarification of strategic goals, their interrelationship and the monitoring of strategic goal achievement. The first step for managers is to understand the Balanced Scorecard approach, and to clarify strategic objectives. This is ensued by the challenging task to assign performance indicators to strategic goals and value drivers. In our paper, we have

made recommendations for the development of a Balanced Scorecard tool in sports organisations. While the development of a specific Balanced Scorecard for a particular organisation was not our intention, the generalisability of our results may be further improved by future case studies of other handball teams, and potentially also in other sports.

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Examination of environmentally conscious consumer groups on the Hungarian food market

IBOLYA BRÁVÁCZ[1]

Today's issues such as environmental protection, healthy diet, quality assurance of food, and consumer protection are attracting more and more publicity. The role of ecological consumer protection is constantly growing in Hungary, with ultimate targeting that conscious consumption will play an important role in the consumers' values.

The main target of my research is the identification and characterization of environmentally and health conscious consumer groups, and tendencies in foodstuff consumption. Therefore, in order to outline the consumer's responsibilities and limits, I carried out a multi-step data acquisition as early as in 2008. This was followed by a survey in 2013. In March 2013 this questionnaire was delivered to 2400 consumers, of which 2000 were suitable for evaluation, hence this was the size of the sample. The two main elements of the research are: health consciousness (importance of health, survey and assessment of its extent and method) and environmental consciousness (motivations of consumers to protect the environment when purchasing foodstuff). I wish to present the results of the latest research series: consumer segments revealed by cluster analysis, and consumer groups by their environmental consciousness. I was able to detect five clusters with the K-means method, considering fifteen variables. The names of the clusters and distribution in percentage:

1. Dark green – with strong environmental consciousness (19.1%)
2. Light / Pale Green – youthfully wasteful (19.5%)
3. Economically green – consciously thrifty (15.2%)
4. Passively green – elderly inactive (22.1%)
5. Potentially green – the evolving environmentally conscious majority (24.1%)

In my study I present the main characteristics and future potentials in these consumer clusters in terms of environmental awareness.

Keywords: consumer behaviour, health consciousness, environmental consciousness, environmental protection, cluster analysis.

JEL code: M30.

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Introduction

Environmental consciousness was first studied by the environmental psychologists Michael P. Maloney and Michael P. Ward. In 1973 they came to the conclusion that some people are not indifferent to the environment, and are worried about its future. They pointed out that, unfortunately, this is not universal. Although they may agree with the necessity of environmental protection, their behaviour cannot be considered environmentally conscious at all (Maloney and Ward 1973). Environmental concern is defined in various ways, as it is a very complicated and unstable concept (Chan and Lau 2004). Crosby et al. (1981) define it as having a strong attitude for protecting the environment.

Environmental awareness is interpreted on several levels: global, national, organizational and individual (Schäfferné Dudás 2008):

Global level. The acceleration of industrialization in the second half of the 20th century was accompanied by the growth of ecological risks. The increase in production and development of applied technology did not only result in spectacular improvement but intensive use of raw materials and environmental destruction as well. The main reason behind this is growth. World population is growing, and so does the pollution and industrial production of food, making this growth exponential (Meadows et al. 2004).

National/governmental level. Environmental awareness of the public sector can show itself in performing its environmental protection related tasks on a high level.

Organizational level. This layer includes profit oriented business entities, non-profit civil organizations as well as academic organizations and the degree of their role in environmental protection.

Consumer level. My research examines consumers' health and environmental awareness, therefore I want to thoroughly describe this level. As it became evident in the light of Vlek's (1996, 2000) data, our consumption patterns need to change. From the 1980's there are a growing number of customers who appreciate environmental efforts of companies and reject companies that engage in activities harmful to

the environment (Menon and Menon 1997). According to Meffert and Kirchgeorg (1993) consumer consciousness is none other than:

- the implementation of ecological consistency concerning shopping habits and decisions;

- the awareness that the product's development, production, distribution, consumption, use and even the following period has a disadvantageous impact on the environment and causes additional costs;

- efforts aiming minimization of adverse effects and additional costs.

These three factors were studied during my research.

Ottman (1998) defines three segments of environmentally conscious consumers based on their environment-related efforts and activities:

- The aim of the *Earth protectors* is the protection of wildlife and the restoration/preservation of the original state of the environment. They consider soil, air and water related problems as being crucial issues.

- *Health fanatics* focus on the effect of environmental problems on health. They are afraid of sunlight-induced skin cancer, genetic disorders caused by radiation and toxic waste and the long term adverse effects of chemical content in plants.

- *Animal protectors* boycott goods produced with animal use, they are the advocates of animal rights and protect endangered species. They are typically vegetarians and refuse to buy animal-tested products.

Albayrak et al. (2010) aimed to measure the environmentally sensitive behaviour of consumers and to cluster them according to their environmental concerns and skepticisms. These two psychographic variables were selected by their diverse nature and importance for understanding the basic determinants of a continuously developing market segment. A solution of three clusters was obtained for the participants who were named as: keen skeptics, fanatics, and hesitants.

Some companies expressly target those people who are environmentally sensitive and prefer to purchase “green” products. To identify these environmentally sensitive consumers and define meaningful market segments, mostly demographic characteristics of

customers are used and analyzed. However, many studies have indicated that demographics are not the exact and only determinants of the environmental concern and environmentally sensitive behaviour (Mainieri et al. 1997; Schlegelmilch et al. 1996).

Materials and methods

A questionnaire conducted in Budapest in March 2013 was delivered to 2400 consumers of which 2000 were suitable for evaluation; hence this was the size of the sample. My objective when creating the sample was representativeness and randomness. The sampling with quotas aimed to provide representativeness by gender, age (over 18) and type of residence. The data survey used standard questionnaires and interviews. The response time was 20-25 minutes, and the number of structured questions which included personal data was 31. The obtained data were analyzed with the SPSS program. The analysis was made by using either one or multiple variables, the results showing a statistical validity at 95% confidence level +/- 2%. The scale type of questions was analyzed by using average and percentage computations as well as cross-tabulations.

First, it was performed a *factor analysis*, concerning the research as a whole, as well as separately regarding the two main areas of my research. For the entire research data, the examination was made on twenty-two variables and managed to establish six factors. During the examination fifteen variables were analyzed focusing on health consciousness, which resulted in four factors. While focusing on environmental consciousness, an opportunity has risen to separate four factors as well, applying fifteen variables as in the previous case.

The *Cluster analysis* can be perfectly applied for the market's segmentation and for analyzing the market structure, which is the main objective of my research. As method of the cluster analysis, K-mean, a non-hierarchical method was chosen since the hierarchical analysis cannot be applied in case of a high number of sample elements. Therefore, one had to determine the cluster centers and the number of clusters to be created (Sajtos and Mitev, 2006).

As a result, including the full research material, six clusters were created. Throughout my research focusing on health consciousness, I have examined fifteen variables, resulting in five clusters. While focusing on environmental consciousness, I was also able to separate five clusters, applying the same amount of fifteen variables. In my study, I desired to present the clusters and consumer groups which I examined regarding the environmental consciousness.

Results and discussion

The standardized questionnaire consisted of twenty questions and three parts: food purchasing habits, level of consciousness during the food purchasing process, and personal data.

The number of adult participants living in the capital was 2000, of which 1963 were added to the statistics during the cluster analysis (the population of Budapest is approximately 1.7 million). The participants' division by gender was the following: male 45.8%, and female 54.2%. Their division based on residence was: capital inner city districts 60.7%, and the capital's outer districts 39.4%. Table 1 shows the distribution of the sample by age groups.

Table 1. Distribution of the sample by age groups

Age groups (years)	Frequency (head)	Percent (%)
Youth(18-34)	607	30.4
Middle-aged (35-60)	1084	54.2
Ageing (60+)	309	15.5
Total	2000	100.0

Source: own research

The results of factor analysis concerning environmentally conscious food purchase

Focusing on environmental consciousness, four factors could be distinguished based on fifteen variables. During the analysis the Principal Component Analysis method and the Varimax rotation was applied. The KMO index value exceeds 0.8, which means that the factor analysis is suitable (Table 2).

Table 2. KMO and Bartlett's Test (n=1963)

Kaiser Meyer–Olkin Measure of Sampling Adequacy		**.837**
Bartlett's Test of Sphericity	Approx. Chi-Square	6352.233
	df	105
	Sig.	.000

Source: own research

The weight matrix of the rotated factors produced using the Varimax method is visible in Table 3. The investigation resulted in four factors which explain 53.9% of the variance.

Table 3. Rotated Component Matrix (n=1963)

Variables	Component			
	1	2	3	4
Paying attention to green emblems	**.815**	.041	.064	-.102
Preference for recyclable packaging	**.795**	.045	.069	.012
Environmentally friendly behavior	**.726**	.164	.073	-.104
Frequency of organic food purchase	**.676**	.061	-.038	-.268
Preference for returnable packaging	**.596**	.021	.198	.268
Purchase of products from nearby manufacturer	**.548**	.101	.122	.034
Pre-planned grocery shopping	.022	**.756**	.191	-.003
Frequency of the usage of shopping lists	.084	**.682**	.042	-.010
The rate of informedness concerning food	.284	**.631**	-.081	-.006
The role of efficiency	-.016	**.583**	.380	.259
Avoidance of unnecessary purchases	.010	.181	**.729**	.143
Preference for fresh food	.170	.099	**.615**	-.297
Avoidance of over packaged food	.420	-.011	**.589**	.040
Degree of routine in food shopping	.035	-.020	-.104	**.802**
Price sensitivity	-.263	.299	.275	**.488**
Extraction Method: Principal Component Analysis. Rotation Method: Varimax with Kaiser Normalization.				
Rotation converged in 6 iterations.				

Source: own research

The factors have been named as a result of a very subjective decision-making process. During the process variables with the highest

factor loadings have to be emphasized. The factors were named as follows:

1. Strong environmental orientation factor;
2. Planned and economical factor;
3. Optimal amount and fresh product factor;
4. Conservative – price sensitive factor.

Clusters from the aspect of environmentally conscious food purchase

Variables and properties have been examined on a scale of 1-5. Referring to the respondents' alternatives, value 1 is not true at all, while value 5 is completely true. The answers' interpretation can be seen in Table 4. In my research, focusing on environmentally conscious food purchase, I was able to detect five clusters with the K-means method, taking into account fifteen variables. I would like to briefly present these consumer groups.

Cluster 1 (19.1%): Dark green – with strong environmental consciousness. This cluster shows the highest proportion of women (64.5%), who are typically middle aged (73% are between the age 31 and 65). The average age concerning this group is 46. The group with the highest qualification is divided as it follows: 47.7% have a college degree, which means 10% more points than the average. Only a small proportion of this group consists of students (4.4%), while most of them are employees (54.5%) and the rate of entrepreneurs is also higher than the average. This is the group of customers with the highest income. Two thirds of them prefer to shop at super- and hypermarkets, but 17.3% of them also like to shop at traditional markets (an average of 9.2%). Due to their high income, this group has the highest value of order details. Small households are typical: two adults (54%) and one (20%) or two (14%) child(ren). This customer group shows the best values concerning every variable examined. According to their own admission, they are the most environmentally-aware, they are strongly brand-loyal, they have the highest standards, they prefer domestic and nearby produced groceries; they mostly buy bio-products and they have the highest proportion in buying products with returnable packaging,

they avoid over-packaged products and are more likely to buy fresh food. For this group the price of the products is of the least importance which is possible because of their high average income. They are highly informed and open-minded to innovations. This is the most environmentally conscious group, who are also highly health-oriented.

Table 4. The mean of the variables of environmentally conscious clusters on a scale of 1-5 (n=1963)

Cluster	Environmentally friendly behaviour	Paying attention to green emblems	Preference for recyclable packaging	Avoidance of over packaged food	Avoidance of unnecessary purchases	Preference for fresh food	Frequency of the usage of shopping lists
1	4.13	3.99	3.94	4.06	4.03	4.64	3.98
2	2.21	1.69	2.11	2.41	3.02	3.58	1.75
3	2.55	1.86	1.77	2.81	3.54	4.22	4.04
4	2.85	2.26	3.24	3.42	4.17	4.15	3.90
5	3.42	3.25	3.00	3.38	3.36	4.05	2.18
Total	3.06	2.66	2.87	3.24	3.63	4.12	3.10

Cluster	Preference of returnable packaging	Frequency of organic food purchase	Pre-planned grocery shopping	Degree of routine in food shopping	Price sensitivity	The rate of informedness concerning food	The role of efficiency	Purchase of products from nearby manufacturer
1	4.09	3.53	4.48	3.23	3.74	3.92	4.24	3.56
2	2.00	1.50	3.06	3.55	3.70	2.76	3.29	1.91
3	2.17	1.82	4.32	2.81	3.91	3.29	3.91	2.02
4	2.69	1.71	4.48	4.02	4.51	3.60	4.51	2.61
5	3.39	2.89	3.44	3.33	3.45	3.26	3.62	2.88
Total	2.91	2.32	3.93	3.43	3.86	3.37	3.92	2.63

Source: own research

Cluster 2 (19.5%): Light / Pale Green - Youthfully wasteful. In this group, the proportion of men is extremely high (65.4%). It is the youngest cluster, more than half of the group (57.3%) is under the age of 45. Two or three adults form a household (68%) with typically one minor (18.3%). Due to their age, the proportion of students is the highest (16.6%) while every other member is an employee. Interestingly, both the number of members with the lowest (14.7%) and

highest (31.5%) income is higher than the average. Two thirds of them like to shop at super- and hypermarkets but the highest proportion prefer small shops (16.8%), they often buy small lots, since they are mostly students or single young adults with a higher income. They "avoid" traditional markets. They claim to be the least environmentally conscious. Concerning most of the variables I obtained the weakest data regarding environmental consciousness. For example most of them don't prefer domestic products, they are the ones least looking for returnable packaging, they don't pay attention to environment friendly emblems. Neither do they avoid over packaged and unnecessarily purchased products. According to their own admission they are less loyal to brands and they don't seek information about the food they purchase. Efficiency and planned shopping is not their characteristic. Overall we can say that they don't feel the importance of their decisions regarding the environment due to their young age.

