

ACADEMIC PERFORMANCE: MEASUREMENT METHODS USED IN SOCIO - ECONOMIC SCIENCES

Abstract

Evaluation of scientific research is crucial, however, although numerous studies have been conducted in this area, it is not easy to measure academic productivity/ performance. The most important perspective in measuring the productivity/ performance comes from the economic field, where it is the ratio between outputs and inputs for a particular product. This article aims to address the most important elements to be considered in the measurement of scientific research: types of indicators, qualitative/ quantitative respectively simple/ composite, level of measurement, micro, respectively macro indicators and the limits of those indicators. Also, this paper presents evidences regarding academic performance for Romanian university professors in economics and business administration from North – East Romania.

Key words: ranking, measurement methods, academic performance, bibliometrics, peer review

1. Introduction

Evaluation of scientific research is crucial (van Raan, 2003), however, although numerous studies have been conducted in this area, it is not easy to measure academic productivity/ performance. The most important perspective in measuring the productivity/ performance comes from the economic field, where it is the ratio between outputs and inputs for a particular product.

In addition, in higher education an important issue is to divide the resources between input and output (Hassan, Tymms and Ismail, 2008). According to Farnham the key variables in defining input for higher education are: funding sources (including taxes/ tuitions) and the number of students (Farnham, 1999). On the other hand, there are a number of indicators associated to output: the number of graduates (students who have completed studies) and the number of publications (Virtanen, 1999). These indicators refer to the measurement of productivity at the macro level (institutional level).

At the micro level, measuring the output of a researcher is becoming increasingly important to justify the acceptance of projects, grants or offering scientific prizes (Alonso, Cabrerizo, Herrera-Viedma and Herrera, 2010). For measurement, there is a whole series of indicators that allow quantification of both the productivity and the impact of academic publications. Usually it is desirable to use a combination of these indicators (Alonso, Cabrerizo, Herrera-Viedma and Herrera, 2010; Martin, 1996).

Academic productivity/ performance is generally measured in terms of both quantity and quality. The quantity can be measured by the number of articles published. Quality is often measured by the reputation of the journal in which the article was published. Also an important element taken into account is the number of citations (Manley, 1998). Citations show that a person's work has been read, or at least someone referred to it, and thus had an impact in that field (Hancock et. al., 1992).

Further analysis of the quality of research is carried out by peer-review method. Peer-review represents a qualitative analysis of research performance, while bibliometric indicators represents a quantitative analysis (van Raan, 2003). Peer-review is undoubtedly the main

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procedure of judging academic research in qualitative terms (Juznic et. al., 2010; van Raan, 2003). However, expert opinion may be influenced by subjective elements (Juznic et. al., 2010; Schmoch and Schubert, 2009; van Raan, 2003), limited horizons (van Raan, 2003), conflicts of interest (Juznic et. al., 2010; Schmoch and Schubert, 2009) and evaluator's incompetence (Schmoch and Schubert, 2009). This is why bibliometric studies are increasingly used to measure research performance (Franceschet, 2009; Schmoch and Schubert, 2009; Wallin, 2005). While bibliometric methods are by nature quantitative methods, they are used to characterize the qualitative elements. This is actually the purpose of the bibliometric methods: to transform something intangible (scientific quality) into something measurable. Compared to peer-review, which has a small area of investigation, bibliometric methods can easily be used to examine a high number of publications. Thus, the bibliometrics provides a tool that can be easily used from micro level (individual, institution) to macro level (countries, international) (Wallin, 2005; Moed, 2000).

Bibliometric analysis is the application of mathematical and statistical methods to publications (from “*biblos*” = book and “*metron*” = measurement). In the narrow sense, a bibliometric indicator is “a measure, an index or a statistic (preferably objective) of the impact or the number of publications as documentary products” (Vinkler, 1988). Scientometric indicators are bibliometric indicators that relate to science. Since 1999, Braun has made a suggestive analysis of the weaknesses and strengths of the two types of analysis, peer-reviewed and scientometric/ bibliometric indicators, as can be seen in figure no.1.

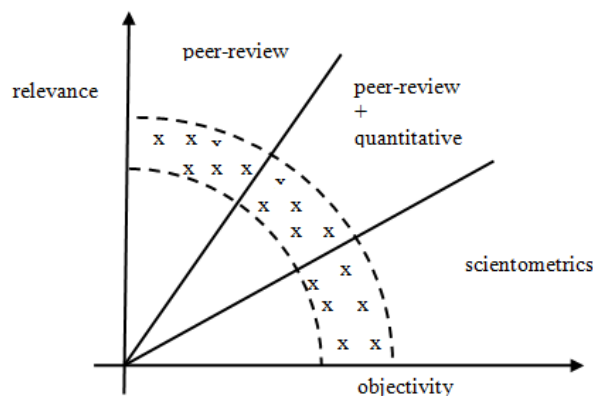


Figure 1. The reliability of peer-review and scientometric methods
(Source: Braun, 1999)

Peer-review has a high reliability in comparison with bibliometric indicators, but have a low objectivity. Specialists not plead for the removing of peer-review method, but believes it would be desirable to use parallel both types of evaluation: based on peer-reviewed and on bibliometric indicators (van Raan, 2003; Schmoch and Schubert, 2009; Aksnes and Taxt, 2004). Bibliometric indicators can not replace peer-review system to support the final decisions, but calculating scores, they can show the weaknesses of peer-review and lead to minimize conflicts of interest (Juznic et. al., 2010). However, the "conflict" between quantitative assessment methods (bibliometric indicators) and qualitative methods (peer-reviewed) seems to be exaggerated. Quantitative elements are always present in peer-reviewed, and citations (often used bibliometric indicators) offered to a paper can be seen as a judgment or a "vote" of peer researchers for the cited paper. Bibliometric approaches are, in fact, a indirectly peer-review: they based on data about publications, however, papers are selected for publication based on experts' opinions and decisions (Juznic et. al., 2010).

2. Measuring academic performance at macro and micor level

The next section briefly describes the most important indicators used for ranks at macro level (countries, institutions, departments) respectively to the micro level (individuals).

2.1. Measuring academic performance at the macro level

The concept of productivity in higher education is closely related to the ranking. Both productivity and rankings can be calculated on individual or institutional level. Generally, productivity is only one of the factors taken into account when a rank is calculated, especially if we speak about the institutions. When it comes to calculate an individual rank, the rank is often based just on productivity.

Making rankings of universities is a difficult task, but very important for different audiences (Sadlak, Merisotis and Liu, 2008). According to Dill and Soo, exactly the request of these audiences regarding information on academic quality of universities led to the development of ranking systems (Dill and Soo, 2005). Such audiences interested in ranking systems are (Alaşehir, 2010): students who wish to choose a proper university to study, academics who want to work for prestigious universities, university administrators which face the defining of governing policies, national authorities that define long-term goals for education, media that wish to inform the society about the quality of the university system, companies that want to provide jobs for college graduates etc.

First ranking system was developed in 1983 by Bob Morse, a representative of the U.S. News and World Report. He published "American Colleges" Ranking, which became an annual publication since 1987 (Mahnung, 1998). Due to the huge impact this ranking had, many ranking systems have been developed at national and international level. They were made by different organizations such as government agencies, magazines and newspapers, professional associations (Dill and Soo, 2005).

Initially, ranking systems were developed mainly at national level, given the complexity and the difficulty of identifying indicators that can be applied to an extensive number of universities. For example, the most popular national and regional systems of ranking are (Alaşehir, 2010 and Ranking Resources, 2011): UK (Guardian University Guide, The Complete University Guide, The Times Good University Guide), Asia (Asia's Best Universities), Australia (The Melbourne Institute's International Standing of Australian Universities, Good Universities Guides), Canada (Macleane's Ranking of Canadian Universities, Canadian Psychological Association Graduate Guide), China (Netbig's Chinese University Ranking, Academic Ranking of World Universities, China Academic Degrees and Graduate Education Development Center, Rankings by the Research Centre for China Science Evaluation, Wuhan University, Ranking of Universities in Hong Kong), Germany (Center for Higher Education Development, Humboldt Ranking, The DFG Funding Ranking, Wirtschaftswoche Uniranking, Karriere University Rankings, Focus University Ranking), Hong-Kong (Education18.com & the Public Opinion Program), India (JAM College Ranking, India's Best Colleges; National Assessment and Accreditation Council), Italy (Universidad de la República), Japan (Kawaijuku Rankings, Asahi Shimbun Newspaper Ranking, Recruit Ltd. Ranking, Sunday Mainichi Newspaper Ranking), Pakistan (Pakistan Higher Education Commission Ranking of Universities), Slovakia (The Independent Slovak Academic Ranking and Rating Agency), Spain (National Graduation Rate Ranking), Switzerland (Swiss Centre for Science and Technology Studies' Champions league'), Romania (National Council of Scientific Research in Higher Education, AdAstra, UEFISCDI), USA (OEDb's Online College Rankings, The Princeton Review College Rankings, The Washington Monthly Rankings, The Top American Research), Ukraine (Compass National University Ranking).

Information provided by national ranking systems are useful for implementing government policies and for university administration, but they say nothing about visibility, attractiveness and quality at international level. For this reason the interest in development of ranking systems that can be applied internationally increased. Table no.1. provides information about the most known international ranking systems.

Table 1

System	Geographic area		Level			Field			Indicator	
	National	Global	Department	Faculty	University	Field	Subject	General	Simple	Composite
ARWU (Academic Ranking of World Universities, known as Shanghai System)	X	X			X	X	X	X		X
CHE (Centre for Higher Education Development)	X	X			X		X		X	X
Financial Times Business School Rankings		X			X	X				X
HEEACT	X	X			X	X		X		X
SCIMAGO		X			X			X	X	X
The Leiden Ranking		X			X			X	X	
The New Global Ranking of World Universities		X			X			X		X
THE-QS World University Rankings		X			X		X	X		X
U.S.News & World Report	X	X			X		X	X		X
Webometrics	X	X			X			X		X

Source: adapted after Alaşehir, 2010

As can be seen from the analysis in table no. 1, these systems differ in terms of area, coverage and number of indicators used. Regarding the level at which they are applied, all systems performed global analysis and institution level analysis.

2.2. Measuring academic performance at the micro level

Bibliometric indicators can be used for different levels of analysis (countries, regions, institutes and centers) and they are described extensively in the literature (Costas and Bordons, 2005; Wallin, 2005; Moed, 2000). Instead, indicators to measure individual performance (micro-level) are less studied because they are considered a challenge. This is due to the need of collecting a complete and accurate database (Costas and Bordons, 2005). Studies that have examined individual performance used different data sources: curriculum vitae (Gaughan and Bozeman, 2002; Dietz et. Al., 2000), institutional reports (Carayol and Matt, 2004), questionnaires and surveys (Prpic, 2000) bibliographic databases (Krapf, 2011; Ursprung and Zimmer, 2007). It is understood that the indicators and indices that can be calculated at the micro level can be used at the macro level analysis by adding results of all employees of the unit to be considered: department, institution, country (Ursachi (Horodnic) and Ursachi, 2010).

There are many classification of individual indicators designed by different specialists (Sen, 1999; Alonso, Cabrerizo, Herrera-Viedma and Herrera, 2010; Costas and Bordons, 2007; Hirsch, 2005; Franceschet, 2010; Franceschet, 2009) .

Given the large number of bibliometric indicators identified in the literature, for their brief presentation we propose the following classification:

- 1) *Simple bibliometric indicators* - take into account only one variable: papers, citations, authors, patents or journal impact:

- indicators based on the number of *papers* – *Papers* (Franceschet, 2010; Costas, van Leeuwen and Bordons, 2010; The Karolinska Institutet, 2008; Rehn, Kronman and Wadskog, 2007; Moed and Visser, 2007; van Raan, 2006b; Okubo, 1997), *ISI Papers* (Rehn, Kronman and Wadskog, 2007), *Paper Top Journals* (The Karolinska Institutet, 2008; Rehn, Kronman and Wadskog, 2007), *Papers per year* (Franceschet, 2010), *Papers per autor* (Franceschet, 2010; The Karolinska Institutet, 2008), *CEST field-based world share of publications* (Rehn, Kronman and Wadskog, 2007)

- indicators based on the number of *citation* – *Citations* (Franceschet, 2010, Costas, van Leeuwen and Bordons, 2010; The Karolinska Institutet, 2008; Rehn, Kronman and Wadskog, 2007; van Raan, 2006b; Okubo, 1997), *Citations per year* (Franceschet, 2010), *Citations per author* (Franceschet, 2010; The Karolinska Institutet, 2008), *Citations per paper* (Franceschet, 2010; Costas, van Leeuwen, and Bordons, 2010; Jarwal, Brion and King, 2009; Rehn, Kronman and Wadskog, 2007; Moed and Visser, 2007; van Raan, 2006b), *Cited Papers* (Franceschet, 2010), *Percentage of publications non-cited* (The Karolinska Institutet, 2008; Rehn, Kronman and Wadskog, 2007; Moed and Visser, 2007; van Raan, 2006b), *Number of patent citations* (Okubo, 1997), *Self citedness* (The Karolinska Institutet, 2008; Rehn, Kronman and Wadskog, 2007; Moed and Visser, 2007), “*Crown*” *indicator* (The Karolinska Institutet, 2008; Rehn, Kronman and Wadskog, 2007).

- indicators based on the number of *co-authors* - *Co-authors* (The Karolinska Institutet, 2008; Rehn, Kronman and Wadskog, 2007; Okubo, 1997);

- indicators based on the number of *patents* - *Patents* (Okubo, 1997);

- indicators based on the *journal impact factor* - *ISI Journal Impact Factor* (Jarwal, Brion and King, 2009; The Karolinska Institutet, 2008; Rehn, Kronman and Wadskog, 2007; Garfield, 2006), *Normalized Factor Impact/ field citations score* (Costas, van Leeuwen and Bordons, 2010; Rehn, Kronman and Wadskog, 2007; Moed and Visser, 2007).

2) *Composite bibliometric indicators* - take into account at least two of the variables: the number of papers, number of citations and journal impact.

- indicators based on the *number of papers* and *number of citations* - *h-index* and its development. The best known index focused on the number of papers and the number of citations is H index (Hirsch, 2005). Its development it has revolutionized the researchers vision on measuring academic productivity. As a result, over 40 other indicators and indicators were developed from the H index.

- indicators based on the *number of papers* and *journal impact factor* - *CLpn* and its development. CLpn index was proposed by Combes and Linnemer in 2003. The index was developed especially for economic field and encompasses all EconLit journals (Combes and Linnemer, 2003). The index was further developed by institutes such as Handelsblatt (Krapf, 2011). For example, in a recent study, Krapf and Schläpfer (2012) used the Handelsblatt methodology to check whether the overall rating scores of the Nobel Laureates in economics are indicative of their high achievements.