Cluster 3 (15.2%): Economically green – consciously thrifty. This is an interesting group consisting of mostly women (62.8%) where the proportion of both the younger (age between 18 and 35 years, 33.9%) and the older (17.4%) age groups is higher, with an average age of 45 years. The highest proportion of the group (cca. 67%) lives in inner city districts. They are mainly employees (55.8%), but many of them are pensioners (19.2%). The households are considered bigger: usually with 4-6 persons of which 1-2 are minors. The incomes are moderate, but since they live in bigger households, they prefer economical and sparing purchases and find environmentally friendly products very expensive. They are the least loyal to brands, but they complete their shopping according to a previously prepared list and plan economically and with a high price sensitivity. They show passivity towards returnable or recyclable packing or wrapping. Based on their answers, they can be characterized as moderately open and informed, having moderate standards.

Cluster 4 (22.1%): Passively green – elderly inactive. As to their gender, the number of women is moderately higher (59.3%). Concerning the oldest cluster, 41.2% of them are over 56 and their

average age is 50. Therefore it is not surprising that nearly 30% are retired and the proportion of single occupancy households is rather high (24.3%). They have the lowest education level, which also explains their passivity regarding environmental protection and their lack of awareness. This group has the smallest number of entrepreneurs (9.7%) and their average income is also the lowest (due to low pensions in Hungary). Certainly, most of them go to supermarkets and hypermarkets, but they also like small shops and markets. It is also not surprising that on these occasions they spend less on groceries than the average. This is a moderately eco-friendly and informed group, but they like domestic products. They are moderately concerned about recyclability, over packaging and eco-friendly emblems. However they prefer returnable packaging, presumably because the product is cheaper this way. They are not typically bio-product buyers, because that is more expensive. Due to their low income they shop economically, avoiding any excesses. They are the most price sensitive group, they mostly buy out of habit, and plan their shopping, they are not too loyal to brands, because they keep looking for discounts. This group is the least open minded concerning new products.

Cluster 5 (24.1%): Potentially green - The evolving environmentally conscious majority. As to their gender, they show the proportion of the pattern, mostly middle-aged (55% consist of age between 31 and 55) with the smallest headcount of elderly people (3.8%) and an average age of 42 years. Regarding their education, the proportion of members with college degree is high (44.8%, which is 6% higher than the average). This cluster includes a higher headcount of entrepreneurs (22.6%), thus the average income is the highest in this group. They almost only shop at super- and hypermarkets (84.8%). They can be described with households of 3-4 members of which 1-2 are children. This is the second most environmentally conscious group (after the first cluster). They prefer domestic and bio-food, and are open to novelties. They pay attention to recyclable packaging and eco-friendly emblems. However, shopping lists and the purchase of fresh products is not their characteristic. They buy a lot of unnecessary products, and don't avoid

over packaging. The members of the cluster have high standards but they are only moderately informed about groceries. This group is the least price sensitive due to their high income.

Conclusion

In this study I have tried to categorize the environmental consciousness of the adult population of Budapest. I obtained five clusters, which show that the population in the capital still has to improve their behaviour concerning the environment. There is a strongly health and environmentally conscious costumer group that has a good effect on the environment and their children, thus their number is likely to grow. The second cluster is the youngest and strongly wasteful, but this may and should be improved by good communication and campaigns. They are receptive and responsive. Ideally, many of them could become members of the strongly environmentally conscious cluster. The third group consists of lower income young adults and elderly people. In my opinion they could only become more environmentally conscious if their salary would grow, otherwise they will keep showing a thrifty but passive environmental orientation. The fourth group consists of elderly people with low pensions, the lowest average income and education. Due to their age, their routines, and the lack of open-mindedness they are difficult to mobilize. Their environmentally conscious behaviour is not likely to improve. The last cluster may be the most easy to improve in the examined matter with most members with adequate income. There is a lot of potential in this group. They are typically middle aged with small children; therefore they might be more open to eco-friendly solutions. This is one of the most important groups, who can be reached through the communication channels and may be mobilized in the near future.

The survey conducted in Budapest in 2013 shows better results than our earlier national research, which can be explained partly by the higher education level and higher average income in the capital, but also by the increase of environmental consciousness in Hungary.

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Configurational methods in operations management contingency research – overview and the introduction of multidimensional scaling as a possible new application[1]

ZSOLT MATYUSZ[2]

In this paper we examine different applicable methods for analyzing configurations of manufacturing practices and contingency factors. The paper consists of two main parts. We first review those methods that can be used for investigating configurations based on Venkatraman (1989) and Venkatraman – Prescott (1990): gestalts, profile deviation and covariation, and we introduce another method for configurational analysis, namely the multidimensional scaling (MDS). The second part provides an empirical comparison between some of these methods by using the fifth wave of IMSS database which contains 725 valid observations from 21 countries from the ISIC 28-35 industries. We give an example for the joint use of factor analysis and multidimensional scaling, and also of cluster analysis and multidimensional scaling.

Keywords: contingency factors, configurational models, manufacturing, operations, multidimensional scaling.

JEL code: M11.

Introduction

When one talks about contingency factors, there are many synonymous terms that lack clear definitions. Just to mention some examples:

- contingencies may be intra- and extra-organizational (Donaldson 2001);

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- context as the totality of contingencies (Baranyi 2001);
- situational or contextual factors (Dobák 2006; Dobák and Antal 2010);
- contextual factors (consisting of organizational and contingency factors) (Sila 2007);
- external environmental variables (González-Benito 2002); and
- environmental, organizational and managerial contexts (McKone et al. 1999).

In this paper, all environmental conditions and long-lasting organizational capabilities and factors will be identified as 'contingency factors' (according to Dobák and Antal 2010). The research of contingency factors has a long history and dates back to the 1950s. The term "contingency theory" was coined by Lawrence and Lorsch (1967), and played a leading role in the organizational practice of the 1970s. Contingency factors became popular in the field of strategic management in the 1970s and 1980s (see e.g. Mintzberg 1979) and have remained a research target area ever since. This applies to the field of *operations strategy* as well. However, according to Sousa and Voss (2008) there is a lot of space for contingency research in operations management (OM). At this level of research we are interested in the effect of contingency factors on everyday *management practices* (e.g. quality management practices or HRM practices), not on operations strategy. If we compare the quantity of articles with a contingency view to the existing OM knowledge, the ratio is very low indeed. Also, most papers did not investigate contingencies on a system-level, but rather tested relationships between pairs consisting of a contingency variable and an OM variable (see Drazin and Van de Ven 1985 for possible levels of analysis). The system approach refers to the simultaneous examination of the effect of several contingency factors and manufacturing practices on operations performance, and the appearing configurations may be analyzed. This configurational view is the natural extension of the contingency view (Ahmad et al. 2003), and its importance is also noted by Boyer et al. (2000). Bozarth and McDermott (1998) see the distinctive feature of configuration models in the

application of multidimensional profiles to describe organizational, strategy and process types. They note that when a theory is described by multidimensional profiles, traditional models (working with mediation and moderation) may be entirely useless because of their linearity constraints and because only few variables may be investigated simultaneously. Configurational models were developed to address these disadvantages. By accepting the fact that there are multiple ways to be successful in any given environment, the configurational approach explicitly supports the notion of equifinality (Meyer et al. 1993). In this paper we examine different applicable methods for analyzing configurations of manufacturing practices and contingency factors, and show practical examples on how to jointly use them.

Literature review

We first reviewed those methods that can be used for investigating configurations based on Venkatraman (1989) and Venkatraman and Prescott (1990). The main problem when writing the articles was that no deeply elaborated method existed to mathematically test fit theories. This gap was caused by the several possible ways to interpret fit. To examine configurations with a system approach in mind, three methods are appropriate: *gestalts*, *profile deviation* and *covariation* (Sousa and Voss 2008).

In the case of *gestalts*, we examine the degree of internal coherence among a set of theoretical attributes. It is important to examine these theoretical attributes jointly because at the level of single pairwise attributes, we may find internal inconsistencies. Basically, this approach intends to create archetypes. The important analytical issues are the descriptive validity (it is necessary to develop a set of formal criteria to evaluate the descriptive validity of the gestalts) and predictive validity (the performance implications need to be established, and the existence of generic strategy types or multiple configurations of equal success should be demonstrated). For gestalts, we use the cluster analysis, which is a frequently used configuration

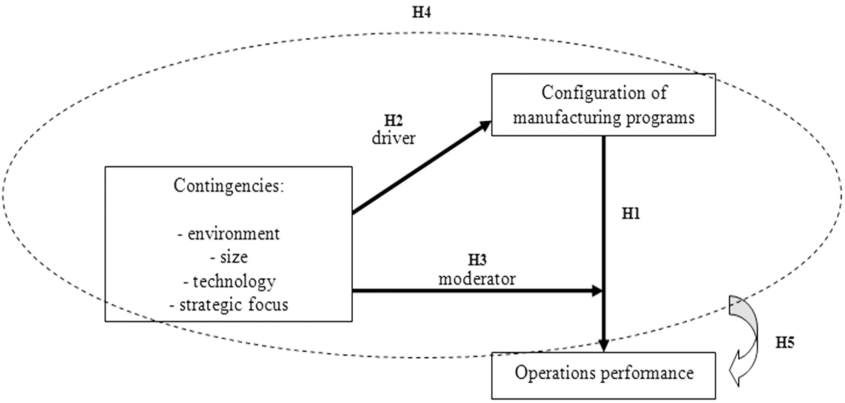
method in the field of OM, primarily in the field of manufacturing strategy (see, for example, Miller and Roth 1994; Bozarth and McDermott 1998; Cagliano 1998; Jonsson 2000; Kathuria 2000; Sousa and Voss 2001; Christiansen et al. 2003; Sousa 2003; Sum et al. 2004; Cagliano et al. 2005; Oltra et al. 2005; Zhao et al. 2006; Martin-Pena and Diaz-Garrido 2008).

In the case of *profile deviation*, fit is the degree of adherence to an externally specified profile. The approach differs from the gestalts because here the profile is attached to a dependent variable. This approach makes it possible for the researcher to create ideal types, and it is helpful in investigating environment-strategy relationships because the deviation from the profile can be linked to the decrease of performance. The analytical issues of profile deviation are the development of a profile, the equal or different weighting of the dimensions and the creation of a baseline model. This approach was used, for example by Ahmad et al. (2003) and Da Silveira (2005).

In the case of *covariation*, fit is a pattern of covariation or internal consistency among a set of underlying theoretically related variables. The main difference between covariation and gestalts lies in the methodology. As we mentioned, we apply cluster analysis for gestalts, while we use factor analysis for covariation. The analytical issues are the explorative or confirmative approach and testing the impact of performance on fit.

As another useful method, we introduce the *multidimensional scaling (MDS)*, which is an explorative statistical tool. The main assumption behind MDS is the idea that every observation has an exact set of coordinates in space and more similar observations are closer to each other. When we use MDS, we do not have to build a model or assume a causal relationship or test a hypothesis. We use the distances between the observations to create a map of them in a reduced space (usually in two or three dimensions to help visualization) to reveal their hidden structure. The aim is similar to the objective of the principal component analysis (Cox and Cox 1994). Apart from Demeter et al. (2011), we are not aware of any other article that used this method in

operations management contingency research. In Demeter et al. (2011) the authors mapped the differences among countries and industries in two dimensions. The objective was to identify which contingency factor causes larger differences in the efficiency of labor productivity drivers.



Source: own research

Figure 1. The elaborated research model

Figure 1 shows the elaborated research model used in this paper, taken from Matyusz (2012). Because of the limitations of the current paper, for the reasoning behind the model and its detailed theoretical foundation and analysis please refer to Matyusz (2012). Here we are only briefly overviewing the model. The model consists of three major blocks. The first block is the configuration of the manufacturing practices, which affects the second block, operations performance (H1). The third block is the block of contingency factors, which have a dual role. On one hand, they are drivers of the use of manufacturing practices (H2), and on the other hand, they moderate the relationship between manufacturing practices and operations performance (H3). Two more hypotheses were stated which dealt with configurations. One assumed that there are different stable contingency-manufacturing practice configurations that coexist simultaneously (H4), while the other proposed that the state of equifinality can be shown, i.e., different

and stable contingency-manufacturing practice configurations exist and lead to the same high level of operations performance (H5). Four important contingency factors were analyzed in the model: environment, size, technology and strategic focus. Similar to Mintzberg (1979), we accepted the assumption that the direction of causation is from contingency factors towards manufacturing practices.

Methodology

In this research we use the International Manufacturing Strategy Survey (IMSS) database. IMSS is an international network of researchers who aim to study manufacturing strategy, its implementation, and its results for manufacturing and other adjacent areas (e.g., supply-chain management and new product development). IMSS was launched by Chris Voss (London Business School, UK) and Per Lindberg (Chalmers University of Technology, Sweden) in 1992. Since then, five survey waves have been executed and the sixth is in progress. In our analysis, we will use the data from the fifth survey wave. These data were gathered by the national research teams, whose members asked the respondents to complete a standard questionnaire, which had been assembled by an expert panel, integrating the experience from the previous waves. Where necessary, the questionnaire is translated into the local language by the local OM professors. Although there is a recommended process for the data collection (focusing on better-performing companies, contacting companies via letter and/or phone, mailing a printed questionnaire to a contact person at each company - usually the plant manager or operations manager -, and tracing and assisting the contact person throughout the response phase), the final decision about the process is made by the national research teams. At the same time, the research teams are obliged to inform the global network about the sampling process. The centre coordinating the research executes a preliminary quality check before disseminating the data to the participants.

The fifth wave of the IMSS survey contains 725 valid observations from 21 countries (primarily from Europe, but apart from Africa, all

other continents are represented) from the second half of 2009. The survey focuses on the ISIC 28-35 industries. The industry and country distributions are shown in Tables 1 and 2.

Table 1. Number of observations in different industries

Manufacturing activity	Observations
Fabricated metal products, except machinery and equipment	242
Machinery and equipment not elsewhere classified	185
Office, accounting and computing machinery	12
Electrical machinery and apparatus not elsewhere classified	92
Radio, television and communication equipment and apparatus	42
Medical, precision and optical instruments, watches and clocks	42
Motor vehicles, trailers and semi-trailers	52
Other transport equipment	34
Missing	24

Source: own research based on IMSS database

Table 2. Number of observations in different countries

Country	Observations	Country	Observations	Country	Observations
Belgium	36	Hungary	71	Portugal	10
Brazil	37	Ireland	6	Romania	31
Canada	19	Italy	56	Spain	40
China	59	Japan	28	Switzerland	31
Denmark	18	Korea	41	Taiwan	31
Estonia	27	Mexico	17	United Kingdom	30
Germany	38	Netherlands	51	USA	48

Source: own research based on IMSS database

Analysis and discussion

Our goal is to show how MDS is able to support well established methodologies such as factor analysis and cluster analysis. In this paper we use certain examples based on the research model in Figure 1 to do this. This section gives two possible applications of MDS to show its capability to help configurational analysis by giving new insights. These insights clearly show the usefulness of MDS as an exploratory tool, and hence it can save considerable amount of energy and time when one examines the structure of the data and build a research

model. The first example uses factor analysis and MDS to construct and interpret the variables of the model, while the second one uses cluster analysis and MDS for the configuration of contingency variables and manufacturing practices. As we mentioned in the previous section we had 725 valid observations to begin with. After cleaning the database, analyzing missing values and examining outliers, a total of 523 companies remained in the final sample. We used SPSS 15.0 for the analyses. For the details, please refer to Matyusz (2012).

Factor analysis and multidimensional scaling

Hypotheses H1-H3 were tested by the SEM-PLS method (Henseler et al. 2009; Tabachnick and Fidell 2007) and it was necessary to create appropriate variables used in the model. In this paper we chose the contingency variable of 'strategic focus' as an example. This variable was based on Question A4 of IMSS about competitive priorities ('Consider the importance of the following attributes to win orders from your major customers.'), whose variables were measured on a 5-point Likert-scale (1 – not important, 5 – very important) (see Appendix 1 for the original question from the survey).

A frequent approach here is to use the traditional four dimensions of operations management (cost, quality, flexibility, dependability). The 12 variables were first divided into 4 factors by factor analysis; then we performed the analysis of unidimensionality based on this grouping. The dimensions consisted of the following variables:

i) *cost focus:* lower selling prices (A4a);

ii) *quality focus:* superior product design and quality (A4b), superior conformance to customer specifications (A4c). Cronbach's alpha for quality focus is only 0.556, which is below the expected 0.6 threshold;

iii) *flexibility focus:* wider product range (A4g), offer new products more frequently (A4h), and offer products that are more innovative (A4i). I.e. this focus is about product and mix flexibility. Cronbach's alpha for flexibility focus is 0.768. By omitting variable A4g (wider product range) Cronbach's alpha's value would increase to 0.799.

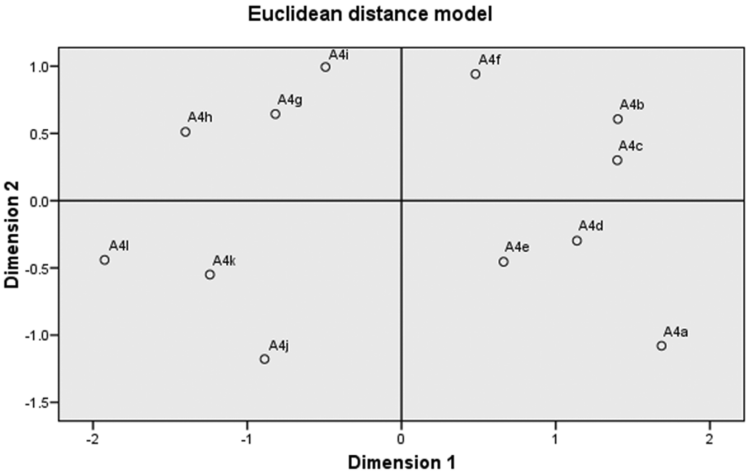
iv) *dependability focus:* more dependable deliveries (A4d), faster deliveries (A4e), greater order size flexibility (A4j), environmentally

sound products and processes (A4k) and committed social responsibility (A4l). Cronbach's alpha for dependability focus is 0.761. It has to be mentioned that this variable measures not only dependability, because it consists of greater order size flexibility (though this can be related to dependability), but also aspects of social responsibility.

One variable, superior customer service (A4f) was omitted as it did not fit into any of the factors. Appendix 2 contains the details of the factor analysis.

Next, we applied the MDS (ALSCAL method) with the Euclidean distance. Figure 2 shows the 2-dimensional result. The S-stress value is 0.14443, which represents a medium fit (values under 0.2 are acceptable). The RSQ (squared correlation) value is 0.874, which means that the resulting 2D map in Figure 2 explains 87.4% of the initial distances between the variables. By using the map, we can refine the results of the factor analysis. It can be seen that A4a is really a stand-alone variable. A4b and A4c are very close to each other, just as to A4d and A4e, which suggests that the quality and dependability-related variables may fit in one factor. It is an interesting insight, because A4b and A4c together were not too reliable based on the alpha value, while A4d and A4e were reliably grouped together with A4j, A4k and A4l, but according to the map, they are very far from each other and should not be treated jointly. A further analysis by PLS-SEM (partial least square structural equation modeling) indeed showed that these five variables cannot be reliably put within the same factor, hence the result of the factor analysis was misleading and the initial model had to be modified. The flexibility-related variables (A4g, A4h, A4i) are close to each other on the map, while A4f does not belong anywhere, it is equally distanced from the flexibility-, quality- and dependability-related variables. In this example we can see that the MDS was able to give a better assessment of the relationships among the variables.

In general, MDS has one disadvantage though, by not telling us the exact meanings of the dimensions on Figure 2. The researcher has to figure them out by thoroughly investigating the initial data, because the aim of the MDS is to map observations based on their distances from



Source: own research

Figure 2. 2D map of the strategic focus variables

each other, but the method itself does not give any further clues about the content of the dimensions. The researcher has to carefully examine the data and identify the causes that may drive the similarities (i.e. closeness in space) or dissimilarities (i.e. wide distances in space) among the observations. By doing this investigation, it is possible to correctly explain the dimensions. For example, in Demeter et al. (2011) the authors applied the MDS to put certain manufacturing industries on a 2D map based on data related to labor productivity and certain management practices. After analyzing the result and the underlying data they were able to conclude that one of the dimensions which clearly separated one industry from the others can be identified as a technology-improvement axis. In this paper our example just focused on the distribution of the variables in order to group them, so the interpretation of the dimensions was not necessary.

Cluster analysis and multidimensional scaling

Based on several contingency variables (namely: environment complexity, strength of competition, company size, strategic focus, product complexity, technological level, process type and customer

order type) and manufacturing program variables, Matyusz (2012) identified four clusters of companies. See Appendix 3 for the original questions from the survey and their operationalization. Appendix 4 shows the mean values of each cluster.

1) 'Large leaders' had the highest values in case of all variables, mostly alone, not together with another cluster. Their environment was the most complex, they faced the strongest competition. They represented the largest companies, and with the exception of cost they treated all other foci as the most important to win orders. Their product was also fairly complex, their technology level was high and they were more of a mass producer with more standardized customer orders. They put the greatest emphasis on the use of different manufacturing practices.

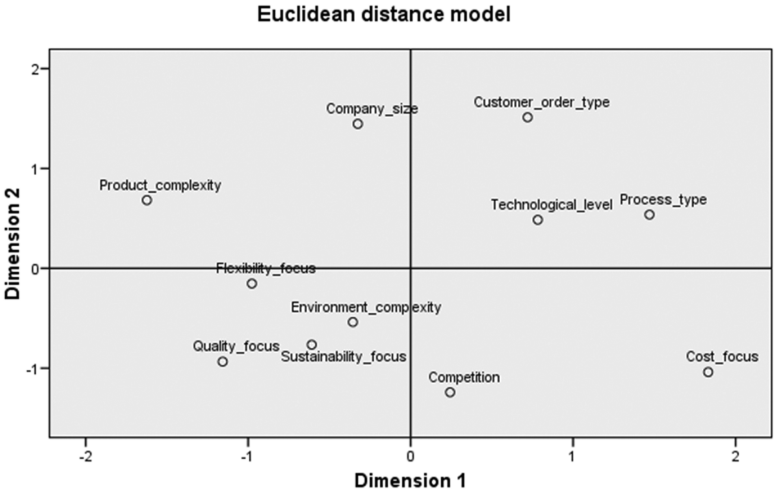
2) 'Small laggards' were their opposite, whose members used all manufacturing practices the least. In their case the product was also quite complex, but the technology level was low. Basically they focused on quality and cost, the two other priorities were not important to them. Environmental complexity was low, and they faced the least competition. They represented the smallest companies in terms of size. The process type was shifted towards one-off manufacturing with heterogeneous customer orders. The use of manufacturing practices was below average.

3-4) The remaining two clusters ('One-off manufacturers' and 'Mass producers') were similar to each other in many aspects. There was no significant difference between them in size, perceived competition (which is above average), technology level (which was medium), and the use of technology and quality management practices (which were slightly below average). The use of the remaining manufacturing practices was a bit more emphasized in the case of 'One-off manufacturers', just as the focus on quality, flexibility and sustainability. This was the consequence of a bit more complex environment and product. They used HR and process control practices to the greatest extent, at an above average level. There was a decisive difference between the two clusters: 'One-off manufacturers' got more unique customer orders and applied more one-off production, while 'Mass producers' were the most standardized mass producers of all clusters.

There was a clear distinction among the clusters along process type and customer order. 'Large leaders' and 'Mass producers' contained companies doing mass production, while 'Small laggards' and 'One-off manufacturers' contained companies that manufacture one-off products. Beyond this, however, clusters in the same category did not resemble each other in the other aspects. 'One-off manufacturers' and 'Mass producers' shared many similarities, while 'Large leaders' and 'Small laggards' were mirror images of each other.

It could be also concluded that environmental complexity moves together with strategic foci: companies operating in more complex environments found quality, flexibility and sustainability more important to win orders than companies operating in a less complex environment.

These were the results of the cluster analysis. If now we apply the MDS to uncover the structure of the clustering variables we get the following picture as seen in Figure 3. For easier visualization, the 2-dimensional map is shown and we focus on the contingency variables of the model.



Source: own research

Figure 3. 2D map of the clustering contingency variables

The S-stress value of the 2D solution is 0.23641, which indicates a weak fit. The RSQ (squared correlation) value is 0.64148; that is, the resulting 2D-map in Figure 3 explains 64% of the initial distances between the variables. Hence, for research purposes one should use the 3D solution (S-stress value = 0.13993 and RSQ = 0.80015) instead, but it would be difficult to visualize, so we discuss the 2D solution here. According to the map, the main conclusions of the cluster analysis stand. Environmental complexity is close to the three strategic foci mentioned before, and the variable measuring the strength of competition is also nearby. Cost focus is a stand alone variable (this was the only one not showing any significant differences among the clusters). Process type and customer order type are in the same quadrant with technological level. This latter relationship was not shown in the cluster analysis. Product complexity and company size are also separated from the other variables. These results help to refine the relationships of the variables as well as the creation of clusters in the future. For example, in the initial model we did not hypothesize any hierarchies among the contingency variables. Based on the results of the cluster analysis and the MDS, one can argue that maybe the effect of environmental complexity and competition is not direct, but mediated through the strategic foci. The role of technological level may also be reassessed, and the number of clustering variables can be reduced to decrease the complexity of the clustering process.

Conclusions

The paper briefly overviewed the main methods for configurational analysis based on Venkatraman (1989) and Venkatraman and Prescott (1990). A new tool, namely the multidimensional scaling was introduced and used as a supplementary method to factor analysis and cluster analysis through two examples based on IMSS data and the model of Matyusz (2012). The results show that the MDS is indeed a useful tool to uncover the structure among variables. It may help create more robust factors and interpreting clusters, and also simplify and improve the cluster analysis process for further research. By mapping variable structure, it may help in future model development as well as

in operations management contingency research. Given to the limitations of the paper, the examples had to be short and we had to refer to Matyusz (2012) for many underlying theoretical and methodological issues. The limitations of the model are also described in detail in his paper. A possible further research direction from a methodological point-of-view is a more thorough investigation of the possible applications of the MDS and its more precise positioning among configurational methods.

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Appendix 1. Original question of the survey used for factor analysis

A4. Consider the importance of the following attributes to win orders from your major customers.