Based on individual indicators, many studies on measuring research productivity go on to identify factors that influence individual research performance. The most common factors influencing academic performance (productivity) include: parenthood and number of children (Krapf et al., 2014), gender (Mauleón et al. 2014; Danell and Hjerm, 2013), the researcher’s historic age (Costas et al., 2010), the academic program he or she graduated in (Brusa et al., 2010), the field of specialization, academic pedigree, academic environment (Long et al. 2009), personal circumstances, career age (Rauber and Ursprung, 2008a), cohort effects (Rauber and Ursprung, 2008b), financial rewards (Backes-Gellner and Schlinghoff, 2008), the size of the laboratory (research group), the number of a researcher’s foreign postdoctoral students (Carayol and Matt, 2006) and promotion (Backes-Gellner and Schlinghoff, 2004).

3. The bibliometric indicators limits

In 2009, Todd performed an analysis of the errors that can occur when bibliometric indicators are used to measure academic productivity/ performance. He identifies several levels at which these errors can occur, as can be seen from fig. no. 2.

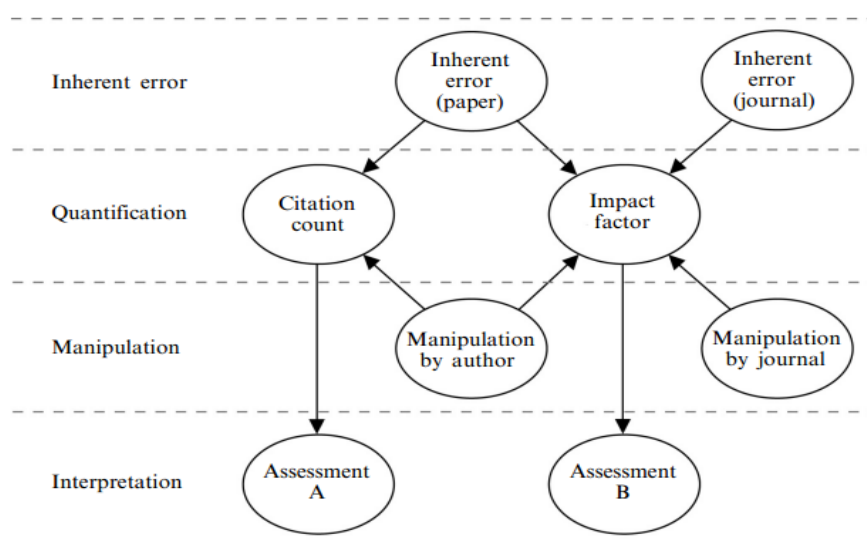


Figure 2. Levels errors "behind" bibliometric indices and indicators for measuring performance (Source: Todd, 2009)

- *Inherent errors*

A citation of a paper is considered as an objective measurement of the impact of the paper, or at least of its usefulness, however, this assumption may be wrong (Todd, 2009). The decision to publish a paper is not always based on its academic merits (Bornmann and Daniel, 2008), social network playing a major role in who cites who (GFO Echological Society, 2009). In addition, the number of citations may be positively correlated with the length of the paper, the number of authors and the open accessibility (Ball, 2008; Leimu and Koriecheva, 2005). Also, the language, the affiliation and the authors position, the significance of the results and the paper position in journal influences the likelihood of being cited (Garcis-Ruiz, 2008; Leimu and Koriecheva, 2005). On the other hand, a paper may be cited because it is "wrong" and citations represent the opposition to what they are supposed to represent (Todd and Ladle, 2008).

Considering the impact factor of a journal is calculated as the number of citations obtained by the articles published in the last two years, divided by the total number of articles published in the journal in the past two years, some areas may be disadvantaged (Garfield, 1997). An author may be lucky to publish article in a journal with a good image and coverage and also a journal may be lucky to publish an article that will become the "superhot" (star) which will increase its impact (Todd, 2009).

This type of error does not refer to the fact that the number obtained is wrong, but that there are a number of factors that can influence the number of citations and therefore the impact factor of a journal. As can be seen, the inherent errors are very difficult to detected and impossible to be controlled.

- *Quantification errors*

Measurement problems may be due to the author or the journal. The author errors may appear due to misspelling of names or due to usage of an inadequate database (Todd, 2009; GFO Echological Society, 2009; van Raan 2005a; van Raan, 2005b). For example, in 2007, Meho and Yang found differences between the results provided by three of the most popular search

engines used for counting citations: Google Scholar, Web of Science and Scopus (Meho and Yang, 2007).

The Impact Factor calculated by ISI Web of Knowledge is the standard indicator for classifying journals (Todd, 2009). However, there are discussions regarding the correctness of calculation. For example, it can generate basic mistakes such as wrong counting or failing to identify articles. (Monastersky, 2005).

- *Manipulation errors*

Errors due to manipulation concerns those errors due to the desire of an author or a journal to increase impact. Prior to exploit the inherent errors mentioned above (long publications, published in English for higher visibility, co-authored, positive results etc.) authors must go through the selection process of the journal. For this, some authors use the "fancy" words in manuscripts, ask not to be reviewed by some demanding evaluators, nominate potential evaluators for awards or cite them, meets with editors at conferences or similar events etc. (Lawrence, 2007).

In the same manner there are ways to improve the impact factor of a journal. Editors publish "hot papers", editorial, or other materials that are citable but are not included in calculating the ISI denominator (Monastersky, 2005). It is unlikely that these tactics will improve the quality of the journal, but it can significantly increase its impact (Todd, 2009).

Another method used is "open access" politic which increase the number of citations of an article, and, therefore, improve the impact factor of the journal in which the article was published. This approach can be carried out by the author, the journal or by both (Chew, Villaneuva and Van Der Weidon, 2007).

- *Interpretation errors*

Given the above errors, it is important to consider these when making an interpretation. For example, when taking into account the number of citations (assessment A), can be taken into account some other indicators such as average number of citations per paper, h-index, g-index etc. (Todd, 2009; Egghe, 2006a, 2006b; Hrisch, 2005). When taking into account the impact factor (assessment B) it can be taken into account factors such as: area, the most prestigious journals in a particular field etc. (Todd, 2009).

4. Academic performance of Romanian university professors in economics and business administration – evidence for the North – East Romania

From the composite indicators mentioned above we choose to measure research performance with the the CLpn index which was developed by Combes and Linnemer (2003) especially for the economics profession. The index is a weighted sum of all journal publications indexed in the database EconLit of the American Economic Association. Three kinds of weights are used for each article: a journal quality weight, the number of coauthors, and the length of the article. The sum runs from some year t to year T . Researcher i 's CLpn index thus has the following appearance:

$$CLpn_i(T) = \sum_k \frac{p_{k(i)} w_{k(i)}}{n_{k(i)}} \quad (1)$$

where, k indexes researcher i 's publications, $p_{k(i)}$ denotes the number of pages of the article k , $n_{k(i)}$ the number of authors of the article k , and $w_{k(i)}$ the quality weight (impact) of the journal in which article k was published. In this study, the original index is adapted to the Romanian academic environment. We did not use the original journal quality weights because only few Romanian professors publish in EconLit-indexed journals, implying that this

weighting scheme would lead to close to zero performance measures in our study. Instead we assigned quality weights to the category of article as classified by the Executive Unit for Financing Higher Education, Research, Innovation and Development (UEFISCDI)²: *ISI (Thomson) indexed journals* with an impact factor (a); *ISI indexed Science and social science journals* without impact factor (b); *ISI indexed arts and humanities journals* (c); *ISI indexed Proceedings* (d); *BDI*³ *indexed articles and working papers* and articles published in B+ journals according to the CNCSIS⁴ classification; articles published in national journals recognized by CNCSIS (B category). The following weights were used: *ISI indexed papers (a)* – 0,8; *ISI indexed papers (b)* – 0,6; *ISI indexed papers (c)* – 0,6; *ISI indexed papers (d)* – 0,4; *BDI indexed papers* – 0,2; *CNCSIS (B) articles* – 0,05.

The bibliometric data were available from 2006 to 2010 in university's reports of public universities⁵. We collected the publication data for a period of five years (2006-2010) for all university professors in economics and business administration from North – East Romania which have a public e-mail address on their university's site. We identified a number of 224 professors affiliated to the following universities: “Alexandru Ioan Cuza” University of Iasi, “George Bacovia” University of Bacau and “Stefan cel Mare” University of Suceava. We obtained a database with 1,894 records (professors and their publications, respectively). Nevertheless some 25 professors did not publish any paper in the analyzed period (2006-2010). The main results regarding the academic performance are reported in the figures no. 3, 4 and 5.

As figure no. 3 shows, a university professor in economics and business administration from North – East Romania has an average of the performance index of 7,64. Almost a half of the professors have though a performance index close to zero, which is alarming. Just a few of the professors have an index greater than 20, and one of them has an index above 100.

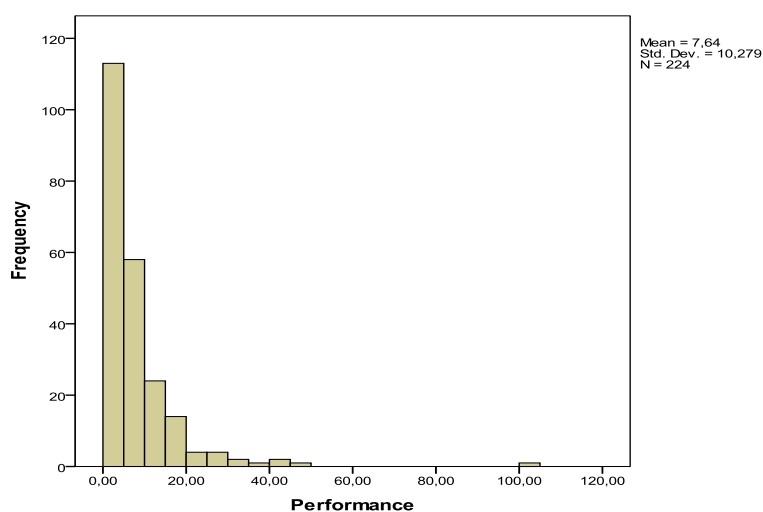


Figure 3. Academic performance of Romanian university professors in economics and business administration – evidence for the North – East Romania, mean for 2006-2010

Turning the analysis to gender distribution, we can see in figure no. 4 that man publish more compared with their women peer. A man have an average performance index of 8,01 since a

² UEFISCDI - public institution with legal personality under the Ministry of National Education (MEN) which operate under the subordination of MEN Advisory Councils with responsibilities in higher education, scientific research, development and innovation.

³ BDI = Indexed database

⁴ CNCSIS - National Council of Scientific Research in Higher Education

⁵ We should mention that those data are the only public data available on the individual level that we are aware. The other recently reports made available for public use compress only institutional data, therefore are useless for the present study.

woman have an average of 7,32. The most performant man has a performance index of 102,59 since the most performant woman has a less than a half, respectively 49,87. Those results regarding gender differences are in line with previous studies.

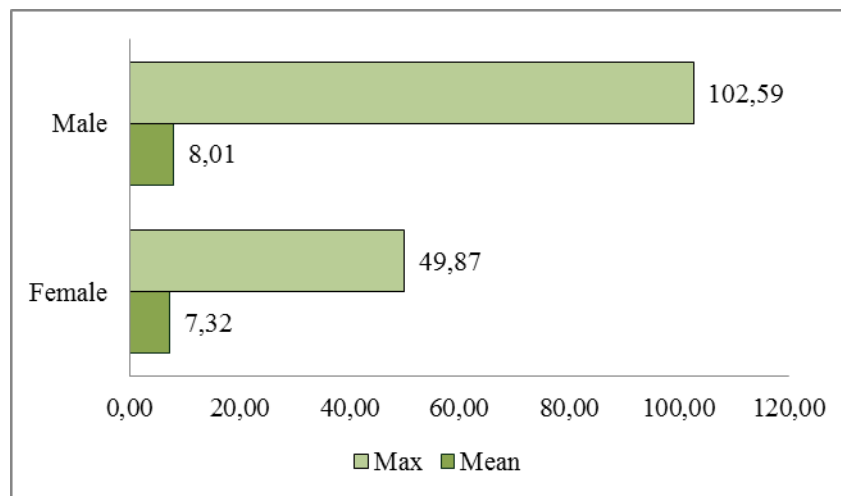


Figure 4. Academic performance of Romanian university professors in economics and business administration – evidence for the North – East Romania, mean and max for 2006-2010, by gender

For a better understanding of the real situation of the Romanian academic environment, figure no. 5 reports the number of the papers published, by categories. As figure no.5 shows, Romanian university professors in economics and business administration prefer to publish database-indexed articles (70 per cent of the total number of publications). A further 15 per cent is represented by ISI (d) published papers, 8 per cent is represented by CNCSIS (B) papers and, 3 percent is represented by ISI (a), ISI (b), respectively. Less than 1 per cent nevertheless, is represented by ISI(c).

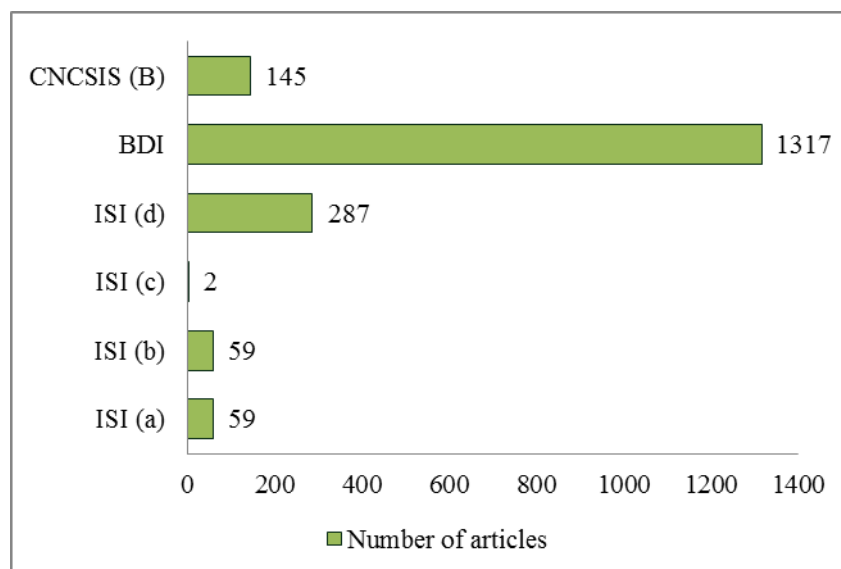


Figure 5. Number of papers published by Romanian university professors in economics and business administration – evidence for the North – East Romania, 2006-2010

These evidence with academic performance of Romanian university professors in economics and business administration depicts us a country undergoing transition. Academic professors just start to publish high listed journals (only 21 per cent of their papers are published in ISI journals or conferences volumes).

Conclusion

As it can be seen after a review of the literature there are several ways to develop rankings between countries, institutions and individuals in terms of academic performance. For this reason a high number of different indicators have been developed. There are different indicators in respect with the level of the analysis (macro and micro) and their nature (qualitative and quantitative). No one can say that a qualitative analysis is better than the quantitative, or the reverse but lately the quantitative ones are mainly used. It is the case because they include qualitative aspects and have a higher coverage. Quantitative indicators with a higher degree of trust are those composite. After analyzing the composite indices measuring academic performance, it can be seen that the choice of one of them depends on the purpose for which the investigation is carried out. Currently it can not be said that a certain indicator or index is perfect because each of them have a certain degree of error. However, the current direction is in favor of using indices that take into account the impact factor of the journal (although is based on the number of citations is less influenced by social networks). In this study, in line with the trend from the literature, we used the CLpn index for assessing the academic performance of the Romanian university professors in economics and business administration. The results reveals us a relatively weak academic environment, with a preference for low ranked journals. This is not unusual for a country undergoing transition.