	Importance in the last three years				
	Not important (1)				Very important (5)
Lower selling prices					
Superior product design and quality					
Superior conformance to customer specifications					
More dependable deliveries					
Faster deliveries					
Superior customer service (after-sales and/or technical support)					
Wider product range					
Offer new products more frequently					
Offer products that are more innovative					
Greater order size flexibility					
Environmentally sound products and processes					
Committed social responsibility					

Appendix 2. Details of the factor analysis

KMO and Bartlett's Test

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.787
Bartlett's Test of Sphericity	Approx. Chi-Square	1834.113
	df	66
	Sig.	.000

Total Variance Explained

Component	Initial Eigenvalues			Extraction Sums of Squared Loadings			Rotation Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	3.979	33.156	33.156	3.979	33.156	33.156	2.485	20.711	20.711
2	1.450	12.085	45.241	1.450	12.085	45.241	2.465	20.538	41.250
3	1.143	9.522	54.763	1.143	9.522	54.763	1.573	13.107	54.357
4	1.030	8.580	63.343	1.030	8.580	63.343	1.078	8.986	63.343
5	.961	8.004	71.348						
6	.789	6.579	77.927						
7	.576	4.804	82.731						
8	.542	4.514	87.244						
9	.525	4.374	91.619						
10	.459	3.822	95.441						
11	.292	2.433	97.874						
12	.255	2.126	100.000						

Extraction Method: Principal Component Analysis.

Rotated Component Matrix (a)

	Component			
	Flexibility	Dependability	Quality	Cost
A4a	-.088	.055	.044	**.862**
A4b	.330	-.022	**.761**	.090
A4c	.054	.257	**.768**	-.052
A4d	-.137	**.672**	.404	-.116
A4e	-.005	**.729**	.182	-.220
A4f	.422	.224	.337	-.374
A4g	**.639**	.250	.013	-.236
A4h	**.819**	.198	.108	-.061
A4i	**.815**	-.008	.259	.054
A4j	.281	**.668**	-.061	.184
A4k	.427	**.632**	.064	.162
A4l	.405	**.643**	.069	.008

Extraction Method: Principal Component Analysis.
Rotation Method: Varimax with Kaiser Normalization.
Rotation converged in 8 iterations.

Appendix 3. Original questions of the survey used for operationalizing variables for cluster analysis

A1. What are the name, origin and size of the corporation of which your business unit is a part?

Name ____ Origin (headquarters' country) ____

Size of the business unit (# of employees): ____ Total sales of the business unit - currency ____ figure ____

A2. How do you perceive the following characteristics?

Market dynamics	Declining rapidly (1)		(5) Growing rapidly
Market span	Few segments (1)		(5) Many segments
Product focus	Physical attributes (1)		(5) Service emphasis
Geographical focus	National (1)		(5) International
Competition intensity	Low intensity (1)		(5) High intensity
Market concentration	Few competitors (1)		(5) Many competitors
Market entry	Closed to new players (1)		(5) Open to new players

A3. Please indicate what characterizes technological change in your business:

Logistic processes change	Slowly (1)		(5) Rapidly
Core production processes change	Slowly (1)		(5) Rapidly
Products become obsolete	Hardly ever (1)		(5) Frequently
New product are introduced	Hardly ever (1)		(5) Frequently

B2. How would you describe the complexity of the dominant activity?

Modular product design (1)		(5) Integrated product design
Single manufactured components (1)		(5) Finished assembled products
Very few parts/materials, one-line bill of material (1)		(5) Many parts/materials, complex bill of material
Very few steps/operations required (1)		(5) Many steps/operations required

B8. To what extent do you use the following process types (% of volume)? (percentages should add up to 100%):

One of a kind production	Batch production	Mass production	Total
%	%	%	0% (100 %)

B9. What proportion of your customer orders are (percentages should add up to 100 %):

Designed/engineered to order	Manufactured to order	Assembled to order	Produced to stock	Total
%	%	%	%	0% (100 %)

11. How advanced is the core process technology of your dominant activity?

Mostly manual operations, using hand tools and/or manually operated general purpose machine tools and handling/ transportation equipment	(1)	(5)	Most operations are done by highly automated machine tools and handling/transportation equipment (computer-controlled machines, robots, automated guided vehicles)
Mostly stand alone machines	(1)	(5)	Fully integrated systems (e.g. flexible manufacturing cells/systems)
No information system supporting process monitoring and control	(1)	(5)	The overall process is monitored and controlled in real time by a dedicated information system

O11. Indicate the effort put into implementing the following action programs in the last three years.

	Effort in the last three years	
	None (1)	High (5)
Increasing the level of delegation and knowledge of your workforce (e.g. empowerment, training, autonomous teams)		
Implementing the lean organization model by e.g. reducing the number of levels and broadening the span of control		
Implementing continuous improvement programs through systematic initiatives (e.g. kaizen, improvement teams)		
Increasing the level of workforce flexibility following your business unit's competitive strategy (e.g. temporary workers, part time, job sharing, variable working hours)		
Enhancing corporate reputation through firm's direct contribution and other campaigns (e.g., employment, safety, work conditions, corporate social activities, support community projects)		

PC4. Indicate degree of the following action programs undertaken in the last three years.

	Effort in the last three years None (1) High (5)
Expanding manufacturing capacity (e.g. buying new machines; hiring new people; building new facilities)	
Restructuring manufacturing processes and layout to obtain process focus and streamlining (e.g. reorganize plant-within -a-plant; cellular layout)	
Undertaking actions to implement pull production (e.g. reducing batches, setup time, using kanban systems)	

PD3. Indicate the effort put into implementing the following action programs in the last three years.

	Effort in the last three years None (1) High (5)
Increasing design integration between product development and manufacturing through e.g. platform design, standardization and modularization, design for manufacturing, design for assembly	
Increasing the organizational integration between product development and manufacturing through e.g. teamwork, job rotation and co-location	
Increasing the technological integration between product development and manufacturing through e.g. CAD-CAM, CAPP, CAE, Product Lifecycle Management	
Improving the environmental impact of products by appropriate design measures, e.g. design to recycle	

Q2. Indicate the effort put into implementing the following action programs in the last three years.

	Effort in the last three years None (1) High (5)
Quality improvement and control (e.g. TQM programs, six sigma projects, quality circles)	
Improving equipment productivity (e.g. Total Productive Maintenance programs)	
Utilizing better measurement systems for self-assessment and benchmarking purposes	

Improving the environmental performance of processes and products (e.g. environmental management system, Life-Cycle Analysis, Design for Environment, environmental certification)	
Increasing the control of product quality along the supply chain (raw materials and components certification, supplier audit, product integrity in distribution, etc.)	
Monitoring corporate social responsibility of partners along the supply chain (e.g. labor conditions)	

T2. Indicate the effort put into implementing the following action programs in the last three years.

	Effort in the last three years	
	None (1)	High (5)
Engaging in process automation programs (e.g. automated parts loading/unloading, automated guided vehicles, automated storage systems)		
Engaging in flexible manufacturing/assembly systems – cells programs (FMS/FAS/FMC)		
Engaging in product/part tracking and tracing programs (bar codes, RFID)		
Implementing ICT supporting information sharing and process control in production		

Operationalization of the variables

1. Complexity: a total of 11 variables can be related to environment (Questions A2-A3), which were all measured on 5-point Likert-scales, with the higher value of the variable indicating that the environmental effect in question is stronger. For all companies, we counted the values of 4 or 5 of these variables, divided this number by 11 and transformed it into a percentage value. In this way, we obtained a new variable with a value between 0 and 100 (value is 0 if the company gave to all variables a value of 3 or less; value is 100 if the company gave a value of 4 or 5 to all 11 variables). A higher value indicated a more complex environment, as more environmental factors had a stronger effect.

2. Competition: based on variables A2e (competition intensity) and A2f (market concentration). We averaged the single variables and transformed this mean value onto a 1-100 scale to expand variable space and therefore the evaluation can be more subtle.

3. Size: measured by the logarithm of number of employees of the business unit (A1c).

4. Cost focus: based on the single variable A4a.

5. Quality focus: based on variables A4b and A4c. The operationalization is the same as in the case of Competition.

6. Flexibility focus: based on variables A4g, A4h and A4i. The operationalization is the same as in the case of Competition.

7. Sustainability focus: based on variables A4j, A4k and A4l. The operationalization is the same as in the case of Competition.

8. Product complexity: based on question B2. The operationalization is the same as in the case of Competition.

9. Technology level: based on question T1. The operationalization is the same as in the case of Competition.

10. Process type: based on Question B8. We weighted the possibilities (the lowest weight went to one of a kind manufacturing, the highest weight went to mass production), then transformed this value to a percentage scale. The lower the value of the variable, the more dominant one of a kind manufacturing is at the company (at a value of 0 there is only one of a kind manufacturing), the higher the value, the more dominant mass production is (at a value of 100 there is only mass production). If there is only batch production, the variable has a value of 50. In case of mixed processes the value moves in the range according to the ratio of the different processes.

11. Customer order: based on Question B9. We operationalized this variable similarly to process type (weighting and transformation). In case of design/engineer to order only the value of the variable is 0, in case of manufacture to order only it is 33, in case of assemble to order only it is 66, while in case of produce to stock only it is 100. In case of mixed customer orders the actual value reflects the ratio of the different orders and moves between 0-100.

12. HR practices: based on question O11. The operationalization is the same as in the case of Competition.

13. Process control practices: based on question PC4. The operationalization is the same as in the case of Competition.

14. Technology practices: based on question T2. The operationalization is the same as in the case of Competition.

15. Quality management practices: based on question Q2. The operationalization is the same as in the case of Competition.

16. Product development practices: based on question PD3. The operationalization is the same as in the case of Competition.

Appendix 4. Final cluster centers

	Cluster			
	Large leaders	Small laggards	Mass producers	One-off manufacturers
Complexity	58.29	29.36	37.37	43.73
Competition	83.28	66.51	71.69	76.72
Size	2.80	2.23	2.42	2.48
Cost focus	3.9	3.8	3.9	3.8
Quality focus	91.02	80.00	78.48	86.59
Flexibility focus	78.66	54.86	60.97	67.16
Sustainability focus	78.44	50.75	57.81	63.50
Product complexity	82.31	68.56	64.18	84.84
Technology level	76.53	44.63	60.14	55.61
Process type	64.16	30.11	68.89	24.53
Customer order	57.79	38.92	58.94	33.03
HR practices	75.48	45.87	62.28	67.92
Process control practices	81.76	43.95	66.69	71.77
Technology practices	73.82	34.56	52.85	51.02
Quality management practices	78.29	42.89	57.25	60.77
Product development practices	76.01	41.23	52.12	60.88
Number of companies	**119**	**122**	**145**	**137**

The future of master's degree, new enrolment challenges – the case of business and economic faculties

BEATRIX LÁNYI[1] – KATALIN DUDÁS[2] – PETRA PUTZER[3]

Nowadays there is an increased interest towards university enrolment, because universities in Hungary, especially economic faculties, are faced with the fact that previous enrolment practices do not result in enough number of applicants. This can be due partly to demographic trends and partly to education policy changes. These demographic trends are relevant not only to bachelors but to master students as well. Based on current practices, public funding is not guaranteed for masters programs. As a consequence, institutions and faculties that would like to ensure their presence on the market have to be proactive and to identify higher education motivators at master's level. The main aim of this study is to explore the possible student choices and the factors of decision processes concerning the further education on a master's level. For identifying the problem, besides collecting secondary data, primary research was carried out using a broad variety of research tools. As a conclusion of the study a decision tree model was created.

Keywords: higher education, master's degree, decision points, motivation.
JEL code: M31.

Introduction

Higher education itself and the development of the higher education system do not represent a self-serving activity; it serves the commonweal and it contributes to the rise of nations. It provides ground to the emergence of an advanced knowledge base and to an

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economic upraise. All these represent the basis of persistency and an excellent mean to join the developed regions of the world.

As a consequence of the above mentioned aspects, higher education should give off professionals that are able to solve the problems of their age and have updated and qualified knowledge. Graduate people should not only be aware of the theoretical knowledge but they should also have practical knowledge so that they can start their life easier, solve problems and join easier the processes of their everyday life. They are able to switch on to the updated and targeted economic and social systems to be able to fulfill their profession at a high level. It is important that the education fit labour market conditions (Katona 2002). Currently, this issue is extremely vital as Berács's (2008) research showed that a clear trend can be observed, namely the competitive advantage and especially the export potential of Hungarian higher education is decreasing. All this indicates that universities should concentrate on developing a strong market orientation approach (Casidy 2014).

In the last decade marketing has gained a critical role among the activities of the European higher education institutions. Like other organizations, higher education institutions evolved and adapted their service offerings to the dynamic economic and social environment. Demographic trends, technological development, changing international economic environment as well as the varying labour market conditions and living standards made a deep influence on the higher education system and on the judgment of the society. After the economic crisis people and institutions paid more attention to the value of the degree and whether it fits the needs and desires of employers. As a consequence, higher education institutions face several problems in the current macroeconomic environment and they react too slowly to the society's expectations and requirements.

Relevance of higher education marketing

The roots of higher education marketing go back to the 1980's. Since that period universities have been competing for students and for financing opportunities (Drummond 2004). Participants in the higher

education system came to the conclusion that it is useful for universities to build market relationships and to react to the actual market trends (Dirks 1998).

If we were to define education marketing we would have to analyze areas that show similarities and compare them to each other. Thus, marketing activity used by higher education institutions shows conformity with both societal and services marketing. It is difficult to make a choice between the previously mentioned areas because in more and more countries there are private institutions besides public ones. From the point of view of societal marketing the main focus is on the increase of individuals' education level. Their main aim is to gain basic knowledge and to develop their skills and competences so that, after graduating, they can meet labour market standards. Therefore, the goal of education marketing is to create harmony between individual aims and the collective needs and desires of the society through education (Filip 2012). Higher education product/service gets to the members of the society via teaching and learning giving professionals and experts to specific scientific areas. All this means that knowledge and skill transfer between universities and the society can be measured in the number of graduates and in the development of human capital. With the help of targeted marketing programs, universities are able to define the expectations of the society and labour market and they can focus their education offering on them. By presenting the right higher education product – that takes the stakeholders' needs and desires into consideration – universities can increase their organizational efficiencies and their students can easier gain the desired job (Filip 2012). If the higher education institution provides the right skills and competencies its students will reach professional success more easily, even in this continuously changing business environment. All these show us that positive effects prevail both towards individuals and the society as a whole (Eckel 2007).

On the other hand higher education marketing is also closely connected to the services marketing, because it can be characterized by the attributes of the services marketing (intangible, heterogeneous, inseparable, perishable).

Universities and other higher education institutions have to create their offering portfolios according to the specific needs and desires of individuals and organizations. These individuals and groups are called stakeholders. The recognition of stakeholders' expectations and the intention towards satisfying their needs concerning higher education should be the basis of the marketing strategy and the tactical means of execution of the universities. According to Kotler and Fox (1995) the stakeholders of higher education can be classified into sixteen groups. This is the reason the current and the potential students, the faculty, the parents of the students, the employees (including administration), the alumni, the suppliers, the competitors, the government, the members of the business life, the media, the foundations, the supervisory bodies, the accreditation institutions, the local community and the community are, in a broader sense, integrated. Hewitt and Clayton stated in 1999 that among the most significant higher education stakeholders one can mention the students and the lecturers (Filip 2012). Pavluska's (2009) research showed that the most crucial buyer is the student but the group of stakeholders of the universities also consists of the partners in the network of the institutions, as well as the public opinion, the decision makers of the labour market, the government and its institutions, the supervisory bodies, the supporters, international organizations and the communities of other activities. As a conclusion, we can state that the demand of students origins from the expectations of the labour market members and/or society.

Pascarella and Terenzini (1991) as well as Leslie and Brinkman (1988) proved in their research that a higher education level leads to advanced salaries, longer working years, more career mobility and better quality of life. Carlson and Fleisher (2002) expressed that higher education is a direct way to career preparation.

On the other hand, the researches of Kürtösi és Hetesi (2007) and Hetesi (2010) showed that graduated students that are in a favorable situation from the labour market point of view are not always satisfied with the services offered by their universities. This indicates that there is no positive relationship between the labour market success and the positive image of the institution.

According to Berács (2003) the entire higher education market can only be effective if submarkets (teachers, textbooks, technical and technological equipment, methods, software etc.) and related markets (e.g. effective capital markets can serve institutions and students to dispose of bottlenecks and make easier the diffusion of innovations) make a coherent interconnection with each other.

Several models – for example the economic models, the status attainment models, the combined models – were developed to evaluate human behaviour concerning higher education enrolment.

Many theorists (for example Fuller et al. 1982 and Schwartz 1985) and researchers developed economic models to analyze enrolment decisions to colleges or universities. According to their theory potential students make a cost and benefit comparison before their decision and the previously mentioned authors also take into consideration the individuals' tastes and preferences. Somewhat later Kotler and Fox (1995) made a more comprehensive version of this model. The *Status-attainment models*, as presented by Sewel and Shah in 1978, do not only see students as rationally deciding entities (as the economic models did) but also as decision determinants able to develop over a person's life (Vrontis et al. 2007). In this case, factors such as the parents' societal status may also determine the student's higher education performance.

The *combined models* comprise the advantage of the status-attainment models as well as the economic models and show the phases of the students' decision making process. These specified models differ from the general five-step model of the consumer decision making process: problem recognition, information search, evaluation of alternatives, purchase decision and post-purchase behaviour (Kotler and Keller 2006. 266) at a lesser or greater extent. To the most frequently cited combined models belong the *Jackson model* from 1982, the *Chapman model* from 1984 (presented in Vrontis et al. 2007), as well as the *Hanson and Litten model* (Hanson and Litten 1982). According to the student-oriented *Jackson model*, student's decision making process can be divided into three phases. The first phase is the preference phase

where academic achievements, family and societal context influence decisions. In the second (so-called exclusion) phase students make selections and rule out some of the higher education institutions with the help of economic factors (location, costs, academic quality). In the final (evaluation) phase a rating of the remained options can be observed. In the *Chapman model* two stages can be distinguished, the pre-search and the search phase. In the pre-search period socioeconomic factors such as family income affect decision and after that – in the search phase – the student looks for specific information about the higher education institutions he or she prefers. The *Hanson and Litten model* originally was also a three-step model. In the first step the desire to attend a postsecondary institution emerges and students decide to gain deeper knowledge about higher education. The second step is the exploratory stage, when students seek information and take potential institutions into consideration. In the last step students apply for the selected institutions. Litten (1982) expanded the model; the new five-step model is the following:

- Aspiration (student has an ambition for higher education);
- Search process;
- Information gathering;
- Sending application;
- Enrolment process.

According to the last mentioned model there are several factors that influence the decision process (Litten 1982):

- Background (for example parental income, parental education, gender);
- Personal attributes (for example academic ability, class rank, self-image, personal values);
- Secondary school characteristics (social composition, quality, curriculum);
- Higher education institution characteristics (for example costs, size, programs, recruitment activities);
- Influences (parents, peers, media, counselors, college officers, etc.).

Material and method

The main aim of our research was to get a picture of the candidate's decision whether he or she is willing to continue the studies after the bachelor degree. If he or she is willing to continue, how he/she will choose an institution or a faculty. During the research we mapped the factors, the main decision points and the main advisors that may be significant during the institution choosing process. The research can be split into three parts. In order to explore the problems we first used secondary research, but because of the length limits of this article we will not explain its results. Based on the results of the secondary research, a wide-reaching primary research was carried out. The qualitative research was made in October 2012 when the first-year master's students were asked to answer ten short open questions and four focus group interviews were made. The main aim was to emphasize motivations and significant decision points. Based on the results of this exploratory research among the full-time first-year master's students and full-time last-year bachelor students, the questionnaires were filled out using the PAPI technique. The aim of the questionnaire technique was also to find decision points and to identify influencing factors. The main topics we touched in the questionnaires were the following: demographic data, information concerning intentions aiming further studies, expectations and attitudes, information gathering habits, main stations of the decision process and main factors that have influence on decision. From the returned 300 questionnaires, 127 could be evaluated. The stratified sampling was used and both the majors and the ratio of education forms served as basis. Therefore, our research cannot be considered representative. Based on the results of the research main decision making points, typical application modes and influencing factors that contribute to the application of the masters can be outlined. After coding the questionnaires the SPSS statistical software was used for data processing.

Results

In the first part of this section the decision-making process will be presented following the logic of the general buying decision-making

process (Kotler and Keller 2006) and by putting the stress on the motives of applying to the master's degree and the sequence of the different sub-decisions. In the second part the time horizon of these decisions and the different student segments will be shown.

The decision-making process

The first step is the problem recognition when the need towards a master's degree arises. Our first question was about the necessity of the master's degree: whether there is a *need of a master's degree on the labour market nowadays in Hungary*, or the type of qualifications needed for a good job. According to the results of the short interviews, the focus group interviews and the questionnaires there is no unequivocal answer to these questions. The responses to the interviews underline two points: an appropriate profession or a master's degree is needed for a good job. However, in the questionnaire research nearly 40 percent of the respondents think that the bachelor degree is enough. The master's degree is necessary only according to 31 percent of the bachelor respondents and 24 percent of the master's students. The following opinion was recorded several times: appropriate connections are more important than the degree.

The questionnaire research highlights that whereas the master's degree gives more knowledge, the Hungarian labour market does not value it sufficiently. This statement was said during the short interviews and the focus groups as well. Thus, it would be worth to make the employers understand the differences between the bachelor and the master's degrees and explain them what they can expect from an employee with a bachelor or a master's degree.

According to the answers collected from students through different research techniques the *main arguments for the master's degree* are the following:

- They can enhance their knowledge with studying another discipline or with deepening the bachelor knowledge.

- They can reach better positions on the labour market or in a certain workplace hierarchy.

- Life-long learning is necessary nowadays.

- They would like to postpone taking on a job (they think they are too young and/or too inexperienced themselves).

The *main arguments against the master's degree* in accordance with our research:

- They have a fear of financial dependency; a master's degree means further costs without salary and students often cannot afford it and some of the students would like to be financially independent.

- They think that master education is not practical enough, so they would rather get practice in a workplace. Thus, the master's students step into the labour market with two years disadvantage.

- The labour market may not appreciate the master's degree. It may not worth more than the bachelor degree.

- Students have fear of being overqualified with the master's degree.

- Several students consider the master program too difficult.

- If somebody has a good job he or she does not risk it. He or she will not go further with the studies or she/he will at best pick a part time program (if it is compatible with the job).

Both the focus groups and the questionnaire research justified that depending on the time of the problem recognition students can be divided into three groups:

- Some of them plan in advance their higher education for five year. When they apply for the bachelor program they know that they will go further.

- The members of the second group realize during the bachelor program's 2nd or 3rd year that their bachelor knowledge is not enough, that is why they would like to go further.

- The third group makes the decision at the last minute, not much before the application deadline (for example because he or she cannot find a job with his/her bachelor degree).

In compliance with the short interviews and the focus groups, the students of the part time program can be mainly included in the 2nd and the 3rd groups.

After the problem recognition, students *search information* about the potential master's program. *Information sources* students use during the decision-making process:

- The websites of the institutions: they must be informative and colourful.

- Information days about the master's programs.

- Registrars departments.

- felvi.hu website and the admission guide book.

- Higher education rankings. Students do not expect the institution to be on the first place, but they attach importance to the fact that an institution is one of the leaders. This information is not decisive, but it has a confirming role.

- Personal sources: former and present master's students of the institution, professors of the institution, friends, and relatives. The parents have only a confirming role in the master's program choosing process.

Based on the results of the information search, students evaluate the gathered information and make *sub-decisions about the different conditions of master education*. In this phase we emphasize the sequence of the sub-decisions and the main considerations about the different conditions instead of the evaluation methods. The conclusion drawn from our research results are that students make the sub-decisions about the different conditions in the following order: first they choose the type of the training (full time or part time) and afterwards they decide on the institution and the faculty, but the order is not clear.

If we take into consideration the type of the training, it can be stated (based on the focus group discussions) that the respondent students value full time training more than part time training; not only because of the more valuable knowledge, but also because of the financial aspects. The questionnaire research shows that full time students accepted this statement more willingly (average: 3.88; variance: 1.29) than the part time students (average: 2.67; variance: 1.26). However, during the focus groups and the short interviews several students mentioned that part time training is easier than full time training. Some of them consider it an advantage; others a disadvantage. According to the results of the focus group interviews, students will choose part-time training if they want to study besides their job.

Concerning the choice of the institution and faculty there is no unequivocal answer. It seems that students generally come to decide upon these at the same time. There is an especially remarkable result, 90 percent of the bachelor students are loyal to the institution, so they can be considered an important basis of that institution's master's program. Their main motivation is the familiar atmosphere; they know the professors, the examinations, the processes, and the other students, so they can fulfill the requirements with less effort. On the other hand, the main motivations of the institution-leavers are the following: environmental change, new challenges, new knowledge, and new relationships. Throughout all research techniques the inquired students mentioned the following features in connection with the institution, so it can be presumed that an average student chooses institution based of these considerations:

- Reputation of the institution.
- Quality of the institution's degree.
- Effect of the institution's location:
  - Entertainment possibilities, events, etc.;
  - Part-time job possibilities; workplace of the part time students.
- Costs (state-founded places and tuition fee, living costs).
- Reputation of the professors.
- Personal experiences during the bachelor program.

According to the results of the focus groups we can divide the bachelor students into two groups depending on the time of *handing in the application form*:

- The first group members hand in the application form very early, because they are sure of their decision, and they have been preparing for the master's program for a long time.

- The members of the second group present the application form only at the last minute. It can be presumed that because of the rapidly changing regulation of higher education in Hungary, in 2012 more students took their the decision in the last minute.

Groups according to the time horizon

One of our research aims was to identify groups of respondents based on different variables and factors. Firstly we ran a factor and a

cluster analysis based on the attitude statements of the PAPI questionnaire. But neither factor analysis nor cluster analysis led to suitable results. The final factors became too general (e.g. reputation, price, quality) and did not help to describe the whole decision process, whereas the two cluster groups, the active and the passive groups, did not show significant differences. To make a distinction between the decision making processes of the respondents and to delineate the decision tree, we had to choose other data analysis techniques.

The descriptive statistics showed that the quartiles of the final decision were three, six and twelve months (Q1=3, Q2=6, Q3=12) in the case of the MSc students and also in the case of the BA students. The frequencies of the mentioned duration were extremely high at one, two, six and twelve months. Based on these results we identified a new variable. With the help of this new variable the decision tree could be created for the different groups. There were three groups within the new variable:

• The 'conscious group': students who are willing to continue their studies on master level belong to this group. They make a decision typically one year earlier than the application deadline (minimum 9 months earlier before the application deadline, but most of the group members made the decision 12 months earlier).

• The 'ordinary decision makers': they make a decision around half year earlier before the application deadline (the decision is made 4-8 months earlier before the deadline, but most of them made it 6 months before it).

• The 'procrastinated decision makers': they make their decision maximum 3 months earlier before the deadline, but most of the group members made their decision 1 or 2 months earlier before the deadline.

In the whole sample the proportion of the 'conscious group' is 22.5%, the proportion of the 'ordinary decision makers' is 44%, and 33.5% of the respondents belong to the 'procrastinated decision makers'. In certain decision making phases and attitudes these three groups differ from each other, but in some cases they show similarities. The cross-table analysis showed significant deviation (based on the χ^2

test and Cramer-V with 95% confidence level[4]) in the case of the minimum necessary qualification, cons against MSc, willingness to continue their studies on master's level, influential factors of the decision making process and the attitudes. Before analyzing the decision making process we briefly characterize these groups.