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QUANTIFYING THE MORAL DEVELOPMENT OF PUBLIC PROCUREMENT EXPERTS

Abstract

The process of awarding public contracts is one of the most important stages of obtaining a sustainable development for the member states of the European Union. At the same time, public procurement experts are under constant moral pressure generated by their difficult assignments. This paper is aimed at identifying the most important ethical risks that these professionals are exposed to. In this context it offers a tested and validated instrument that can quantify the moral development of public procurement experts.

Key words: *moral development, public procurement experts, ethical principles, deontology*

1. The ethical risks that public procurement experts are subjected to

The public procurement systems active in the states of the European Union are organized around a set of principles. These principles can also be observed when analyzing the PRAG (Practical Guide to Contract Procedures for EU External Actions).

The principles that generally guide the procurement process are: *non-discrimination, equal treatment, mutual recognition, transparency, proportionality, the efficient use of funds and taking responsibility.*

Non-discrimination consists in assuring conditions for the manifestation of real competition so that any bidder, regardless of nationality, can have the means to be part of the procedure in which a public contract is assigned. By respecting this principle a healthy and competitive environment is created, giving the opportunity to any tenderer to partake. Public procurement officers must make sure that, by using certain selection criteria, they are not restricting the access of tenders that have a different nationality or are organized as a different type of organizations. At the same time, when evaluating offers, the evaluation committee must analyze the documents presented by tenderers so that they can present equivalent documents issued by different states.

Equal treatment takes into account setting and imposing rules, criteria and requirements, so that all the participants have the same chance in obtaining the contract. By respecting this principle, a framework of trust and impartiality is created and subjective elements are removed. Public procurement experts must ensure that a tenderer who does not meet the requirements imposed by the documentation, or offers an unacceptable technical solution, will be removed from the bidding so that equal treatment is respected. At the same time, when the evaluation committee discovers a problem in regard to one of the biddings, all the rest must be verified in regard to the same issue, so that the principle is respected.

Mutual recognition takes into consideration the acceptance of services, products and works offered in the European Union, diplomas and certification, equivalent to the ones required by the contracting authority. The role of the public procurement expert is to control and evaluate the documents submitted and accept the ones that are emitted by equivalent

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institutions and are similar to the one required. The public procurement experts that are involved in the bidding process must know the equivalence of their certifications, or the characteristics of their products, so that they can present them in regard to the requirements of the contracting authority.

Transparency consists in the disclosure of information regarding the application of the procedure that will lead to the awarding of the contract. The experts involved must assure that the procedure is visible to all those who might be interested, and the results are available for the public. Public procurement experts that are involved in the bidding must assure that the offer includes all his suppliers, collaborators and subcontractors. In the UE, when certain values are exceeded, the procurements will be visible in the Official Journal of the European Union (ted.europa.eu).

Proportionality ensures the correlation between the objective necessity of the contracting authority, the objective of the contract and the requirements of the procedure. The duty of the public procurement expert is to set the minimum requirements so that the necessity is fully satisfied. The tendency of public procurement experts that are purchasing, is to use extended requirements even if the objective of the contract does not impose so. The duty of the experts involved in the bidding is to inform the contracting authority and, if it is the case, the judging authority.

The efficient use of funds refers to obtaining the best value / cost ratio for the contracting authority. The duty of the public procurement expert that is involved in the creation of the tender documentation is to use requirements that will lead to the highest ratio, without restricting the free access. He also has to enlist all the characteristics of the product, service or work.

Taking responsibility will lead to a high level of professionalism and impartiality for the experts involved. The duties will be distributed by the manager who will give the proper tasks to different members of the team.

The general duty of all public procurement experts, regardless if they are buying or selling goods, services or works, is to respect these principles. The many problems that Romania has encountered in regard to the usage of European funding are mainly the effect of not respecting these principles. At the same time, our country is not the only one faced with these problems. Countries such as Moldavia or Ukraine have undeveloped public procurement systems that can't cope with large amount of funding from the UE.

The management of public procurement is defined by two main limits concerning the behavior of the participants: the legal component and the manifestation of an ethical behavior. The legal component is regulated by the national and international law. The manifestation of an ethical behavior is more than just the obedience of law, it is the respect toward the duty you have towards your organization, the bidders, the beneficiaries, the coworkers, the managers and not least, towards yourself. The risk concerning the violation of the law is generally known by the experts and the consequences are regulated. Ethical deviations are not legislated, and unethical behaviors can hardly be recognized outside the system. In the following section, the risks concerning unethical behavior will be analyzed.

We can identify three stages of the public procurement process: the planning, the procedure and the following of the contract. The main risks of manifesting an unethical behavior are presented in Table 1.

Table 1

The main risks of manifesting an unethical behavior in the process of public procurement	
Stage	The risk of manifesting an unethical behavior
Planning	Contracting authority
	The division of a procurement composed of several CPV codes (international

	codification of procurements) so that several direct procurements take place and a proper public procedure is avoided.
	The superficial assessment of the estimated value, based only on the previous experience of past years.
	The unrealistic allocation of time for every procurement procedure.
	The insufficient justification of criteria and requirements.
Procedure	Contracting authority
	The excessive implication of the top manager in the procurement procedure.
	Imposing requirements that are too general and that do not lead to the desired quality level.
	The frequent and unnecessary consulting with bidders.
	Imposing excessive penalties in the contract that is to be signed.
	Imposing technical characteristics that can be fulfilled only by a small number of bidders.
	Giving the minimal legal amount of time for obtaining the documentation, even if the complexity is very high.
	The usage of the maximum legal period of time to respond to clarifications, even if the complexity is low.
	Discussions of the evaluation committee in public sessions that injure bidders.
	The appointment of persons that do not know the law or have no logical bond to the procedure inside the evaluation committee.
	Rejecting offers based on procedural vices that could have been corrected.
	Forming preferences towards certain bidders based on the long business relation.
	Forming animosities based on past experience.
	Extending the evaluation period without a founded reason.
	Bidders
	Sending requests for clarifications that do not cover clear elements of the documentation.
	Taking part in discussions with other competing bidders.
	Sending requests for clarifications in regard to elements that have already been clarified in the past.
	Manifesting in an unprofessional way during the public sessions.
	Allusions about the quality of products, services, or works of other bidders.
	Refusing to sign the procurement contract.
	Contesting the public procurement procedure even if the bidder is not interested in the contract.
	Following of the contract
The lack of involvement from the procurement department in the implementation of the contract.	
The random archiving of the documents generated by the procurement procedure.	
Bidders	
The usage of unclear clauses in the contract to their advantage and the disadvantage of the contracting authority.	
Introducing subcontractors even if they were not initially stated.	

It is clear from the previous table that public procurement experts are subjected to a large number of ethical risks. It is thus necessary to quantify the stage of moral development in the case of public procurement experts.

2. Methodology. The instrument

In order to quantify the degree of moral judgment development, in the case of public procurement experts, a consecrated instrument that proved itself over countless studies was selected. The DIT-2 is the most recent version of the instrument developed in the '70s by John Rest. The instrument presents 5 moral dilemmas under the form of short stories. Respondents have to read the story and, for each of them, answer a question with 3 possible variants on what should the hero do, evaluate 12 items in regard to their importance and classify the most

important 4 of them. The functionality of the DIT is best explained by Rest himself: *as the participant meets an item that both makes sense for him and activates a certain schema, that item gets a high rating and is ranked high. Alternatively, when the participant meets an item that has no logic to him or seems simple and unconvincing (does not activate a schema), the item is rated low.* (Rest, 1999).

In order to apply for the first time the DIT in Romania, permission was required from the Office for the Study of Ethical Development inside the University of Alabama to translate and apply it. At the same time, according to the agreement, the institution also generated the scores.

For the present study we are interested in the values of the two most popular scores generated by the DIT-2: the P-score and the N2 score. The P-score is the oldest version and takes into consideration the classification of data. When the subject gives a high rating to a main item, he is given 4 points. If the main item is second, the subject gets 3 points, and so on. The values of the P-score vary from 0 to 95 and it is updated if recordings are missing. The N2 score is the most recent development and has two components: the degree to which main items are prioritized (similar to the P-score) and the degree to which low stages are evaluated lower than higher stages. After large studies, it has been proven that the N2 score perform better than the P score.

3. The study sample

The respondents are public procurement experts from the N-E Region of Romania that have obtained a certification from the Ministry of Education. They are evenly divided between the public and private sector.

The instrument was implemented between January and May 2013 on a sample of 223 public procurement experts, 88 being handed personally and 135 over e-mail. The response rate was low at only 47%. After removing the incomplete questionnaires, 77 recordings were available. The reliability checks removed another 3 recordings, so that a final number of 74 was available.

The demographics of the sample are available in Table 2.

Table 2

The demographics of the sample

Variable	Recorded level							
Age	Lower than 30 years	Between 31 and 40 years	Between 41 and 50 years	Between 51 and 60 years	Over 61 years			
	47,3%	25,7%	23%	2,7%	1%			
Sex	Male				Female			
	33,8%				66,2%			
Education	Collage degree		Master degree			Doctoral degree		
	47,3%		44,6%			8,1%		
Political orientation	Towards left		Towards right			No orientation		
	9,5%		32,4%			58,1%		
Level of income	Lower than 1000 lei	Between 1001 – 1500 lei	Between 1501 – 2000 lei	Between 2001 – 2500 lei	Between 2501 – 3000 lei	Between 3501 – 4000 lei	Over 4000 lei	
	10,8%	24,3%	20,3%	13,5%	13,5%	10,8%	6,8%	
Organization type	Public				Private			
	45,9%				54,1%			
Marital status	Not married	Married	Consensual union	Divorced	Widowed			
	41,9%	48,6%	4,1%	4,1%	1,4%			
Religious	Orthodox	Orthodox non-	Catholic	Catholic not-	Another	Atheist		

orientation	practitioner	practitioner	practitioner	practitioner	orientation	
	47,3%	45,9%	1,4%	1,4%	1,4%	2,7%
Is there a code of ethics implemented in your organization?	YES		NO		I don't know	
	41,9%		28,4%		29,7%	
Have you attended any course in ethics?	YES		NO		I don't know	
	21,6%		75,7%		2,7%	
Do you know the content of the Good Practice Guide developed by A.N.R.M.A.P. (the institution that regulates public procurements in Romania)	To a very large extend	To a large extend	To some extend	To a small extend	Not at all	
	6,8%	13,5%	40,5%	21,6%	17,6%	

Following Table 2 it can be concluded that the study sample is in general a young one, 73% are younger than 41 years of age. At the same time, public procurement experts have in general a high degree of education, 52.7% graduated at least a Master Degree. The division between the public and private sector is equitable, 45.9% are employees of the public sector and 54.1% employees of the private sector. Of high interest is the fact that 29.7% of the respondents don't know if in their organization there is implemented a code of ethics and 76.7% have never attended a course or seminar on ethics.

4. Data analysis

The results of the current research are aimed at identifying the development of moral judgment in the case of public procurement experts by calculating the P-score and N2 score derived from the application of the DIT-2. For the current research the mean of the P-score is 28.46 and the mean of the N2 score is 28.69.

In a similar research, Wimalasiri (2001) has generated a mean of 27 for the P-score by applying the DIT to a number of 266 students from Australia. Holland (2011) determined a P-score between 21 and 24 for his sample of students from the UK. Babeau and Thoma (2003) have obtained a mean of the P-score of 32.32. Following this study, Jagger and Strain (2007) generated only a value of 23. In Asia, Wimalasiri et. al. (1996) determined a value for the P-score between 24.5 and 30.35. We can observe that the value generated by the current study respects the trend of other researches done on very different samples.

Furthermore, in pretesting the instrument (Tabarcea, 2013), a value of 27.46 was obtained on a sample population of 26 public procurement experts. It can be concluded that by almost tripling the sample, the variance of the P-score was very low, only one point. This is a clear indication of the fact that the sample population is representative. This conclusion is very important taking into consideration that the total population is very small and unknown.

The mean of the N2-score generated by other researches also varies. Rest has obtained a mean between 40 and 50 in his researches, while Holland (2011) only a value between 21 and 24. Bebeau and Thoma (2003) generated a mean of the N2 score of 36.67. The pretest of the instrument resulted in a mean of 28 for the N2 score (Tabarcea, 2013). Taking into account that the sample population almost tripled, the mean of the N2 score only varied 0.69, thus confirming the validity of the instrument.

The statistical analysis for the N2 score has resulted in the conclusion that the value mean is close to the one of the median, which signifies a symmetrical distribution. At the same time, the range is high, of 67.57, which indicates a dispersed population. This is not surprising as we are testing the very different moral nature of individuals that find themselves in different stages of moral development. The values can be consulted in table 3 and the range is clear in figure 1.

Table 3

Descriptive statistics for the N2 score	
N2 score	
Mean	28,69
Median	27,10
Std. Deviation	13,76
Range	67,57

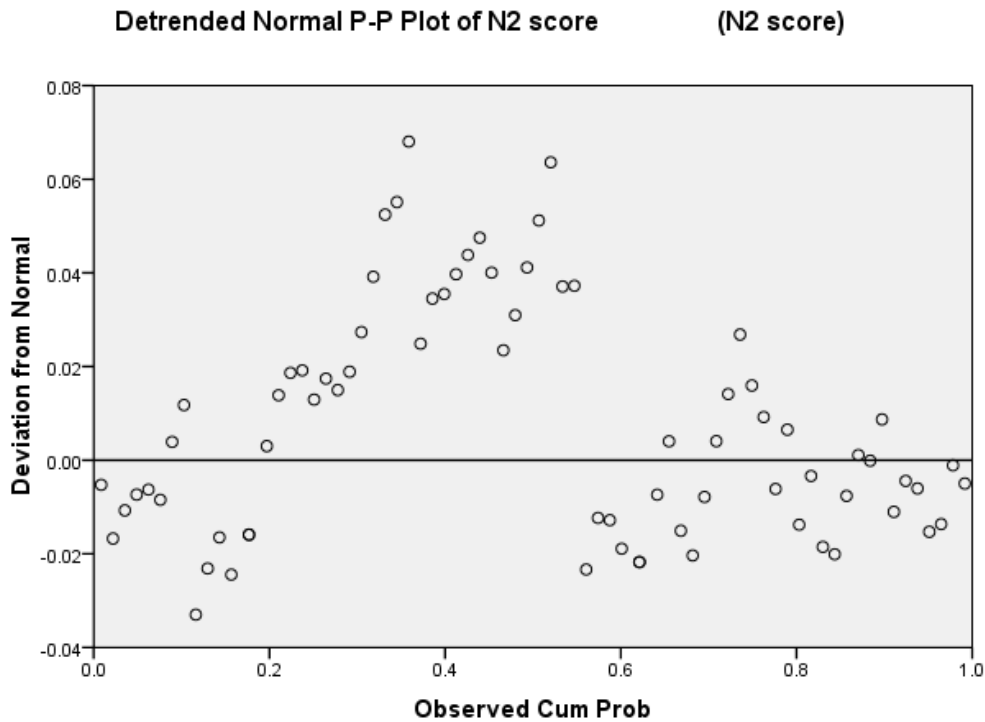


Figure 1. P-P Plot for N2 score

Taking into account the studied phenomenon, the high range is not surprising and the values obtained for the mean are in trend to other researches done in the field, thus proving that the DIT is a great instrument in quantifying the moral development of public procurement experts.