The 'conscious group' is dominated by men. Within this group there is the highest proportion of full time students, which means that who chooses the full-time option, probably has been planning their studies more consciously and for a long while. In this group the proportion of those respondents who think that a skilled worker degree is sufficient for being successful in life is the highest. Many of the group members believe that a good job does not necessarily depend on qualification.

The group of 'ordinary decision makers' is the most balanced in terms of gender (women: 58%, men: 42%). The proportion of full time students is high and the proportion of 'rural' students (not living in Pécs) is also the highest in this group. 38% of the group members think that MSc degree is necessary for a suitable living standard (the highest proportion out of these three groups), but 39% suppose that the BA degree also could be appropriate.

The group of 'procrastinated decision makers' is dominated by women and the proportion of part-time students is the highest within this group. 48% of the group members suppose the BA degree represents a sufficient qualification level, but compared to the two other groups the proportion of other qualifications, OKJ and FSZ (education levels higher than high school but lower than BA) is also the highest within this group. The opinion of this group about the labour force market is the worst, because 42.5% of the group members (against 26.5% and 29.5% of other two groups, but this deviation is not significant) feel that, compared to the BA degree, the MSc degree is not

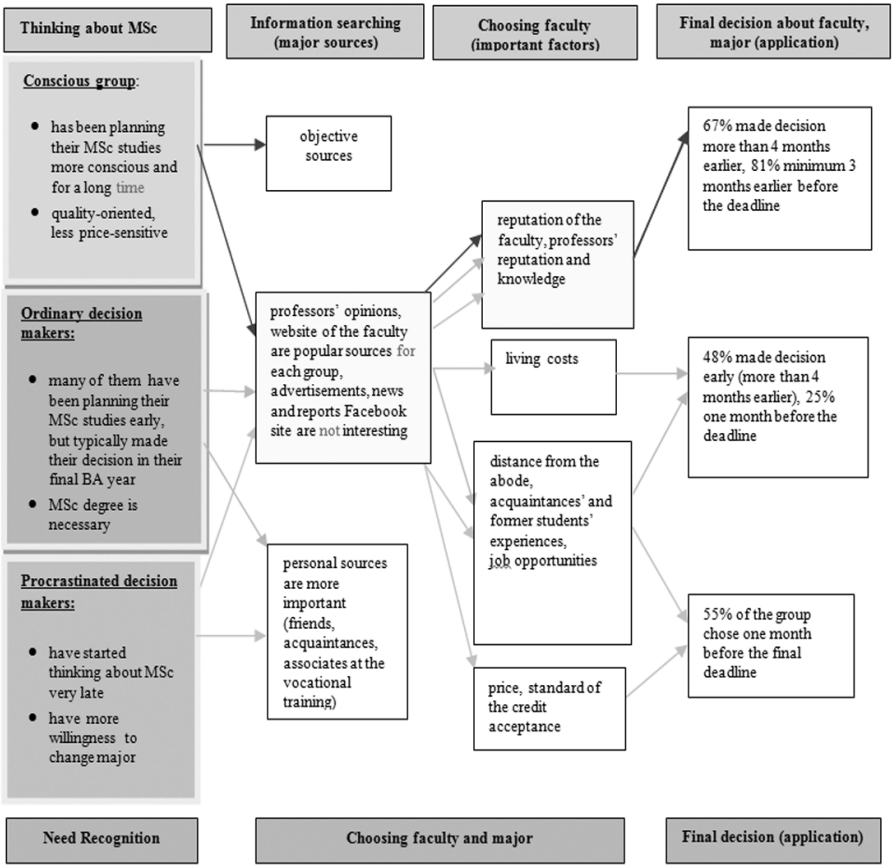
[4] In some cases we diverged from the standard 95% confidence level and 5% significance level to better approach the differences between groups. The maximum significance level was 15%.

appropriately valued by the actors of the labour force market, and probably this opinion is the reason for their late decision.

According to these deviations the three groups' decision making process to set up the decision tree, which shows the correspondences and differences of the groups. Regarding the first step, the *problem recognition*; the biggest difference is that the conscious group had chosen the BA program because they knew they are going to continue their studies on master's level or in their BA year 1 or 2; the group has already decided about further studies by applying to MSc. The proportion of predestined MSc students was much lower among the 'ordinary decision makers' and the 'procrastinated decision makers'. The 'procrastinated decision makers' made a decision about the MSc only in their last BA year or later, so this group recognizes the problem typically 2-3 years later than the 'conscious group', as you can see in the final decision tree (Figure 1).

After the problem recognition, students gathered information about the potential master's programs. There were significant differences between the groups regarding the following sources of information: friends, acquaintances, associates at the vocational training. Personal information sources, like friends, acquaintances, associates at the vocational training have a greater importance for the 'ordinary decision makers' and for the 'procrastinated decision makers' than for the 'conscious group' that is rather looking for objective information sources. There are also similarities; the professors' opinions and the website of the faculty/university belong to the popular information sources for each group, while the advertisements of the faculty/university, the news and reports in the press and the Facebook site are not interesting. Personal information sources (acquaintances' and former students' experiences, opinions) have greater influence on procrastinated decision makers, than on the other two groups. The most important information sources are presented in the decision tree (Figure 1).

During the evaluation of the available alternatives we found that the *influential factors* also have different importance for the groups. There are significant deviations in the following factors: price of the



Source: own compilation

Figure 1. Decision process modeling

program, living costs in the city of the faculty, distance from the abode, standard of the credit acceptance, acquaintances' and former students' experiences, opinions and job opportunities in the town of the university/faculty. The conscious group is the less price-sensitive; they can be persuaded by rational, quality criteria. The factors connected with the costs are more important for the two other groups. The

distance from the abode and the job opportunities are serious influential factors for these groups. The ordinary decision makers also choose according to the living costs in the city of the faculty. For the procrastinated decision makers the price is the critical factor. But the standard of the credit acceptance is also taken into account by this group. The significant influential factors are included in the final model.

After choosing the decision requirements and collecting the necessary information *final decision making* should come. There was no significant deviation in the case of choosing major against faculty. There was only significant deviation in the case of willingness to change major. The two earlier decisive groups are less willing to change major, than the procrastinated decision makers, because nearly half of this group was thinking about following other major of their university/ faculty. The conscious group makes this *final decision* (which university/faculty and major) very early, typically they know more than four months earlier before the application deadline which faculty and major to choose. Only half of the ordinary group made the decision early; 25% of the ordinary group knew which faculty and major to choose one month earlier before the deadline. The procrastinated decision makers did not just start thinking about application for the MSc later than the other two groups, but they also made their decision very late, half of the group chose faculty and major just one month before the final deadline.

Analyzing the answers of these three groups according to the decision making process we can set up the decision tree (Figure 1) and with it we are able to model major routes to MSc.

Conclusions

Nowadays there is an increased interest towards the university enrolment; as our literature review also showed this field becomes more and more important. A reason can be that universities in Hungary, especially economic faculties, are faced with the fact that previous enrolment practices do not result in enough number of applicants. This can be due partly to demographic trends and partly to education policy

changes. These demographic trends are relevant not only to bachelor but to master's students as well. Our research had two main aims: to reveal the cons against master's program and to identify higher education motivators at master's level. Based on the results the most important cons against the MSc are: the inappropriate valuation of the master's degree by the actors of the labour force market compared to the BA degree, the preference for work experience and the high price of the program. These results are very important because public funding is not guaranteed for masters programs. Currently this problem emerges in the case of 'procrastinated decision makers', the group is less willing to continue their studies on master's level. Based on the results of our research this group has many members; therefore it represents a real and relevant problem. The results imply that there will be more and more students with BA degree on the labour market, because many of them do not want to continue their studies. It could be a big problem in the following years because there will be fewer professionals with strategic thinking and the number of candidates for PhD programmes and of the scientific community will also decrease. This could become a problem of higher education, because the very talented, but less conscious students may enter the labour market instead of following a scientific carrier.

Still, faculties can have an effect on the decision making process of the 'conscious group' and 'ordinary decision markers', but in the future they will need more efficient and differentiated communication. As a consequence, institutions and faculties that would like to ensure their presence on the market have to be proactive and they have to make steps to face the possible threats and challenges.

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Defining new borders for Romanian development regions[1]

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The aim of the present paper is to formulate a proposal for a new regional division in Romania. As a replacement of the eight current NUTS2 level regions, we recommend a number of seventeen divisions. The regions suggested by the authors are built up using as basic territorial units the NUTS3 level counties that are currently functional in the country, and that also serve as a base for the existing NUTS2 regions. Socio-economic aspects, geographical patterns, historical regional borders and EU legislation stand as a basis when redefining regional borders. Besides presenting the recommended Romanian territorial reorganization, the development in the last decade, as well as the status-quo of the present and proposed regions is going to be analysed from a socio-economic perspective within the framework of the present study.

Keywords: Romania, NUTS2 regions, territorial reorganization, labour productivity, competitiveness, regional development.

JEL codes: R10, R58, Q18.

Introduction

In order to be able to understand and appreciate the possibility and the importance of a new regional division in Romania, it is vital to have an accurate view on the applicable legal regulation related to the topic on the one hand, and the current situation of the existing regions that

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are proposed to be reshaped, on the other hand. Therefore, the structure of the present study follows a logical line according to which, after a brief literature review, the legal framework related to the NUTS regions is presented, which is followed by the brief presentation of the administrative divisions in Romania. The status-quo of the current Romanian regions is presented afterwards. Finally, an attempt is made in the direction of a possible reshaping of the Romanian NUTS2 development regions, introducing a number of seventeen development regions instead of the eight existing ones, using as a starting point the NUTS3 level counties which – contrary to the NUTS2 development regions in Romania – have administrative authority power and self-determination rights.

The European Union's various development policy concepts highly depend on regions as territorial "starting points". The strengthening of both economic and social cohesion within the EU is thus based on the pursue of correcting imbalances between regions. According to Johannes Hahn, European commissioner for regional policy: "Regional policy is a strategic investment policy targeting all EU regions and cities in order to boost their economic growth and improve people's quality of life. It is also an expression of solidarity, focusing support on the less developed regions" (European Commission 2014.1). Having an expertly designed policy however cannot guarantee its success in terms of realization. Appropriate territorial divisions, as well as properly associated institutional systems of member states are among key issues that determine the successful realization of Europe's regional policy targets. Increased economic, social and infrastructural disparities can be detected among the numerous member states of the Union. Large disparities are noticeable regarding demographic, labour market, economic and environmental processes influencing the spatial structure of the Central and Eastern European new member-states that lead to accentuated heterogeneity in the EU (Horváth 2014a, 2014b).

Recent administrative attempts in Romania regarding regionalization were not grounded and were not accompanied by studies showing their necessity and appropriateness, they were not

transparent and lacked debates with beneficiaries. Some authors (for example Donosa 2013 and Tabără 2013) also underline the fact that authorities did not explain coherently the essence of the country's regionalization project, the competences of the regions to be created, the bonds between regional and central ministries. The question: "What goes from regional councils towards the center?" remained unanswered, too.

The existence of functional regions, however, would be essential in Romania. Functional regions, that are correctly defined, could serve as a better geographical tool for normative use than administrative regions as they can be used when assessing regional disparities, labour market policies, investments' allocation, transport infrastructure planning, etc. (Erlebach et al. 2014). In their study, Farmer and Fotheringham (2011) offer an effective regionalization procedure on a simulated geographical network and through the example of Ireland, maximizing the modularity of commuting flows.

Several researchers proposed different groupings of existing NUTS3 level units (i.e. counties) in order to offer a more effective NUTS2 regional division for Romania instead of the current one. Benedek and his co-authors use economic, cultural and demographic multidimensional criteria system for testing the homogeneity/heterogeneity as a starting point and to legitimate their proposal (Benedek et al. 2013, Benedek and Jordan 2007). They offer three different scenarios, along which they conclude with a number of ten, eleven and twelve regions, evidently smaller than the existing ones. Mateoc et al. (2013) offer two different alternatives to current Romanian development regional system with the three historical macroregions: Moldova, Muntenia and Transylvania (NUTS1 level), and further redrawing the borders of present NUTS2 regions in a way that lead to unevenly dimensioned development regional territorial units (e.g. in the second version the Transylvanian NUTS2 region consists of 9 counties, while the Dobrogea part of Muntenia only of two counties). Máté et al. (2011) in their study detect region-like structures in Transylvania using a mechanical spring-block model based on

spatiality and connectivity using geographic coordinates of settlements and by detecting neighbours.

According to Vincze (2008) regional policy is the most successful in those countries where the regional level has significantly decentralized administrative functions. The process of regionalization-decentralization should contribute to a better implementation of the EU's Cohesion Policy in Romania, opening the door for a better absorption of funds for the recently started programming period (Constantin 2013). Through regionalization not only the Regional Policy toolkit would gain better targeting possibilities, but that of the Common Agricultural Policy as well, as continuously increasing regional power in the agricultural sector is noticeable on EU level (Trouvé and Berriet-Solliec 2010).

The legal framework of regionalization

The constitution of NUTS2 level regions is regulated by Regulation (EC) No 1059/2003 published in 26 May 2003 – referring to the establishment of a common classification of territorial units for statistics (NUTS). As follows, the most important regulations related to the definition, size and role of the NUTS regions are highlighted from the text of the legal provision and some aspects related to possible amendments of them. The average size of the specified levels of class of administrative units in each of the member states shall lie within the population thresholds presented in Table 1.