5. Conclusions

The fact that the variance of the N2 score and P-score compared to the pretest (Tabarcea, 2013) is very small, suggests the fact that the results are valid and representative for the entire population. It can thus be concluded that the DIT-2 is an useful instrument in quantifying the development of moral judgment of public procurement experts in Romania.

The need for this quantification is very important as the risks of unethical behavior in the case of public procurement experts are vast, and the values traded are very high. At the same time, the measures to promote deontological behavior in Romania are at a minimum, a

fact denoted by the percentage of 29.7 of respondents that don't know if a code of ethics is implemented in their organization and the 75.7% of respondents that have never attended a course or seminar on ethics.

The values of the P and N2 score generated by this research fit the trend set by authors all over the world, offering a plus of validity to the data analysis and proving that the instrument is fit for Romania. From the statistical analysis it can be stated that the distribution is symmetrical and that the values of the N2 score are dispersed, indicating a high variety of moral development in the case of public procurement experts.

5.1. The importance of quantifying the moral development

Taking into account the mean of the N2 score generated by the current research, managers should try to involve in the public procurement activity employees that have obtained scores higher than 28.69. If such a fact is not possible, at least the managers of the public procurement departments should have a higher score. The DIT can become an instrument involved in the recruitment of personal, ensuring that future employees will have a tendency towards ethical manifestations.

Quantifying the moral development can also be useful in the activity of ethical officers, a qualification imposed in Romania by law. Their main objective is to identify and take measures that target unethical behavior. By applying the DIT, they could identify which employees are more likely to manifest in an unethical way.

Managers have to understand that a minimum investment in the formation of employees will lead to major changes in the organization such as: the settlement of labor disputes, a better understanding between employees, a better relation between management and employees, the decrease of situations involving bribery and influence peddling and finally an increase in productivity.

The double testing procedure refers to the process of testing employees in the organization before and after the implementation of instruments that promote ethical behavior, such as courses and codes. If the instruments are correctly implemented there will be an increase in the mean of the N2 score for the study population. At the same time, there is the possibility to analyze every individual in order to observe how he scores in regard to the mean of the organization. In order not to expose the same sample to the same instrument, the first test can be done with the simple version of the DIT, and the second with the DIT-2 or an instrument specially developed for the domain in which the employees are active.

5.2. Limitations and future research

Quantifying moral development is, regardless of the instrument used, a difficult endeavor and a delicate subject for respondents (Akaah, 1989; Trevino, 1992). At the same time, the DIT-2 uses impersonal cases that are much easier to approach. The respondents only evaluate and classify items in regard to their importance. This helps avoid test errors generated by the desire of respondents to offer socially acceptable answers. Taking into consideration the structure of the DIT, respondents are never asked if a behavior is right or wrong.

Another limitation can be observed from the results of the scores generated by John Rest in the United States. The so called American bias manifests in a higher P and N2 score obtained by American samples in compared to the rest of the world. A solution to the problem can be the development of specific moral dilemmas. Taking into account that the DIT has never been implemented in the region, the current research is a first step in developing an instrument specifically aimed at public procurement experts.

The resulting instrument will have to be tested on the same study sample as the DIT in order to observe if it produces similar results. Once created, the instrument will be made

public so that other authors can use it in their research. With the collection of a large data base, the instrument will be easier to validate.

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HIGH FREQUENCY TRADING – A REVOLUTIONARY CONCEPT ON FINANCIAL MARKETS

Abstract:

High Frequency Trading has a revolutionary impact on financial markets, by introducing many innovative changes - from the new algorithmic systems (robots) and network connections to the new possible risks and new regulations. This paper explains the concept of High Frequency Trading (HFT), analyzes its origins and evolution, highlights the main drivers of its development and discusses its impact on the financial markets.

Key words: *financial markets, algorithmic systems, High Frequency Trading*

1. Introduction

The financial markets today are an extremely dynamic part of our modern economy. If the financial markets are functioning properly, the economy has the strength to perform also well and the transfer of the financial resources between market participants is done efficiently. The innovative structure of financial markets makes possible to permanently adapt to the economic environment. But the characteristics of financial markets were not like this from the very beginning.

We start from the hypothesis that the financial markets were the object of major changes over the time. We specifically assume that the new approach named High Frequency Trading (HFT) had an important impact over the way market participants are transferring their financial resources.

This paper explains, through a theoretical approach, the concept of High Frequency Trading in the financial markets context, analyzes the origins and evolution of HFT, highlights the main drivers of its development and discusses its impact on the financial markets. All these secondary objectives will be achieved in order to fulfill the scope of this paper, to show that High Frequency Trading had a revolutionary impact on financial markets introducing lots of innovative changes, from the new algorithmic systems (algorithmic robots) and network connections with an amazing speed, to the apparition of new possible risks and new regulations.

The contribution of this paper is to combine and systemize information from the literature written by highly respected theoreticians with facts from the economical reality, facts expressed in newspapers or articles written by highly experienced professionals.

The organization of this paper is as it follows. The second section presents a short history of trading. We define the concept of High Frequency Trading (HFT) and its characteristics in the third section. The fourth part treats the evolution of High Frequency Trading. The fifth part highlights the importance of advanced technologies for the development of HFT. The

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sixth part focuses on the contribution of the HFT in the financial markets context. The final section presents the conclusions of this research.

2. A short history of trading

Since the beginning of securities markets (the early 18th century), all activities were run in a manual fashion. At that time, requesting a quote on a financial security was a difficult, time consuming and expensive action: a client would contact his sales representative in person or, later, via telegraph (1850), via telephone (1975) and through the first available computers (after 1986). The sales representative would then contact the trading representative to request the prices of the securities of interest to the client. The trading representative obtained prices from brokers (physically present on trading floors) and/or exchanges and then this trading representative would report back. [1]. All this process was time consuming, expensive (with all the costs supported by the client) and errors incurred with a high probability (due to human communication).

As modern technology evolved, the National Association of Securities Dealers Automated Quotations (NASDAQ) became the world's first electronic stock market [6]. In 1976, New York Stock Exchange introduced the first electronic execution system, Designated Order Turnaround (DOT). In the next years, computer-based execution has become more and more available, but adopting systematic trading was delayed until the 1990s because of the high costs of computing and because of the low throughput of electronic orders on many exchanges [9]. Electronic Communications Networks (ECNs) were introduced in the 1990s, many financial institutions accepted them and a rapid increase in the proportion of systematic trading took place. In 1992, the Chicago Mercantile Exchange (CME) launched its first electronic platform, Globex, and in 2000 New York-based International Securities Exchange (ISE) launched the first fully electronic U.S. options exchange.

It is not exactly clear when, but researchers admit that a new approach, the investment discipline called High Frequency Trading (HFT) started to evolve in 2005.

3. The “High Frequency Trading” concept

One simple explanation for the concept of “high frequency trading” is the fact that the term itself refers to the fast entry and exit of trading positions [1].

A more complex definition of high frequency trading is given by Martin Wheatley, chief executive officer of the Securities and Futures Commission in Hong Kong and former deputy chief executive of the London Stock Exchange in an article published by The Financial Times [17]. According to Wheatley [17] High Frequency Trading represents “the execution of trading strategies based on computer software or algorithms to capture opportunities that may be small or exist for a very short period of time”. Wheatley [17] also mentioned three important characteristics of HFT: high volume of trades on a daily basis with low level of profits per trade; submitting numerous orders; extreme short stock holding period (positions are usually closed at the end of the day, so no significant open positions overnight).

The last characteristic just mentioned helps us to differentiate Algorithmic Trading (AT) from High Frequency Trading (HFT). Both make use of technology in the decision process, both use computer algorithms to analyze quote data, to take decisions and to optimize trade execution, but positions can be opened for days, weeks, months in AT, whereas positions in HFT are closed at the end of the day. High Frequency Systems are algorithmic, but not many algorithms are high frequency.

It is more beneficial to close the position at the end of the day because it brings savings (the costs to have an open position over the night are eliminated) and it reduces the

exposure to a big risk in the mornings due to the information accumulated over the nights (volatility is usually high in the mornings).

Another characteristic of HFT is that it manages market impact and minimizes the risk by dividing large trades into smaller trades.

Compared to other older investment styles, like the traditional approach Low Frequency Trading, High Frequency Trading is characterized by a very high number of orders with a smaller average return per transaction. This makes the capital turnover to be much faster and bigger. HFT represents a method to diversify investors' portfolios and focuses only on high liquid instruments. HFT reduces the personnel, the associated costs with personnel and reduces the risk of human errors.

In a low frequency approach traders can keep their open positions for a longer period (weeks, months) waiting for the prices to change significantly (at least few %). One single transaction brings considerable returns in this case. Investors adopting a high frequency trading approach will trade more frequently, the rapid submission, cancellations, deletions of orders is imperative so holding periods are very short. The return per transaction is very small (the change in prices is low and the gains are measured in fractions of a penny, for example) but total returns can be considerable since hundred or thousand transactions are executed in one single day.

Under a HFT approach, human beings are not capable to take decisions. Human brain is not capable to function at the speed of HFT, "close to the speed of light" [12]. Also, human emotions, hesitation or distraction could reduce the system's profitability. That is why High Frequency Trading is done by computers, also referred to as silicon traders [14]. The algorithm makes important decisions related to timing, price, and in the majority of cases the orders are executed by passing any human intervention. Computers look for signals like miniscule interest rates movements, economic fluctuations, news, and then algorithms take decisions accordingly. However, human supervision of the systems is imperative in order to ensure that they function properly, without being affected by any virus or by unexpected events. If the boundaries of the system are breached, the human trader is authorized to shut down the system until the situation is fixed. That is the only intervention that a trader can make. All other activities are performed by computers, and human traders are meant only to monitor the trading performance and to decide if the system is performing within pre-specified boundaries, or not.

One good example of what can happen if the activity is not properly supervised is represented by the Knight Capital Group Inc. case. According to Bloomberg.com, this market maker lost \$440 billion on the 1st of August 2012 due to a computer malfunction. A huge number of orders were transmitted to NYSE without having a logic strategy behind, nobody realized what was happening, and in 45 minutes Knight Capital gone bankrupt.

Even if High Frequency Trading approach might seem difficult to understand and to practice, an immense profitability can be achieved. This can be proved with the case of Jim Simons, an investor manager from Renaissance Technologies Corp. According to The Rich List for 2009, published by Alpha magazine [2], Jim Simons reported that he earned \$2.5 billion in 2008 alone. According to Haldane [10] the secret is to be informed and to act "on market prices sooner than competitors. Today it pays to be faster than the average bear, not smarter. To be uninformed is to be slow." And speed is highly related to innovative technology. In order to stay ahead of the competition, traders must make use of the most competitive algorithms.

4. Evolution of High Frequency Trading

According to Financial Times, High Frequency Trading had an ascendant trend which started in 2005. In only few years, it has captured a large share of equity trading volume in the U.S. and a large share of equity value in Europe (Fig. 1 and Fig. 2). Starting with a 21% volume of the entire equity turnover in the U.S., HFT has reached its maximum level in 2009 (61%). Despite the economic recession that started in 2008, HFT added value and it managed to keep developing and generating big profits while the Over-the-counter (OTC) market almost collapsed.

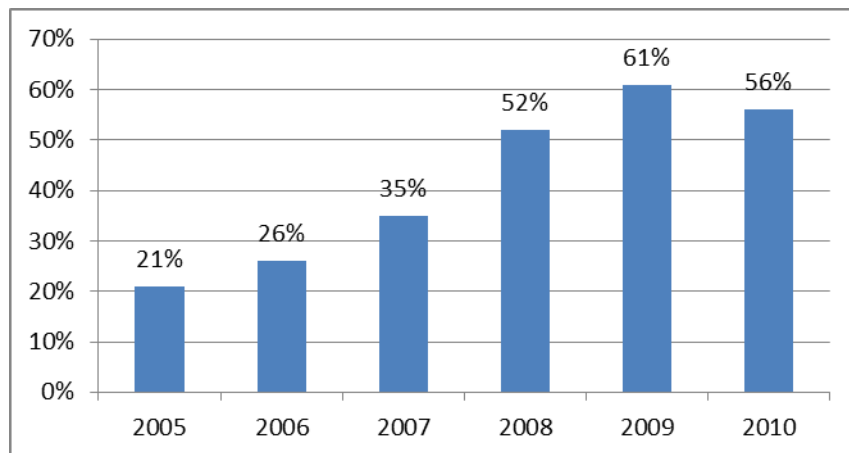


Figure 1: High Frequency Trading market share in the U.S. (as a % of volumes traded)

Source: financialtimes.com

The growth was delayed in Europe, but the compounded growth rate has been over a 106% every year, exceeding the one from U.S.

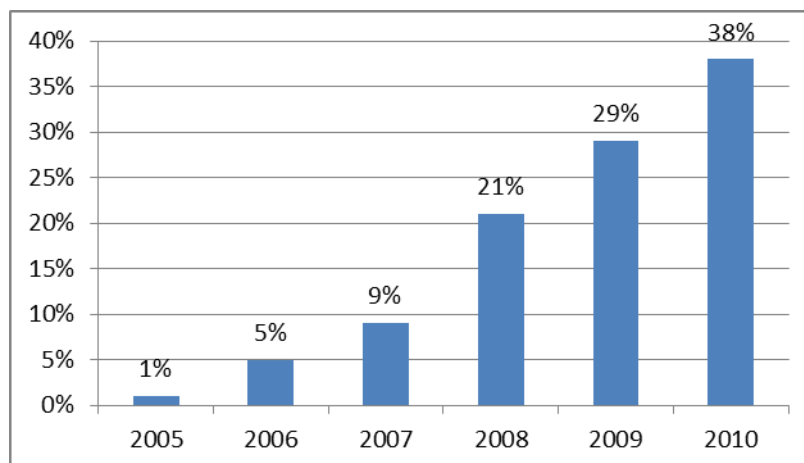


Figure 2: High Frequency Trading market share in Europe (as a % of value traded)

Source: financialtimes.com

The Fig. 1 and Fig 2 indicate that HFT is an important component of regulated financial markets: in the U.S. High Frequency Trading market represented more than 50% of the volumes traded, and in Europe 38% of the total value was traded on HFT systems.

An unexpected event, with a huge market impact, happened on the 6th of May 2010: The Flash Crash. U.S. Securities & Exchange Commission (SEC) and U.S. Commodity Futures Trading Commission (CFTC) published a report with “Findings Regarding the Market Event of May 6, 2010” [16]. The trigger was represented by a sell order of a \$4.1

billion block of E-Mini Standard & Poor's 500 futures contracts on the Chicago Mercantile Exchange. The order was placed by a trader holding long-term positions, not by an HFT firm. The market was already facing some fears due to the Greek debt crisis, and this large sale order only augmented the volatility of the prices on the market. The sale order was placed at 2:32PM. In less than 20 minutes the Dow Jones Industrial Average fell by 900 points and in the following 20 minutes, rebounded almost entirely (fig. 3).



Figure 3 – the Dow Jones Industrial Average, May 6th 2010
Source: cnmmoney.com

After this event, most of the reactions expressed the intention to ban the High Frequency Trading. But this did not happen. The activity (measured in % of volumes traded – Fig. 1) was only reduced because traders knew that HFT brings too big profits to be stopped.

5. The importance of advanced technologies for High Frequency Trading evolution

The growth in HFT has gone hand in hand with a huge development of informational technologies and transaction speed.

The advance of technology has been revolutionary for the way the information is transmitted, stored and processed. Large volumes of intra-day data can be stored, processed and used in real time thanks to new processors that speed up computation and digital communication. Sophisticated new software has been developed in order to speed up and to improve the decision process.

High Frequency Trading firms invest billions per year to buy competitive algorithmic systems called algorithmic robots. These supercomputers allow silicon traders to place orders and to execute them in a matter of milliseconds.

Besides the algorithmic robots, HFT firms invest large amounts of money to improve their communication networks, implicitly the execution time, called latency. Every millisecond (or less than a millisecond) could make a big difference in the level of the profitability of a trader.

The latency or the execution time has decreased significantly from an average of 15 seconds in 2001 to few seconds in 2009 (fig. 4).

After 2010, traders are not interested anymore in seconds, but in milliseconds. According to the press release, “Perseus First to Offer trans-Atlantic Wireless” [5], Perseus Telecom Company launched in March 2013, the fastest Trans-Atlantic network connection, QuanTA™. The direct routes are: New York City, New Jersey, London and Frankfurt. The performance latency is only 67.68 milliseconds with the possibility to be reduced to 67.39

milliseconds in July 2014. What is very important to highlight is that traders are investing billions per year to improve the latency by at least 1 millisecond. Information is the most valuable asset in an HFT approach, and being informed sooner than everyone else means being more profitable than anyone else.

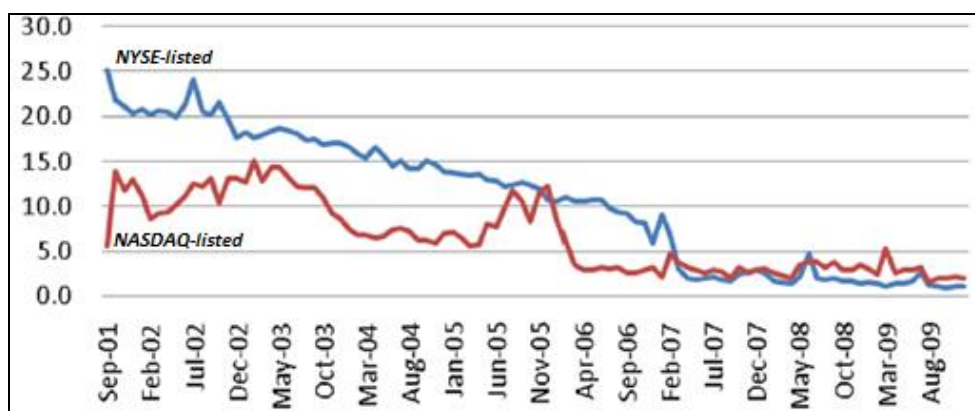


Figure 4 - The speed of execution Market orders

Source: Angel, Harris and Spatt [3]

With all these developments in informational technologies (algorithmic robots and ultra fast network connections) it is literally possible to trade at the speed of light almost. Nowadays, it is possible that every person, no matter the location over the globe, can have information in less than one second and can make profitable trades. This characteristic represents another revolutionary aspect of HFT.

Another way to increase the speed of trades is to purchase real estate as close to securities exchanges as possible. This strategy is called “co-location”. In this way, servers that execute trading strategies will have faster access to the information from exchanges. Few thousand dollars a month are spent for only a couple of square feet of space near the exchanges. Office space in the proximate of the exchanges costs an immense amount, but firms are willing to pay for it because it will help them gaining information more quickly, trading faster and implementing strategies that will bring them large profits compared to their competitors.

6. The impact of High Frequency Trading on Financial Markets

High Frequency Trading has numerous advantages that impact positively the markets, but after some events, including the May 6th Flash Crash in 2010, critics try to highlight the drawbacks of HFT and regulators all over the world try to minimize the potential negative impact that HFT could have on the market structure.

The positive impact of HFT contributes to the quality of financial markets in a few ways stated below. HFT increases liquidity by posting continuous quotes on the market. Volumes increase in this way and traders can “easily move large blocks of shares without running too much risk of prices moving against them.” [15]. HFT reduces spreads by updating the prices of securities more frequently and more accurately. In this way, the risk of outdated quotes or incorrect pricing is almost eliminated. HFT improves market efficiency since prices reflect the information existing on the market more quickly and more accurately. HFT reduces the costs per transaction for large institutional investors and for retail investors as well. HFT reduces human efforts and reduces errors caused by the human factor. HFT encourages the innovation and the performance and supports the development of new algorithm systems, more powerful algorithmic robots, more advanced software and faster network connections.

Small investors experience some of the drawbacks of HFT. They do not have the resources to “co-locate” their facilities or to massively invest in advanced technologies and this leads them to be less informed, not so fast in trading, and their investments are less profitable. Another drawback is the rapid moral depreciation of fixed assets such as algorithmic robots. Large amounts of money are spent to develop and buy high advanced technologies, but in a short time they become obsolete. Despite of large investments, traders are usually in a “technology war”, trying to have a better performance, trying to be faster and smarter than all the others.

Critics of HFT believe that HFT can give rise to price fluctuations and short term volatility. This could be caused by the rapid intra-day trading with open position for only few minutes, or sometimes even seconds. According to a Press Workshop of Eurex Exchange [8], academics have been conducted studies and 6 of them stated that HFT dampens volatility, 7 of them found that HFT has no effect on volatility and only 2 of them accused HFT of causing volatility.

Regulators all over the world could have an adverse impact for HFT. Their main strategies could be: imposing a transaction tax for each trade made and/or ban certain HFT and algorithmic trading strategies. Some of them are already implemented. These regulations could reduce or even stop the profit per trade in the disadvantage of traders. However, as a result of public pressure, the risk of over regulation for HFT is high and the regulatory initiatives are multiple: Markets in Financial Instruments Directive (MIFID), European Securities and Markets Authority (ESMA) Systems & Control, and National Rules. All these initiatives have the main purpose to consolidate the market structure and to prevent market events that could generate a financial crisis.

7. Conclusions

Since the competition, innovation and regulation are increasing, High Frequency Trading is just a natural evolution of the financial markets. Participants adapted to new market structures and conditions, so the phenomenon is not a completely new one.

Some unfortunate events, including the Flash Crash induced the idea that HFT can generate big risks. New regulations were set and the volume of transactions started to reduce. However, High Frequency Trading still has a huge potential to generate profits to traders and still has a huge potential for growth since the overall market structure was positively impacted by the way HFT increases liquidity, reduces spreads, lowers transaction costs and reduces volatility.

The big profitability achieved in the past will determine traders to continue using High Frequency Trading strategies. Also, the important investments in advanced technologies (hardware and software) cannot be wasted. That is why exchanges, regulators and traders need to be more prudent in their future activity, but they should also avoid over-regulation.

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EXPLORING THE MEDIATING ROLE OF PERCEIVED QUALITY BETWEEN ONLINE FLOW AND CUSTOMER'S ONLINE PURCHASE INTENTION ON A RESTAURANT E-COMMERCE WEBSITE

Abstract

The aim of this paper is to explore the relationship between online flow, also called optimal experience, perceived quality of a restaurant e-commerce website, and customer's purchase intention. First, we reviewed flow, perceived quality, and purchase intention studies in the literature, and proposed a conceptual model of the hypothesized relationships between our variables. Afterwards, we identified in the literature measuring methods and scales for online flow, perceived quality and customer's purchase intention, and ran a reliability analysis. In order to study the relationship between the variables from our conceptual model, we used a quasi-experimental design. The first phase of our study consisted in selecting a restaurant e-commerce website: www.pizzeriaalila.ro, and establishing a task scenario. Second phase involved data collection. We sent 3200 emails containing an invitation to participate to study, through an email marketing platform. The sample used was nonprobabilistic. The opening rate of emails containing the invitation was 28.5%, with 8% click rate on the link to participate to our study. At the end of this second phase, July 15, 2014, we received 210 answers, thereof 132 were valid.

Multiple regression analyses were conducted to assess each component of the proposed mediation model. Results of the mediation analysis confirmed the mediating role of the perceived quality of an e-commerce website in the relation between online flow and online purchase intention. Finally, we discuss conclusions and limitations of our study.

Key words: online flow, perceived quality, e-commerce website, purchase intention, online customer, mediation

1. Introduction

In the last years, the Internet is rapidly growing and provides unique opportunities for marketers to sell their products and services. According to a recent research, the Eurostat report [35], the degree of Internet access varies among EU Member States, ranging from more than 90% of households in Denmark, the Netherlands, Luxembourg and Sweden, to less than 55% in Bulgaria, Romania and Greece.

In another report published in 2013 by Ecommerce Europe Association [34], data shows that the e-commerce is developing extremely well in Europe. In 2010 Europe overtook the USA, the biggest market in the world until then, and in 2012 European B2C e-commerce, including online retail goods and services such as online travel bookings, vents and other tickets, or downloads grew by 19.0% to reach € 311.6 bn. For example, in 2012 the e-sales in Romania were at 800 million euros [34].

In this context, scholars and practitioners were interested to understand the online customer's behavior, in order to propose successful business models and effective marketing strategies in the online environment.

E-commerce websites are important tools for marketers that can be used to facilitate online trading between a company and its customers. Unlike traditional shopping channels, firms that use online shopping as a means to generate revenue, can sell both “real items” and

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“virtual items” [6] by using e-commerce websites. “Real items” refer to goods or services that can be used offline - no matter whether these goods or services are bought online or offline [6], such as computers, food, and smartphones. “Virtual items” are goods or a service whose purchase and use are constrained to a particular online space, as opposed to the concept of “real items”, and includes virtual gifts, avatars, or music. So, for marketers is extremely important to create high quality websites that can facilitate the online trading of “real and virtual items”.

Previous studies have proposed that website quality can directly lead to purchase intention [4]. Therefore, further understanding of the relationship between online flow, e-commerce website quality that sells “real items”, and purchase intention is the main concern of this study.

In our view, selling “real items” can be facilitated by an e-commerce website with a high perceived quality, that can induce flow experience to customers. According to flow theory [11], flow is an extremely enjoyable experience where an individual engages in an activity with involvement, concentration and enjoyment, and experiences an intrinsic interest as well as a feeling of time distortion during his/her engagement [7]. The concept of flow has been used in marketing since 1996 for a better understanding of users’ experiences and behavior in virtual worlds [15, 22].

The aim of this study is to explore the relationship between online flow, perceived quality of a restaurant e-commerce website, and customer’s purchase intention.

Research objectives of the study are: to measure customers’ flow state that occurs during their surfing on a restaurant e-commerce website; to investigate the relationship between online flow state and perceived quality of an e-commerce website; to study the relationship between perceived quality of a restaurant e-commerce website, and customer’s purchase intention; to examine the relationship between online flow state and customer’s purchase intention.

The paper is structured as follows. First, we review flow, perceived quality, and purchase intention studies in the literature; based on this revision, hypotheses are then formulated. Thereafter, we summarize the research methodology and present the study results. Ultimately, limitations are discussed.

1. Conceptual framework and literature review

1.1. Online flow and perceived quality of a restaurant e-commerce website

According to flow theory, “optimal experience or flow is the holistic sensation that people feel when they act with total involvement” [11]. Individuals may experience flow every day, in different activities, in offline and online environment (e.g. playing tennis, surfing on the Internet, online purchasing).

From Csikszentmihalyi’s [11] point of view, the individual needs to have: a clear goal, balance between perceived skills and challenges, and an immediate feedback, in order to experience a flow state. Flow symptoms are: concentration, mergence of activity and awareness, sense of control, time distortion, loss of self-consciousness, and autotelic experience [10]. Marketing and information system researchers used the flow concept in computer mediated communications (CMC), and later in human-computer interaction studies [30, 12]. For a better understanding of the e-commerce phenomenon, scholars used flow theory to explore customer’s experience and their online behavior.

Hoffman and Novak [15] defined online flow as “the state occurring during network navigation which is: characterized by a seamless sequence of responses facilitated by machine interactivity, intrinsically enjoyable, accompanied by a loss of self-consciousness, and self-reinforcing”. They argued that online flow can have positive marketing outcomes, such as:

increased perceived behavior control, positive subjective experience, increased learning and an increased exploratory behavior [15]. For example, online flow is positively related to an increased learning [14]; influences attitudes towards online purchasing [17], brand attitudes [21, 26] and attitudes towards a website [19]. In other studies, flow has been found to influence behavioral intentions: online purchase intentions and revisit intentions [19], intention to use the web [1, 26], and intention to play an online game [16]. Another outcome of flow experience was an increased exploratory behavior [22; 17] and perceived behavioral control [15].

In our paper, we are interested in studying online flow state in goal-directed activities (purchasing food from a restaurant e-commerce website). We briefly remind that online activities can be divided in two broad categories: experiential and goal-directed activities [23]. Online customers tend to seek utilitarian values rather than hedonic values in goal-directed activities [6], given the context of selling "real items".

We anticipate that the customers that surf on a restaurant e-commerce website and experience online flow, may evaluate the website as more qualitative. Therefore, the following hypothesis is proposed:

Hypothesis 1. There is a relationship between customer's online flow experience and perceived quality of a restaurant e-commerce website.

1.2. Perceived quality of restaurant e-commerce websites and online purchase intention

Perceived quality is considered to be an important construct for marketers because it is an asset in firms' competition, and a driver for business success in virtual markets.

Aladwani and Palvia [1] defined perceived quality of a website as: "users' evaluation of a website's features meeting users' needs and reflecting overall excellence of the website".

Internet shopping websites, or e-commerce websites, are defined by Yoo & Donthu [32] as: "web retail sites in which customers can browse, evaluate, order, and purchase a product or a service." So, according to Yoo & Donthu [32], e-commerce websites are "online versions of physical retail stores where all transactions and relevant activities take place in online cyber space." E-commerce websites are a substitute for conventional retailing channels, mail or phone-order stores [32]. High quality e-commerce websites are able to attract more customers than competing low quality e-commerce websites, because quality builds sustainable competitive assets [32]. Quality studies of traditional retail stores confirm that customers use store quality as a vital extrinsic cue about quality of the store's products [32]. High quality e-commerce websites attract more attention, customers, and positive word-of-mouth communication for the site [32].