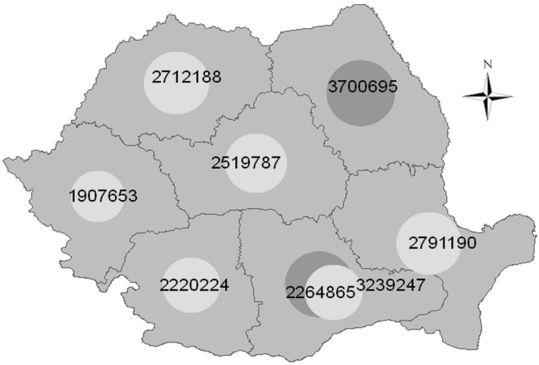
Table 1. Population thresholds of the administrative units

Level	Minimum	Maximum
NUTS1	3 million	7 million
NUTS2	800 000	3 million
NUTS3	150 000	800 000

Source: European Commission 2003

Related to the regulation of the population threshold it is important to mention that Romania breaches the provisions of the mentioned regulation, which is otherwise compulsory for each member state, as

regulations are one of the secondary legislation of the EU[4]. Figure 1 presents the population of the existing NUTS2 regions in Romania and draws the attention to the fact that in the case of two development regions the threshold defined by legislation is exceeded, as the South-Muntenia and the North-East regions have more than 3 million inhabitants.



Source: authors' own design based on NIS (2013) data

Figure 1. Population of the Romanian NUTS2 development regions in 2012

Existing administrative units within the Member States shall constitute the first criterion used for the definition of territorial units. To this end, 'administrative unit' shall mean a geographical area with an administrative authority that has the power to take administrative or policy decisions for that area within the legal and institutional framework of the Member State. Considering the timing of possible amendments to the NUTS classification, they shall be adopted in the second half of the calendar year in accordance with the regulatory procedure, not more frequently than every three years. Nevertheless, in

[4] Regulations are directly applicable and binding in their entirety upon all member states, without providing national legislation for the implementation.

the case of a substantial reorganisation of the relevant administrative structure of a Member State, the amendments to the NUTS classification may be adopted at intervals of less than three years. When an amendment is made to the NUTS classification, the Member State concerned shall transmit to the Commission the time series for the new regional breakdown, to replace data already transmitted. The list of the time series and their length will be specified in accordance with the regulatory procedure taking into account the feasibility of providing them. These time series are to be supplied within two years of the amendment to the NUTS classification (European Commission 2003).

Finally, a determinate provision of the above mentioned regulation is considered to be Article 4, Paragraph 5 which provides that "If for a given level of NUTS no administrative units of a suitable scale exist in a Member State, in accordance with the criteria referred to in paragraph 2, this NUTS level shall be constituted by aggregating an appropriate number of existing smaller contiguous administrative units. This aggregation shall take into consideration such relevant criteria as *geographical, socio-economic, historical, cultural or environmental* circumstances." Thus, it is clearly visible that in the process of definition of the development regions' borders not only socio-economic criteria should be taken into account, because geographical, historical and cultural aspects are also highly important.

Administrative divisions in Romania

Eight regional divisions (so called development regions) were created in 1998 in order to better co-ordinate regional development in Romania, country which at that time progressed towards accession to the European Union. The current NUTS2 level regions in Romania are the following: North-West Region, Center Region, North-East Region, South-East Region, Bucharest-Ilfov Region, South Muntenia Region, South-West Oltenia Region and West Region. Each development region is made up by several subregional units called counties. Regional divisions in Romania correspond to NUTS2 level divisions in European Union member states, but do not have an administrative status and do not have a legislative or executive council or government. As of 2013,

Romania is divided into 41 counties and one municipality which are assigned as NUTS3 level divisions. Romania has no NUTS4 units, the counties being composed directly of cities (some of which with municipality status) and communes.

As in all modern democracies, the political power in Romania is divided into three independent branches: legislative, executive, and judicial. The government is represented at county level by the prefect; the prefect and his administration have only executive prerogatives. The territorial districts of the Romanian judicial system overlap with county borders, thus avoiding further complication. At the same time with local elections (of mayors and councilors for the cities and communes), a County Council is elected in each county. Since 2008 the President of the County Council is also elected by direct vote. The legislative powers of county councils are quite reduced, but there are plans for more decentralization. These plans, however, call for the introduction of Regional Councils for the 8 development regions of the NUTS2 level.

According to the most recent OECD urban-rural typology (Eurostat 2011), only Bucharest-Ilfov region falls to the predominantly urban category, 15 Romanian counties belong to the intermediate, the remaining 25 counties to the predominantly rural regions. The OECD urban-rural typology values show that 46.2% of the total population lives in predominantly rural regions, 43.9% in intermediate regions and only 9.9% in predominantly urban regions. From a territorial perspective 59.8% of the land belongs to predominantly rural, 39.4% to intermediate, and only 0.8% to predominantly urban regions (Eurostat 2011).

Competitiveness and convergence of the Romanian development regions

In the European Union of the 27 Member States, related to the issues of convergence, a common set of indicators and criteria has been set that can help to achieve a shared vision on the impact of certain action in order to reduce disparities. The indicators selected for evaluation of the Cohesion Policy and regional development are: GDP

per capita, unemployment, life expectancy at birth and educational level. Their use is affected by the availability of data at sub-national (regional) level in the EU (Antonescu 2012).

The situation of the currently existing eight NUTS2 regions of Romania is going to be presented as follows. We measure regional competitiveness and convergence of the regions through different indicators and groups of indicators; one of the most commonly used indicator besides the per capita GDP is considered to be the per employment GVA (regional labour productivity). In the calculation process we use two types of datasets: regional GVA values and regional employment values. In order to get a more accurate view on regional competitiveness, a sectoral decomposition is introduced, using a relative simple model of the economy, consisting of four economic sectors: agriculture, industry, construction and services.

Besides labour productivity, the evolution of the per capita GDP, employment rate and average gross nominal monthly salary earnings are also calulated and presented.

In our calculation process we used the formula below:

$$\frac{GVA}{E} = \frac{\sum_{i=1}^{n}\sum_{j=1}^{m} GVA_{ij}}{\sum_{i=1}^{n}\sum_{j=1}^{m} E_{ij}}$$

where n=8 is the number of NUTS2 level regions in Romania and m=4 is the number of economic activities (aggregated sectors) (Bíró and Bíró 2012a).

Figure 2 presents the contribution of the different economic sectors to the total regional gross value added in 2008. In all NUTS2 regions the services sector contributes at the greatest extent to the creation of the GVA and the most unproductive sector in each region is agriculture. The region of the capital, Bucharest-Ilfov, follows the same tendencies, but in an accentuated way, as the contribution of the services sector represents almost three-quarter of the total regional GVA and the contribution of the agriculture sector is negligible.

According to Cojanu and Lungu (2010) workforce is one of the most important regional competitiveness indicators. Figure 3 presents the



Source: authors' own design based on NIS (2013) data

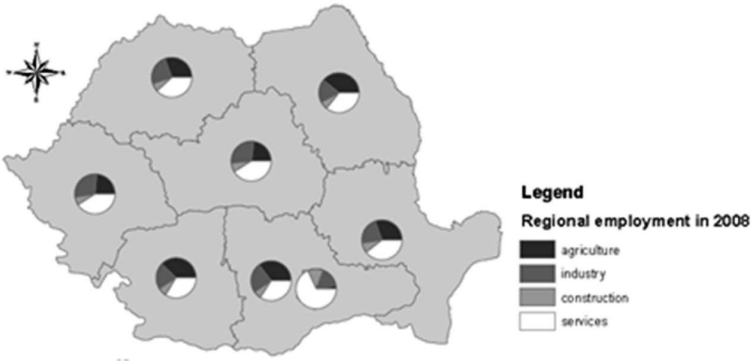
Figure 2: The contribution of the economic sectors to RGVA in 2008

sectoral distribution of the employed population by regions. The share of agricultural employment is relatively high: excepting Bucharest-Ilfov, in each region nearly one-third of the employed population works in agriculture[5]. This supports the above mentioned idea referring to the unproductive characteristic of the sector. The relatively high productivity of the construction sector can be observed in each region: a small share of the employed population is working in this sector (Figure 3), while the contribution of the sector to the total regional GVA is relatively high (Figure 2).

Using regional GVA and regional employment values, the regional labour productivity was calculated and presented in Figure 4. The most productive sector proved to be the construction sector, followed by services, industry and the most unproductive sector, agriculture.

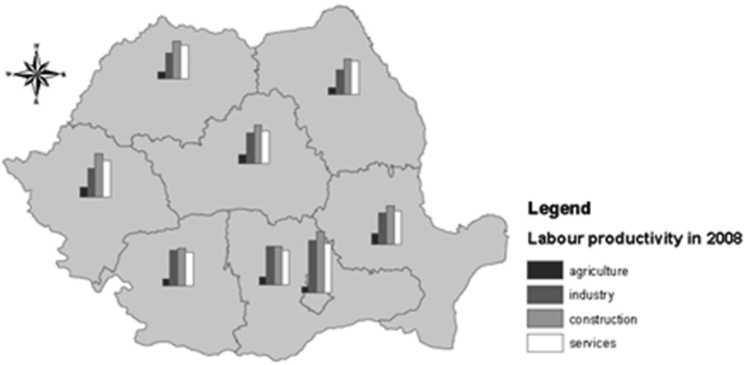
Regarding the examination of the status-quo of the existing NUTS2 development regions in Romania, the regional per capita GDP is calculated (Figure 5).

[5] According to the OECD classification Romanian regions are predominantly rural or intermediate, only Bucharest-Ilfov region falls to the predominantly urban category (Eurostat 2011).



Source: authors' own design based on NIS (2013) data

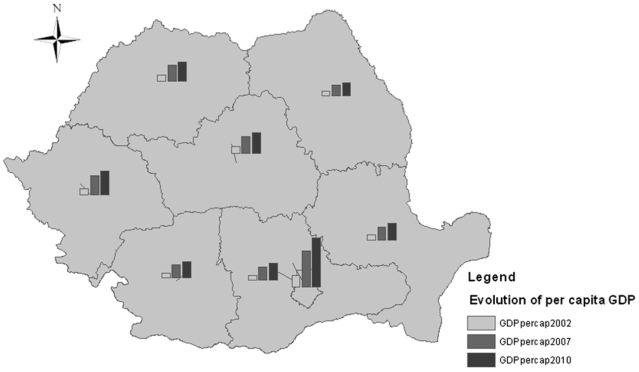
Figure 3. Regional employment in 2008



Source: authors' own design based on NIS (2013) data

Figure 4. Regional labour productivity in 2008

Changes in time show similar tendencies in each region as the per capita GDP increased during the analysed time period. On the one hand this is caused by the fact that the used per capita GDP values are expressed in lei (current prices). It is clearly visible that increase from 2002 to 2007 was higher (numbers in some cases almost doubled or



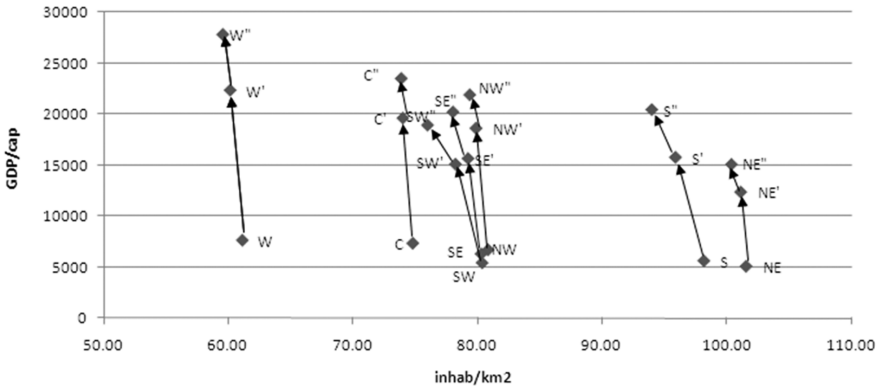
Source: authors' own design based on NIS (2013) data

Figure 5. Evolution of the regional per capita GDP between 2002 and 2010

represented at least one and half times higher values) than that from 2007 to 2010 (the sharpest increase showed a change about 30% in 2010 compared to the 2007 value) and this is not only the consequence of the simple fact that the time gap between 2002 and 2007 is wider than between 2007 and 2010 (which otherwise partly explains the tendency). Yet, the modest increase of the regional (and national) per capita GDP expressed in current prices from 2007 and 2010 is also the result of the global economic and financial crisis.

Quite large disparities of the regional per capita GDP can be observed among the development regions. Besides the outstandingly high value of the regional per capita GDP in Bucharest-Ilfov region (more than two times higher than the national average), disparities can also be found among the other seven regions, the worst performing being the South-East region (with a per capita GDP value of 15043 lei in 2010, only around 60% of the national average). The best performer among the seven development regions is the West region, the only one that has higher per capita GDP values than the national average (113%, 27774 lei in 2010).

Figure 6 presents a complex visualization of the relation between population density and per capita GDP in a given region, at different time points (2002, 2007 and 2012), the arrows indicating the direction of the regions' movement. We can observe that population density is lower in the more competitive development regions (those with the highest values of per capita GDP). Mathematically speaking, if in a fraction the denominator is higher (the number of inhabitants), the value of the fraction (per capita GDP) becomes lower. Yet, it is expectable that those regions where the number of inhabitants is higher should produce added values at higher extent than those with low population values. It is true, that this aspect is closely related to the demographic composition of the population. On the other hand, population density is also determined by geographical endowments.