Many studies of e-commerce website quality have their origins in the service quality literature. There is a plethora of e-commerce quality literature identifying a large number of proposed dimensions. According to their focus, studies for evaluating perceived quality of a website have their origins in online retailing services and website design [9]. For example, in a study for online retailing services, Zeithaml, Parasuraman, and Malhotra [33] proposed 5 dimensions of the perceived quality of a website: information availability and content, ease of use or usability, privacy/security, graphic style, and reliability.

In another study that focused on website design, Loiacono, Watson, and Goodhue [18] developed WebQualTM scale to assess website quality, with 12 dimensions: informational fit-to-task, interactivity, trust, response time, ease of understanding, intuitive operations, visual appeal, innovativeness, emotional appeal, consistent image, online completeness, and better than alternative channels.

eQual scale proposed by Barnes and Vidgen [5] contained 4 factors: content quality (it encompasses accuracy, believability, timeliness, relevance, level of detail, and appropriateness of format. It also includes the degree to which the design is appropriate for

the type of site, the degree to which the site conveys organisational competency, and confidence that goods and services will be delivered as requested), usability (it includes learnability, site reputation, the ability to complete useful transactions, clear and understandable interaction, navigability, and a sense of control), transaction safety and efficiency (feeling safe when completing transactions on the website, security of personal information, believing that transactions on the site will be efficient), interaction quality: it includes the range of offered transactions, a sense of enjoyability or entertainment, the degree to which the site creates a positive experience, the degree to which the site makes it possible to communicate with the organisation, and whether, overall, the user considered the response time acceptable.

We conclude that the scales proposed for measuring perceived quality of e-commerce websites differ in terms of origins and number of suggested dimensions.

In our study, for measuring perceived quality of restaurant e-commerce website, we used 5 dimensions: (1) design quality, (2) content quality, (3) perceived ease of use, (4) novelty, and (5) perceived usefulness.

Analyzing the literature, we notice a lack of studies in flow literature that focus on evaluating the relationship between the perceived quality of a restaurant e-commerce website and customer's purchase intention. We anticipate that customers who evaluate an e-commerce website as having a high quality, will have the intention to perform a purchasing over the assigned e-commerce website. Therefore, we propose the following hypothesis:

Hypothesis 2. There is a relationship between the perceived quality of a restaurant e-commerce website and customer's purchase intention.

1.3. Online purchase intention and online flow

Online purchase intention refers to the strength of a consumer's intention to perform a specified purchasing behavior over the Internet [24]. Researchers argued that behavioral intention reflects the individual's likelihood of engaging in the behavior of interest. It measures how hard an individual is willing to take a specific action [2].

Previous flow studies showed that purchase intention is an outcome of online optimal experience, or online flow [17, 19, 28, 29, 14, 6]. Therefore, consumers who experience online flow while they surf on a restaurant e-commerce website, would be likely to generate transaction intentions [31]. Based on our argumentation, the hypothesis is made as it follows:

Hypothesis 3. There is a relationship between online flow state and customer's purchase intention towards a restaurant e-commerce website.

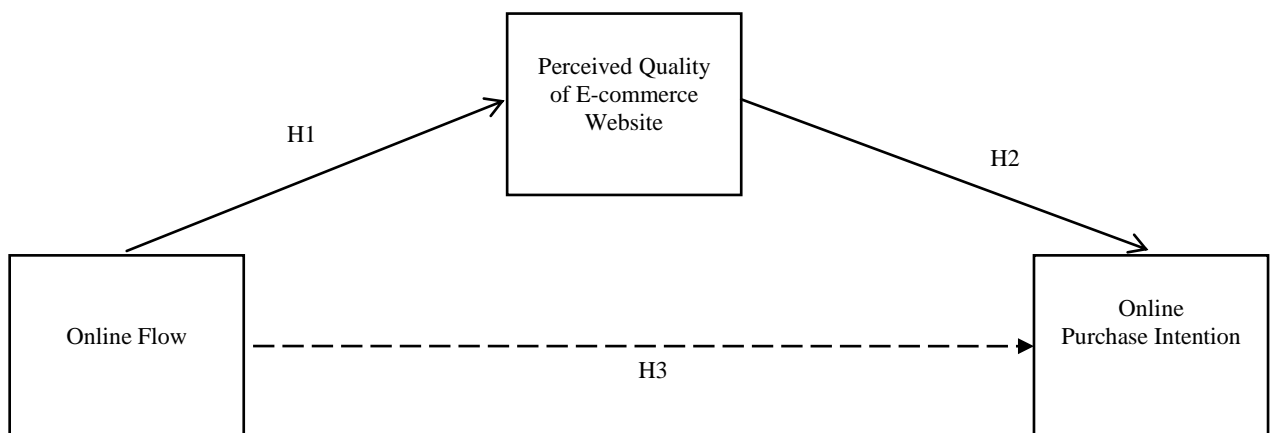


Fig. 1. Conceptual model of the relationship between online flow, perceived quality of a restaurant e-commerce website, and online purchase intention.

As we can see, **fig. 1** depicts the relationship suggested in the three hypotheses previously discussed.

2. Research methodology

1.4. Research design

In order to study the relationship between the variables from our conceptual model, we used a quasi-experimental design. The first phase of our study consisted in selecting a restaurant e-commerce website: www.pizzeriaalila.ro, and establishing a task scenario. The second phase involved data collection. The study population was represented by potential customers of a restaurant e-commerce website. In order to collect data, we used a convenience sampling.

We sent 3200 emails containing an invitation to participate to study, through an email marketing platform. The sample used was nonprobabilistic. The opening rate of emails containing the invitation was 28.5%, with 8% click rate on the link to participate to our study. At the end of this second phase, July 15, 2014, we received 210 answers, thereof 132 were valid. To facilitate online flow state occurrence, we asked the participants to simulate buying products from the assigned e-commerce website (goal-oriented behavior), by completing the entire purchasing process. Afterwards, we used a self-administered survey questionnaire to collect the information from participants.

1.5. Instrumentation

The measurement approaches and scales were adapted from the existing literature, and were used to operationalize the research constructs in this study.

The questionnaire we built had three sections: the first section contained the task, a narrative description of flow experience, and a simple direct report item asking the respondents to rate if they had an optimal experience during their surfing session (we used a seven-point Likert-type scale ranging from strongly disagree – 1 to strongly agree - 7). This unidimensional measurement approach of online flow is consistent with other previous flow studies [8, 19, 17, 27], and according to Hoffman and Novak [14], it has an important advantage: ease of administration. Subjects presented with a narrative description of online flow are assumed to be able to understand the flow concept intuitively and holistically [14]. Also, in the first section of the questionnaire, we used a filter question: respondents were asked to mention the products they simulated purchasing from the assigned e-commerce website, in order to determine if they qualified to answer to the next questions, regarding the perceived quality of the e-commerce website, and to evaluate their purchase intention.

The second section of the questionnaire consisted in closed-ended questions, and we used 36 items to measure the constructs of perceived quality of a restaurant e-commerce website, and online purchase intention. Perceived quality of a restaurant e-commerce website was assessed using a seven-point Likert-type scale ranging from strongly disagree – 1 to strongly agree – 7, containing 33 items.

Cronbach's alpha (α) coefficient for perceived quality of a restaurant e-commerce website scale was 0.963 indicating an adequate reliability. For online purchase intention variable, we adapted the scale proposed by Cha (Cronbach's $\alpha = .96$) [6]. In our study, Cronbach's alpha (α) coefficient for online purchase intention scale was .892 indicating an adequate reliability.

The third section contained items for collecting the socio-demographic data from the respondents.

3. Results and main findings

First of all, our study respondents were 29% male and 71% female. 86% of the respondents had their age between 19 – 35 years; 40.9% had a bachelor degree, 43.9 a master degree, and 4.5 a PhD degree.

Second, after completing our analysis, we concluded that 54.55% of the respondents did not experience a flow state during their surfing on the assigned e-commerce website, and 45.45% experienced a flow state while they simulated buying products (21.21% of the respondents experienced a flow state with a low intensity, 15.5% experienced a flow state medium in intensity, and 9.09% experienced a high intensity of flow state). This result is consistent with other flow studies in which the respondents experienced a flow state during their web activities.

Third, we consider important in this section a brief discussion on the mediation analysis. Scholars conduct mediation analysis in order to indirectly assess the effect of a proposed cause on some outcome through a proposed mediator [24]. Preacher and Hayes [24] argue that the utility of mediation analysis stems from its ability to go beyond the merely descriptive to a more functional understanding of the relationships among variables. A necessary component of mediation is a statistically and practically significant indirect effect.

We briefly remind that a variable may be called a *mediator* “to the extent that it accounts for the relation between the predictor and the criterion” [24]. The simple relationship between X and Y is often referred to as the *total effect* of X on Y ; we denote the total effect c to distinguish it from c' , the *direct effect* of X on Y after controlling for M . The formal heuristic analysis often used to detect simple mediation effects is straightforward and follows directly from the definition of a mediator [24]. Variable M is considered a mediator if: X significantly predicts Y ; X significantly predicts M ; and M significantly predicts Y controlling for X . When the effect of X on Y decreases to zero with the inclusion of M , perfect mediation is said to have occurred, and this situation is called complete mediation [24]. When the effect of X on Y decreases by a nontrivial amount, but not to zero, partial mediation is said to have occurred [24].

There are more statistically rigorous methods by which mediation hypotheses may be assessed (e.g. Sobel test, Baron and Kenny criteria, and bootstrapping method with bias-corrected confidence estimates).

For our data, multiple regression analyses were conducted to assess each component of the proposed mediation model.

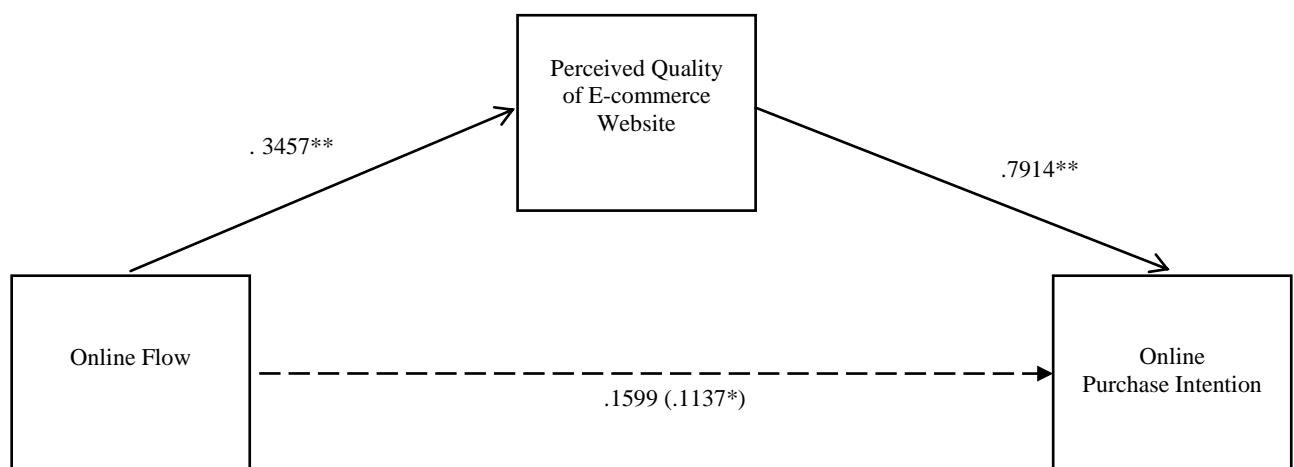


Fig. 2. Indirect effect of Online Flow on Online Purchase Intention through Perceived Quality of an E-commerce Website

First, it was found that online flow was positively associated with online purchase intention ($B = .1137$, $t(130) = 2.0195$, $p = .05$) – (c path).

It was also found that online flow was positively associated with perceived quality of a restaurant e-commerce website ($B = .3457$, $t(130) = 8.3468$, $p = .01$) – (a path).

Results indicated that the mediator, perceived quality of a restaurant e-commerce website, was positively associated with online purchase intention ($B = .7914$, $t(130) = 2.8085$, $p = .01$) – (b path).

Because both the a-path and b-path were significant, mediation analyses were tested using the bootstrapping method with bias-corrected confidence estimates [24]. In the present study, the 95% confidence interval of the indirect effects was obtained with 5000 bootstrap resamples [24].

Results of the mediation analysis confirmed the partial mediating role of perceived quality of a restaurant e-commerce website in the relation between online flow and online purchase intention ($B = .2736$; $CI = .1962$ to $.3635$). Fig. 2 displays the results.

4. CONCLUSION

First of all, our study proves that customers can experience online flow while they surf on a restaurant e-commerce website. This is in accordance with previous studies from the literature showing that during web navigation, customers can experience an optimal experience, or online flow.

Second, the findings of this study provide support for the model presented in **fig. 1** and for the hypotheses regarding the relationship among the model variables.

The most important finding of our study was the confirmation of the relation between users' online flow state, perceived quality of a restaurant e-commerce website, and purchase intention. Also, our mediation analysis shows that perceived quality of an e-commerce website is a mediator between online flow and online purchase intention.

This main finding is important for flow theory and for marketing and IS practitioners due to its implications. First, the confirmation of online flow state influence on perceived quality of a restaurant e-commerce website could be useful for a functional understanding of the relationships among these three variables. This finding is particularly important for managers of a restaurant e-commerce website, as they decide how to allocate resources for creating effective tools to sell their products. The importance of superior service quality is critical for the success of a restaurant e-commerce website. This study suggests that a restaurant that uses e-commerce website should consider focusing their efforts to provide their customers with an optimal experience and a high qualitative e-commerce website. Considering the fact that a restaurant has both an online and offline presence, marketers could use the flow experience that occurs during web navigation to extend the customer's positive feelings to the offline store.

The findings of this study show the importance of online flow marketing outcomes. Our study supports the idea that flow experience is positively associated with customer's online purchase intention, and perceived quality of a restaurant e-commerce website.

We conclude by considering that this study results can be useful for marketing and information systems practitioners in order to understand online customer behavior and to develop effective marketing strategies in the online environment.

5. Limitations and future research

First, we consider that a high reliability of online flow measurement could be achieved by using a direct and an indirect approach. Second, the study design and the nonprobabilistic sample we used require caution in generalizing results and draw inferences for a larger population. We consider that our study is an exploratory one, and should be replicated on a larger sample. Finally, we emphasize the need for more studies in assessing the mediating role of the perceived quality of a restaurant e-commerce website between online flow and customer's purchase intention.