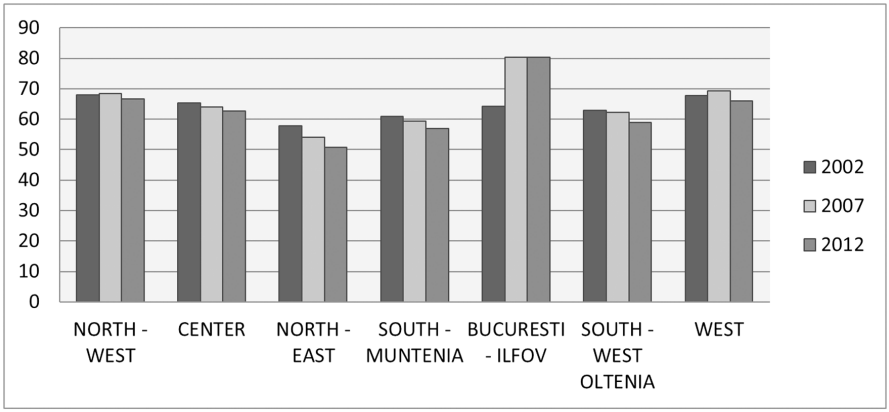


Source: authors' own design based on NIS (2013) data

Figure 6. The relation between population density and per capita GDP in the Romanian regions between 2002 and 2012

The scatter plot from Figure 6 illustrates that Romanian development regions are scattered; there exists determinant dispersion among them.

The evolution of employment rate and average gross nominal monthly salary earnings from the period 2002-2012 are presented in Figures 7 and 8.



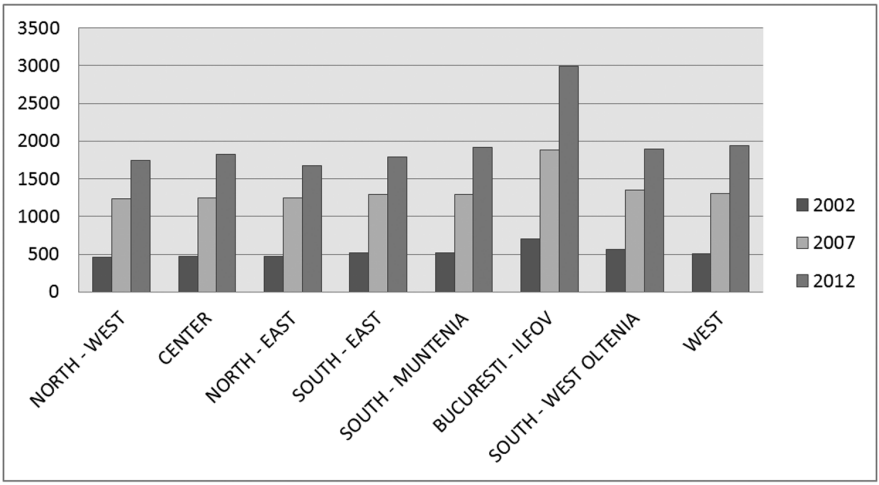
Source: authors' own design based on NIS (2013) data

Figure 7. The evolution of employment rate (%) in the Romanian development regions

Employment rate of labour resources represents the ratio, expressed as percentage, between the civil employment population and labour resources. The ratio decreased in almost each Romanian development region, the only exception being Bucharest-Ilfov region (where the employment rate increased from 64% in 2002 to over 80% in 2012). The underdeveloped character of the North-East region is conspicuous in this case as well, as the analysed ratio in the mentioned region showed a value of 50.8% in 2012, far below the national average of 61.1%.

Figure 8 shows the evolution of average gross nominal monthly salary earnings[6] expressed in lei in 2002, 2007 and 2012. The relative position of the regions compared to each other remains the same regarding this indicator as well, as the North-East region is the worst performer, with the lowest average nominal monthly salary earning (1679 lei in 2012) and again, the best performer is the region of the

[6] The gross nominal earnings comprise salaries, respectively money rights and other complementary benefits (bonuses, meal tickets, holiday vouchers, etc.).



Source: authors' own design based on NIS (2013) data

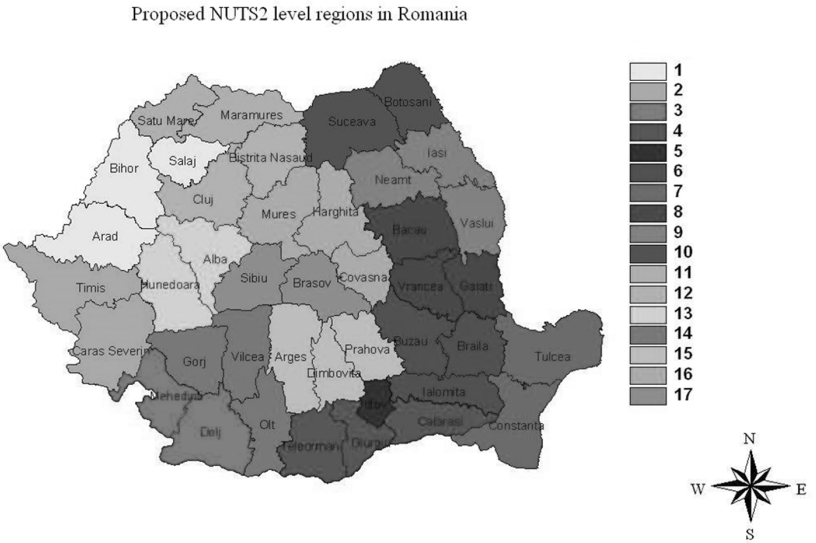
Figure 8. The evolution of average gross nominal monthly salary earnings (lei)

capital city (2989 lei in 2012). The values of the other six regions are situated somewhere in the (1750, 1950) interval.

An attempt for reshaping the Romanian development regions

The final chapter of the present study proposes a new regional division for Romania. The proposal uses as starting point the counties that are currently functional in the country.

Figure 9 presents the authors' proposal for a new regional division of Romania. It can immediately be noticed that the number of NUTS2 level development regions is much higher: we propose seventeen NUTS2 development regions, each of them containing two or three counties. In our proposal, each region respects the population threshold of 3 million (the waste majority of the regions has a population around 1 million inhabitants). We consider that even economic policies that refer to subnational units can be practiced more effectively in regions that are smaller from territorial and from population approaches.



Region	Counties	Region	Counties
1	Arad, Bihor, Sălaj	2	Caraş-Severin, Timiş
3	Dolj, Mehedinţi	4	Călăraşi, Teleorman, Giurgiu
5	Bucureşti, Ilfov	6	Brăila, Buzău, Ialomiţa
7	Constanţa, Tulcea	8	Bacău, Galaţi, Vrancea
9	Iaşi, Neamţ, Vaslui	10	Botoşani, Suceava
11	Maramureş, Satu Mare	12	Bistriţa-Năsăud, Cluj
13	Alba, Hunedoara	14	Gorj, Olt, Vâlcea
15	Argeş, Dâmboviţa, Prahova	16	Covasna, Harghita, Mureş
17	Braşov, Sibiu		

Source: authors' own design based on NIS (2013) data

Figure 9. Proposed development regions for Romania

The new division takes as a starting point not only economic, but historical, geographical and legal aspects as well, as stated in Reg. (EC) No 1059/2003, Article 4, Paragraph 5. The historical perspective refers to the fact that when reshaping we respected the borders of the old historical regions: Banat, Bucovina, Crişana, Dobrogea, Maramureş, Moldova, Muntenia, Oltenia and Transilvania.

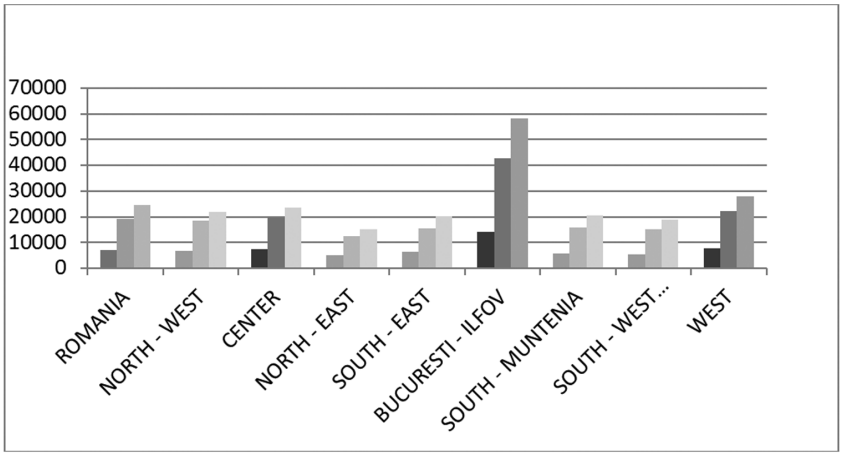
Besides the simple displacement of the regional borders a real

valuable proposal should refer to the assignment of administrative authority power and self-determination rights for the development regions both in the case of current or proposed divisions. However, even if current NUTS2 development regions do not have any financial autonomy (contrary to counties, cities or communes) they play a vital role in the efficient use of European funds (called European Structural and Investment Funds in the 2014-2020 programming period) and the increase of their absorption ratio.

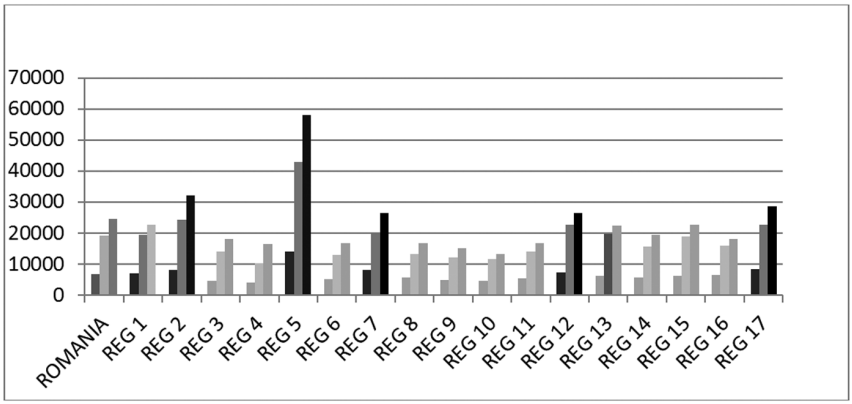
Figure 10 shows the evolution of per capita GDP in 2002-2010 in the current and proposed development regions in such a manner that if the value of a specific region in a specific year is higher than the national average, the colour of the column representing the given region in the given year is darker than that of the national average, otherwise it has a lighter nuance.

Darker nuance occurs more frequently in the case of proposed regions, which means that with the new regional division we have created smaller and more homogenous regions. It is true that there are more regions with lighter colour, but those are again more homogenous with lower regional competitiveness values. Per a contrario, the question is obvious: does the more fragmented new division affect negatively the convergence of the regions, increasing the developmental gap between them? The question is somewhat legitimate, yet the answer is not unequivocal: it is true that by separating more developed counties to form together a region – and naturally as a consequence more undeveloped counties together create more undeveloped regions – the difference between the regions increases, but homogenous regions with similar development problems can be better treated, specific regional policy instruments can better be targeted to them.

Maybe the developmental gap widens at the beginning, divergence appears, but the region itself can be developed in a better way, otherwise the developed counties of a region drain the potential from the undeveloped ones and divergence is going to appear within the region which is a greater threat regarding regional development. In summary, homogeneity helps the catching up of the lagging behind regions even if at first sight the homogenous fragmentation of the regions seems to determine divergence between the regions of the country.



a.



b.

Source: authors' own design based on NIS (2013) data

Figure 10. Per capita GDP values expressed in lei in 2002, 2007 and 2010 in the current (a) and proposed (b) NUTS2 regions

Another important aspect related to the topic of the new regional division proposed by the authors is the issue of the expenses that this new regionalization would bring. It is obvious that with more regions,

more regional institutions are required, meaning extra costs. Yet, there are solutions for this problem: for example the Technical Assistance Operational Programme (with a budget of about 250 million euro for 2014-2020) could finance the better functioning of the system.

Another important observation can be related to the role of the development regions in the process of withdrawal and usage of the EU funds. Regarding the CEEC countries that accessed to the EU with the occasion of the enlargements from 2004 and 2007, according to a study carried out by Baun and Marek in 2008, in the first programming period after the accession (2004-2006) Cohesion Policy was implemented in a highly centralized manner in the new member states; national governments were responsible for program planning and management, and sub-national authorities played only a very limited and subordinate role. In 2007-2013, however, Cohesion Policy was implemented (in those member states that accessed in 2004) in a more regionalized or decentralized fashion (Baun and Marek 2008). In the case of Romania the same tendency can be detected, as the 2007-2013 programming period was the first post-accession time horizon, the role of central authorities were determinative (even if sub-national management authorities exist). However in the process of preparation for the 2014-2020 programming period, decentralized authorities at regional level get a more emphasized role. According to this, if the future holds greater roles to the regions, the issue of both current regional division and future regional "re-division" becomes even more important.

Conclusions

In the present study we have analysed the competitiveness and convergence of the current Romanian NUTS2 development regions, and proposed a new territorial division of the country in the view of a more efficient functioning.

The increase of labour productivity in the primary sector would be crucial for Romania in the medium and long-run, being a country that consists of mostly predominantly rural and intermediate regions – according to the OECD classification – showing very high shares of agricultural employment. On the one hand this is a must in the view of

reaching higher level labour productivity values and thus increasing regional competitiveness, on the other hand it should be considered as a valuable country potential that is currently insufficiently exploited. The diversification of economic activities in rural areas would also be essential in order to absorb the persisting agricultural labour force excess.

Absorption of EU funds for 2007-2013 shows that more developed regions applied for more support than less developed ones (Bíró and Bíró 2012b, Bíró and Bíró 2012c). As a consequence, we are facing the situation when richer regions are getting more and more rich, while those lagging-behind cannot catch-up. This way disparities between regions are deepening.

The definition of the proposed development regions' borders was based not only on socio-economic criteria, but on geographical, historical and cultural aspects as well. We believe that EU policies, such as Regional and Cohesion Policy and Common Agricultural Policy could better reach their goals with the proposed system of NUTS2 regions in Romania. A higher level of decentralization, together with the necessary institutional system with proper administrative authority power and self-determination rights, could lead to higher absorption ratios and a more effective use of European Funds.

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