Acknowledgement

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Present-day topics

HISTORICAL RETROSPECTION AND STATISTICAL INTROSPECTION INTO ROMANIA'S CONVERGENCE TO THE EUROPEAN (MONETARY) UNION AND THE SEASONAL MOUNTAIN TOURISM'S IMPACT

Abstract

This article provides a retrospective and a summary of the convergence of Romanian economy to the model of the European economy, from the transition to a stable market economy, through the pre-accession period, and also the post-accession to the European Union since 1 January 2007, with the declared intention of eventually joining the euro space or area. The retrospective is accompanied by an instrumental-statistical or reasoned introspection based on key indicators. Tourism, and especially its seasonality, is analyzed from the angle of their present and future impact on the national economy. The conclusions highlight the need for programs and policies meant to promote tourism development and diminish the seasonal character of tourist activities, with a higher contribution of mountain and rural tourism.

Key words: convergence, convergence criteria and indicators, seasonality, statistical instrument, the euro area.

1.Introduction, or from the entropic economic model to convergence

Teleonomics is the science of research into the living organisms, due to their specific features, which include causality, finality, and especially their development towards *higher functionally differentiated structures* (i.e. the famous teleonomic capacity). Teleonomics includes both convergence and divergence, while being a much longer term in relation to either of them. Divergence is an antonym of convergence, but in conjunction with convergence, it dominates the paradigm of variation in biology, culminating in the law of irreversibility in evolution, which, in the simplest form, would translate as *regressive evolution is irreversible*, and thus it identifies with the signal of *entropy*, ever since Rudolf Clausius and Nicolae Georgescu-Roegen [1971], as a measure of the irreversibility of spontaneous processes in isolated systems.

The model of entropy provides an incipient answer for a number of essential questions of economic theory, inducing hopes that economics can become a science with a rigorous approach within a broader framework of globalization, in a necessary yet not sufficient manner, virtually accepting the principle of entropy, postulated by the second law of thermodynamics. Nicolae Georgescu-Roegen, the founder of the new *bio-economic* theory, and implicitly the and entropic economic model, identified economic decline as an imminent prospect (very much as other researchers comment on sustainable decrease as counting among the few solutions that take into account the law of entropy), but entirely based his theory on the mechanisms of the living world, on the similarity between the economy and every living organism, where the individuals become cells, companies and states become tissues or vital

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organs, the public services become organic functions, etc., so a living body existing precisely on account of some (money, energy, etc.) fluids and nutrients of the food and non-food type.

The entropic model led giving up the classical model (permanently under political impact, so in a qualitative leap declared theoretically, and also rational, i.e. imposed), through the apparently idealistic and irrational attempt of globalization (actually, a scientifically real alternative), hoping to speed up the access of the Earth's economy to resources of low entropy, or qualitative procedures such as limited increases or decreases in the economic environment, seen as a system, and thus a reduction of the rate of the process of world economy entropy. The extent to which the entropic economic model is correctly specified and analyzed allow one to identify a set of solutions of intervention in the system, in order to try to change the rate of unequivocally entropic flowing, which is unfortunately not acceptable by any standard, though declaredly nonspecific to the living world, yet accurate and demonstrated as an end. The solutions are somewhat similar to those concerning the ways to put to use photosynthesis in converting solar energy in a negentropic manner (in a direction going counter that of evolution, from high to low entropy), and are aimed at, with an ever growing interest, in the world economy in order to get a cessation, or at least a relative reduction of the complete degradation of the planet's environment.

The entropic economic model draws economics close to biophysics, obviously through biology, and then via physics (i.e. thermodynamics), noting that in the new economy a theoretical code of phenomenological ordering cannot be provided without quality and entropy evolution. So the originality of the thinking based on the entropic model can arguably consist precisely in the presence of this new variable, i.e. the size of that disorder, called entropy, and economic theory should identify solutions to predict the temporal (partial) stages and their order in an entropic economic universe. The economic system being an open system, in which permanent shifts and exchanges of matter and energy with the outside occur, it can make its living entities and structures be in a perpetual state of instability (matter and energy waste being high, it can be defined as a highly dissipative system). The state of economic equilibrium cannot be modelled statistically, but only dynamically, and the economic phenomenon should be simplified as a continuous oscillation around an equilibrium point, which involves including in the equations the impact of self-regulation processes (based on feedback connections, and even anticipatory anti-entropic or negentropy connections, through consumption of low entropy from the environment, in order to maintain the initial entropy of the economic phenomenon, which is itself relatively low). Accepting the entropic model generates an additional crisis of classical economic theory (bivalent by its theoretical and forecast emphasis, the consistency and verisimilarity of classical economics being directly dependent on the quality of the forecast). The entropic tries to also subsume eco-economics, or ecological economics, a derived field of bio-economics, a multidisciplinary science proposed by Lester Brown. Eco-economics is redefining the current economic theory and practice through a long-term type of development, without affecting its own support system (the environment), or providing essential own models having the same quality as predictive originality. Obviously, the process does not stop here, the entropic model continue integrating, into its own fabric, the sciences of complexity, the science of systems, the applied holistic theory, etc.

To facilitate its broader application, to begin with at the level of the European Union, and then globally, the entropic model should be applied in an expanding system (in a context of accession and continuous integration), with a convergent evolution of its subsystems (national economies, and especially regions of development).

To do that, a common evolutionary cycle and a complex convergence would create the truly scientific prerequisites of integrated EU economic development, a faster inner expansion of the European Monetary Union within the context of a complex paradigm such as economic

convergence. But first it is necessary to clarify, in terms of terminology, convergence and the inflectional picture of this key contemporary economic concept. This paper advocates a hierarchy in which tourism should be positioned as a priority domain, alongside of agriculture, in relation to many of the other activities providing and generating services, in the long process of the real convergence of Romanian economy towards the EU mean value of sustainable economical and social development.

2. The multiparadigm, or the complex paradigm of economic convergence

Economic convergence represents a complex paradigm, or more correctly a multiparadigm, and is conceptualized circumstantially, as defined by a state of similarity, apparently structurally complete, but also partial from the point of view of the limited similarity of a small number of level parameters, which an economy, seen as a complex open system, must reach within a certain time horizon. Convergence is also definable as a dynamic and systemic integrative phenomenon, which presupposes pooling to achieve economic and social objectives that are regularly assessed and updated, based on historical requirements and the global evolution, and involves, in a systemic manner, other phenomena too, or at least some aspects of those, generally of a biological nature and apparently omitted, or less dealt with, in today's scientific knowledge of human society developments, such as *emergence*⁵ and *teleonomics*.

Extended economic convergence has in practice as many as four dimensions [Iancu, 2006]: a) *nominal* or strictly monetary, targeting economic stability and the transition to the single European currency; b) *actual* or *real*, intended to diminish disparities (especially felt by income and productivity); c) *institutional*, i.e. ensuring compatibility of institutions; d) *structural* or complete. Theoretically, another classification of convergence coexists, of an instrumental and parametric type: β (conditional on the initial state), σ (similarity of GDP per capita), γ (business cycle synchronization), δ (similarity of convergence factors), α (similarity of the structure of the economy), etc., which is commonly used in structuring the phenomenon and its distinct way of modelling. Basically, convergence postulates, in the neoclassical theory of economic growth, that all economies that are characterized by the formal similarity of their basic parameters (of the production function) will achieve the same level of development, regardless of their initial position.

Based on these findings, three hypotheses of convergence were formulated in the convergence theory: a) the *absolute convergence* (unconditional) *hypothesis*, according to which the level of income per capita across countries converges in the long term, regardless of their initial conditions b) the *conditional convergence hypothesis*, in keeping with which the level of income per capita in countries having fundamentally identical structure converges in the long term, independently of the initial conditions; c) the *hypothesis of club or group*

⁵Emergence, unlike teleonomy and convergence, still retains a sense of ambiguity and remains a concept in construction from the standpoint of contemporary science, being exploited variously as an explanation of the emergence of coherent global properties in any system which consists of subsystems, or any whole composed of parts or items, all of which hold observable behaviors in space and time, and sometimes it substitutes the inexplicable in the behavior or development of any complex system. Being specific to complexity sciences, this still unfinished concept of emergence remains mostly the new properties, coherent but unpredictable, as an immersion into the substrates occurs in a global vision. What is thought to be evidence is that the emergence depends on the self-organization of the system, and the emergent properties determine the maintenance of the cohesion of a system in the face of entropy induced by the environmental action, as well as its already recognized typology as ontological emergence (which tries, and partly manages, to explain how a system exists in a universe dominated by the second law of thermodynamics), and also representative (which theorizes about entities, components and structures, observed and explained in the world continuously redefined as objective and real).

convergence. Testing those hypotheses led to the initial definition of several types of convergence:

a) *type β ("beta") convergence*, indicating that, in the long term, in the context of the absolute convergence hypothesis, according to its own regression equation and its own *regression coefficient* [Sala-i-Martin, 1996], economies in developing nations tend to grow much faster than those in developed countries, and in the context of the conditional convergence hypothesis, there is the same phenomenon, only with some parameters changed, depending on some determinants (focused on the connection between classical qualitative convergence and contemporary convergence, which also includes some qualitative aspects, while also reflecting a decrease in the disparities, or the processes of bridging the *gaps* (*dimensional* or of macroeconomic correlation, of *dynamics* in the real economic variables and *simple structural*, or structural differences that exist between two entities that are segmented methodologically), rather than those of *catching-up*, defined as dynamic recovery, at different rates, in the short and medium term, to the advantage of the less developed and developing economies, against developed economies;

b) *type σ* , or "sigma" *convergence*, indicating a decreasing variation in the level of the income per capita in a group of countries; convergence of type σ is expressed by the statistical indicator of the *coefficient of variation of GDP per capita*, and is fairly commonly exploited in analyses of convergence or economic studies, through a mathematical expression based on an indicator resulted from the classical statistical algorithm of the coefficient of variation (σ_t); the interpretation is quite straightforward, when σ^2 or the dispersion of the phenomenon considered is decreasing in a certain period of time or a transverse process, or in a certain spatial delimitation of national economies (or even parts of these), or when the coefficient of variance σ decreases, then it identifies a convergence process ($\sigma_{t+1} < \sigma_t$).

c) *type γ* , or "gamma" *convergence* (quasi-real convergence), which can be described as synchronization of business cycles, is valid even in conditions in which, structurally, there are notable differences between the economies analyzed as an open system or a set of open events (synchronization of business cycles may have positive effects in terms of elimination of asymmetric shocks by transforming them into symmetric shocks, which can be exemplified by the shocks generated by the monetary policy in the euro area);

d) *type δ* , or "delta" *convergence* [Dinga, 2008], which requires *similar levels of real convergence factors for two or more economies*, or at least a "list" of factors of identical convergence, yet not necessarily similar levels of those (once the convergence factors having become similar in two economies, the convergence process would be already completed);

e) *the convergence of type α* or "alpha", which involves "the final target, or a destination of the ultimate type" of any economic development, is shown by *a similar structure of the economies being compared, although permanently raising major dimensional and methodology questions that are hard to solve* (once they are solved, the very idea of a process of convergence disappears, too).

The updated 2013 version, at the level of EU, includes six convergence indicators of the Maastricht Treaty, structured as in Table 2.4: a) three based on monetary criteria, viz. *inflation* ($IM3 \leq +1.5$ pp, where IM3 is the average inflation of the three EU member states having the lowest inflation), *the nominal interest rate on long-term bonds* ($\leq D3 + 2$ pp, where D3 is the average of nominal long-term interest of the three EU member states having the lowest inflation), and *the nominal exchange rate* (keeping the nominal exchange rate within the band $\pm 15\%$ of the pilot exchange rate); b) two fiscal and budget criteria: *total public debt* (percentage of GDP $\leq 60\%$) and *the general government deficit* (percentage of GDP $\leq 3\%$); c) a legislative criterion: national financial legislation (including national central bank legislation – focusing on the status of the central bank). Tables 1 and 2 show how Romania has evolved,

and, at the end of 2013, managed to meet two major criteria, and is currently approaching the other limit values quite clearly.

Table 1
Concrete monitoring of fulfilling the Maastricht Treaty criteria for Romania, in 2011

Criterion	Thresholds, limits and bands of variation, and fulfillment		
Public debts	Maximum 60% of PIB	Fulfilled (33.4%)	YES
Budget deficit	Maximum 3% of PIB	Not ulfilled (4.9%)	NO
Inflation rate	1.8%+1.5%=3.3%	Not ulfilled (5.8%)	NO
Nominal long-term interest rates (10 years)	2.4%+2% = 4.4%	Not ulfilled (7.0%)	NO
Exchange rate	Two years without devaluation in ERM* II	Not ulfilled	NO

Source: *** (2012), Romanian Academic Society (SAR), *Euro, mai devreme sau mai târziu?* (*Euro, sooner or later?*), accessible on-line: <http://www.romaniacurata.ro/spaw2/uploads/files/SAR-13-24.pdf>.

Table 2
Analysis of satisfying the convergence criteria for Romania as of 31 March and 31 October 2013

Country	Average inflation rate (in last 12 months)	Budget deficit as% of GDP	Public debt as % in GDP	Member state ERM II	Long-term interest rate (last 12 months)
Limit indicators (thresholds/limits)	maximum 2.5% (31 March 2013)	maximum 3,0% (fiscal year 2012)	maximum 60% or decreasing (fiscal year 2012)	Minimum 2 years (31 March 2013)	maximum 4.81% (31 March 2013)
31 March	3.9	2.9	37.8	Not member	6.43
Conclusions	Not fulfilled	Fulfilled	Fulfilled	Not fulfilled	Not fulfilled
Limit indicators (thresholds/limits)	maximum 2% (31 Oct. 2013)	maxim 3,0% (fiscal year 2012)	maximum 60% or decreasing (Oct. 2012)	Minimum 2 years (31 March 2013)	maxim 5,1% (31 oct. 2013)
31 October	3.7	3.0	37.9	Not member	5.7
Conclusions	Not fulfilled	Fulfilled	Fulfilled	Not fulfilled	Not fulfilled

Sources: <http://appsso.eurostat.ec.europa.eu/>; http://en.wikipedia.org/wiki/Euro_convergence_criteria and <http://www.acad.ro/com2013/doc/d1211-ConferintaESPERA2013-Isarescu.pdf>

*Note: ERM II stands for *Exchange Rate Mechanism*. By 1999, the exchange rate mechanism (as an important element of the European Monetary System) was a multilateral system of parities which allowed each currency to fluctuate within a band limited in relation to each of the currencies included in the system, and at the same time a central parity rate in ECU was established. It was called the first exchange rate mechanism (ERM I). When the the single currency, the euro, was adopted in 1999, a new exchange rate mechanism, called ERM II, was adopted. Thus, the multilateral system was replaced by the bilateral system, through which each participating currency has a defined central parity rate expressed in euro.

As can be seen, the variables described above cover the combined criteria, but explain only partially explain the convergence factors, whose spectrum is very broad, as they appear in the econometric modeling devoted to this phenomenon. To be sustainable and real, Romania's economic development of a convergent type to the European Union (including the euro area, or the European Monetary Union) is structured based mainly on fiscal, banking and monetary targets, and this in turn implies the existence of a converging economy oriented, as shown by the so diverse factors of convergence, towards: stability and economic balance, mobility of production factors, similarity of inflation and interest rates, similar productivity, relatively equal economic structure, price flexibility – within acceptable parameters,

integrability of financial markets, comparable economic openness, diversification in production and consumption, fiscal and especially political integration.

It can be asserted that Romania's long progress towards the average value of EU sustainable development is still ongoing; even in the context of a poorer political and even economic management, the national economy has covered, over a quarter of a century, the difficult route to a functional economy, then towards an economy competing for accession, and after the accession there followed an intense process of economic integration, with a population that are making huge efforts towards convergence, without however feeling also the benefits of real income convergence. This route could be simplified, we believe, by a more active participation of tourism, through a real convergence of tourism revenues towards average European income, a goal much easier to achieve than in other economic activities.

3. Macroeconomic convergence and priority convergence of tourism, or the compromise on a new hierarchy of the importance of economic activities

The stage argumentation based on systems of variables, as well as the conclusions about the completion or the state of duration or historical processes, with diverse territoriality or structural elements which have the nature of thresholds or limits, underly most complex phenomena investigated in the statistical spirit of thinking spirit, such as the transition, accession, integration, emergence, convergence, etc. [Săvoiu, 2007; Săvoiu, Iorga-Simăn, 2010; Săvoiu, Popa, 2012; Săvoiu, Apostol, 2013]. If similarities can be identified with the mathematical theory of convergence of the series, then they should be accepted in parallel with the absolute convergence, in the context of the Maastricht Treaty and semiconvergence, temporarily, for some of the criteria that are potentially or partially met, yet whose instability can lead to the opposite of convergence, i.e. to absolute difference. According to the same type of statistical and mathematical thinking, greater dispersion implies a greater distance or real convergence harder to achieve if the current activities with the lowest incomes are not encouraged or supported to develop as priorities.

Recalling that this is type σ convergence, expressed through the statistical indicator of the *coefficient of variation of GDP per capita*, capitalized in convergence analyses through the coefficient of variation (σ_t), whose rather simple interpretation conduces to this reasoning, i.e. when σ^2 , or the dispersion considered decreases over a certain period of time, or in a transverse process, or a certain spatial delimitation of national economies (and even parts of them), or when the value of the coefficient of variation σ decreases, then a convergence process ($\sigma_{t+1} < \sigma_t$) is identified. This requires unconditionally there to be a statistical and mathematical culture of economic convergence, according to which precisely the least developed spaces and the least prosperous activities should be supported, which actually coincides with the European culture social cohesion. This is the major reason that the Romanian economy would have to accept a new hierarchy of activities and a change of priorities and hierarchies starting from macroeconomic convergence criteria.

Two special emphases are detectable, the first placed on the convergence of the Carpathian and coastal tourism, alongside the second, meaning the cancellation of seemingly divergent trends in rural tourism, which is deprived of the seasonality making up for agricultural activities, so necessary for the economic recovery of the area of the Romanian village, permanently deprived of its essence, the resurgence of small peasant farms.

According to these initial emphases of re-scaling hierarchies on the principle of the priorities in Romanian tourism and agriculture, within the broader context of achieving the objectives of economic convergence towards the EU average, two directions of sustainable development of the two activities were born:

C. Revival of tourism, especially Carpathian mountain tourism and countryside tourism,

D. Revival of Romanian small rural farms in mountain agriculture, where it was otherwise necessary, and where it was the only solution.

Essentially, all that can recover the size of a convergence programme of mountain rural tourism and agriculture, whose title could be *Saving the the Romanian Carpathians through European economic convergence*, exploiting new Romanian priorities and European funds through pilot researches pilot applied to a new model of farm in mountain villages. The central idea should be started from the experience inherited from Dimitrie Gusti's sociological school, and the programme will investigate, will model and become the genuine "godfather" (i.e. "sponsor") of over 1,000 families (in a first pilot project), accessing European funds for a new economic model of rural family mountain farm. Alexander the Great's victory was greater through the marriage in Susa of the 10,000 Macedonian and Greek soldiers to Persian women, than by the battles he won, and even more than by the conquest of the world, which suggests that demography should be the essence of the revival of the Romanian mountain village by stimulating 1,000 marriages, which can generate, supported by European funding, the demographic revival of a mountainous range, on different economic principles, in the idea of a starting point (if a family will have a child, ownership of what will be called the farm of the mountain rural family will enter his property after the first year or within three years of stability of the farm activity, with or without a baby born in the new farm).

The value should be increased of the state allowances for mountain children, in the form of a special mountain aid (1,000 children of the 1,000 new families, in the first three years, which can have a possible EU support under the program to compensate and stimulate the adaptation effort). The new families will have previous ties with the mountain or mountain farming activity (mostly animal breeding), but they will also graduate special training courses with touristic impact. The Carpathians is an aggregate of ranges, and if a well-devised pilot project can revive a mountain range, it can be generalized and adapted to all the ranges that make up the Carpathians.

A first draft of the pilot project located in the Vatra Dornei area or any other area, for instance the Apuseni Mountains or the Fagaras mountains, can be the start of adaptive inferentiating. Thus, the small small mountain household or farm can become the basic cell of that pilot of the Carpathians. The modern Carpathian mountain farm will be focused on mountain agriculture and endowed with pasture and livestock from European funds.... The same farm will be stimulated to keep the traditions of Romanian Carpathians and will have, through education and proper training, certified specialists in the development of tourism activities in the mountain area, marketing its products in the European space, etc. As part of the essential principles of optimization or cost effectiveness of the mountain farm business, the project will have to ensure:

- a) the **energy** independence of the Carpathian mountain farm;
- b) economic and productive activities in keeping with the **seasons** and interspersed infra-annually (agriculture and tourism, agriculture and domestic industries, agriculture and hunting and competitive fishing tourism, agriculture and commerce, tourism and rapid transport in other European regions of clients and organic products), etc.
- c) a new form of **school training**, beyond the ninth grade, with **new** mountain-wise **skills** as its target..., a new school of mountain apprenticeship, with an intra-Carpathian programme, adapted to geography, to crafts, from traditions to the languages specific to the Carpathian region, from the economy of the mountain to mountain services, from mountain tourism to mountain trekking.
- d) a new way to **manage the free zone of the Carpathian mountain farm** (zero fiscal requirements for the first 3-5 years, mayors elected from the new farmers, administrative services appropriate to the new farms and their activities, tourism incentives, etc.)

e) a new **culture**, which combines the tradition of the fair with the modernity of sales on the Internet, traditional customs with international online competitions winning European prizes live.

f) a **new system of health care, safety, comfort and communication** specific to the mountain farm.

g) a successful model will be generalized locally, and the farm of the year award will be presented by leading European personalities in saving the mountains (promotion and impact).

If such a pilot project unfolds, to begin with, on its own, it may be followed by a national one, and then by a Carpathian trans-border project, all from European funds, which together can increase the convergence speed of Romania to the EU average and the EMU.

4. A final remark

The lack of interest in mountain tourism and agriculture on the part of the policy, economy, institutions or government of any kind, automatically becomes a lack of interest in the long process of real convergence, causing delays and gaps that will not be recovered in generations, but the essential problem is even more serious, even alarming, namely that soon the rural Carpathians, unsupported demographically, agriculturally and touristically, will become desert, and it all may be too late...

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COSTICĂ MIHAI²

Present-day topics

THE STRUCTURE OF THE TRADITIONAL COMPONENTS IN THE NEW RURAL TOURISM PRODUCTS. THEIR IMPACT ON THE BEHAVIOR OF TOURISTS

Abstract

Rural tourism is presented to us as an economic activity with important particular characteristics in terms of the tourism services offers. It can be said, without fail very much, the fact that, in this area, a real competition does not exist almost at all. The provider of such services is not able to offer services that meet the quantitative, qualitative or structural level of the services offered by other tourism services operators in the region or outside it. The source of these differences is represented by the set of individual, local or organizational particularities. In this diversified structure of tourism products, an important share is held by the traditionalist component that is often the element of differentiation and attractiveness on the specific market. However, some contemporary tourists, although they state that they prefer these services with a high degree of originality and local specificity, they have the tendency to choose those tourist establishments that offer modern accommodation conditions, a well-known gourmet menu and modern entertainment and leisure services. In this study, we aim to identify the extent to which traditional rural tourism products may or may not be preferred by those that include an important component of modern tourism services. We also want to highlight those specific traditional components that have a major impact on the behavior of tourists.

Key words: rural tourism, the structure of touris services, tourists' behavior.

1. Introduction

Tourism is an activity that has evolved very much lately along with the technological revolution of the 20th century. Communications and transportation have significantly evolved, which allowed the development of tourism [O'Connor, P., 1999, Sorupia, E., 2005]. The development of the food industry has resulted in attracting in the tourist circuit some towns or regions that did not have the raw materials necessary for covering the food component of tourism products [Sheldon, P.J. și Fox, M., 1988].

Nevertheless, the Fordist mass tourism [Donaire, J. A. 1998] worked in the large tourist resorts, but its impact on the environment and local population led to the need for a more evident differentiation between the tourism products [Weaver, D.B. și Lawton, L.J. 2007]. The accountability of the tourism stakeholders in relation to the impact of tourism on the culture and characteristics of the population in the areas where the tourist activity was performed, determined the distribution of the revenues coming from tourism to the local population as well with the view to supporting the common interest in maintaining the cultural and ecological features of these regions. [Vayda, A. P. , ed. 1969].

The rural tourism product is designed in order to add value to the potential of the village with a view to meeting the recreation and knowledge functions for a certain category of tourists. Therefore, this tourism should be a form of reconciliation between traditional elements that are specific to village and the culture of the rural population and the components required by tourists. There is great diversity among tourist preferences – be they supporters of the same form of tourism, their expectations are also determined by the backgrounds from which they come. Thus, a first distinction appears between the preferences of tourists from different areas, countries or regions with different development levels and living standards.

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Moreover, tree preferences become diverse along with the appearance of new criteria, such as the one related to the information and awareness about the characteristics expected for each form of tourism. Thus, a tourist who comes from an area with a high living standard, but who has minimal knowledge about rural tourism might be particularly interested in nature, quiet and maybe some recreational activities, hoping to find standards related to classical tourism at the level of the rural guesthouses: large rooms for accommodation, modern household and entertainment equipment, etc. On the other hand, a tourist who is very well informed and loves rural values will exclude from the beginning the modern or the “hybrid” establishments from his search even if they are in rural areas. He will move towards the rustic, possibly original, unaltered establishments, which create a successful compromise between comfort and the primary values of the village.

Under these circumstances, the rural tourism operator must identify those components of the tourism product which should give it attractiveness for a wide range of tourists, but which, at the same time, should ensure enough authenticity so that they are able to subsequently operate in the field of rural tourism. In fact, they will have to find the optimal combination of accommodation services, food and entertainment which, in the geographical and cultural area of the village, should attract and reward the loyalty of a number of tourists, ensure the profitability of their activities.

In its traditional form, rural tourism includes all the accommodation, food and entertainment services that are specific to rural life and to the areas in which tourism activities are practised.

The tourism product that resulted is different from the other types of tourism products, with a high specificity according to the area, village or person that organizes such a type of tourism. The village is represented by that group of families who live together in the rural area and carry out specific economic and cultural activities. If we approach the issue of the life of the peasant and his family, we will notice a strong connection with nature, religion and tradition. It can be generally stated that the villagers know better the terrain and the weather conditions, interact with them and fuse in a “symbiotic” way into the space intended for their activities. The thorough knowledge of the terrain, flora and fauna that are specific to the village area, are elements that can be used by villagers by means of the rural tourism. As most of the tourists come from urban areas, they are often in search of nature, of the green areas – regions without pollution and agglomeration. However, the access to these areas can be a cause of stress due to the lack of practical knowledge about nature, man’s interaction with the natural elements, which creates, for most of the tourists, a contradictory feeling of attraction and fear. Their assistance by the rural hosts in the process of discovery of the surroundings and the benefits of nature determines a great attractiveness of the rural localities from the tourist point of view. In this respect, based on the hosts’ ability to develop programmes of raising awareness on the surroundings, to initiate the direct contact with the flora and fauna of the region, the tourist will be fulfilled from the point of view of their fusion with the natural environment of the village and the direct knowledge about it.

2. Data and methods

The study took into account the offers made by a number of fifty rural guesthouses in Bukovina for which the components of the provided tourism product were considered. The sample was drawn from the tourism package offers in the Bukovina area (site: www.ruraltourism.ro). The localities and areas from which data concerning tourist guesthouses were taken were the following: Moldovița, Vatra Moldoviței, Vama, Humor Monastery, Sucevița, Frasin, Gura Humorului. Being highly attractive tourist locations, especially due to their position and the existence of the monasteries with painted churches in

the area (internationally well-known sights), we believed that the sample is representative of rural tourism. Furthermore, the display of the offers on a public website confers a high degree of confidence in the data collected due to “customer testing” that penalizes any discrepancy between the information provided and reality. The general data and the data specific to the studied guesthouses have been subject to the process of analysis and synthesis with a view to their statistical processing. The tabular and graphical representation of data as well as the quantitative and qualitative analysis of the results represented research methods of the relation between the traditional and modern components of the rural tourism product.

3. Results and Discussion

The tourist guesthouses in the Bukovina area provide rich tourist offers, specific to rural tourism, agritourism, adventure tourism, religious tourism, ecotourism and other specific forms of tourism carried out in an environment with a rich natural and anthropic potential.

The analysis performed on the selected sample aimed especially to highlight the structure of the rural tourism products offered by guesthouses and their share. The distribution of these guesthouses per area types is shown in Table 1 and highlights the general directions of the offer specialization.

Table 1

The distribution of guesthouses per area types

Areas	Number
Periurban	4
Rural	12
Natural rural	2
Rural with monasteries	32

Source: Personal processing according to www.ruraltourism.ro

The data emphasize the placement of guesthouses mainly in the areas of the monasteries in Bukovina, a thing which is justified by their reputation on the national and international level. Although the existence of the places of worship represents an important aspect of the strategy of promotion of the guesthouses, we can not relate the existence of rural tourism only to the villages with monasteries. We have to take into consideration the fact that the cultural and historic dimension of the Bukovina region is pervasive in all the localities, which means that the existence of guesthouses is connected with the activities of sightseeing and presentation of the local specific religious places. From the offers that have been analyzed, it results that in 18 of the guesthouses, the hosts are directly involved in specific programmes aiming to organize visits to the monasteries in the area. These activities can be organized under an authentic, traditional form, by attending different religious ceremonies, discovering monastic life, eating at the monastery, and others. However, when visiting churches and monasteries occurs as part of the “passage” tourism (transiting the area) – in which the predominant factor is not the component related to getting acquainted with the monastic lifestyle, but the one related only to visiting the churches and their surroundings, tourism becomes one with several modern characteristics, in which the transportation, the purchase of craft food and non-food products made in monasteries and of the souvenirs become prevalent. The rural tourism operator is the one who decides, according to the type of tourists arrived in their guesthouse, what type of equipment they should make available and what activities they should promote:

- organizing short-term sightseeing activities carried out on any day of the week and, possibly, a route leading to several such goals or
- the complex involvement in organizing a programme together with the religious institutions, at specific moments of the monastic life or of the Orthodox religion, a

programme being developed over a longer period of time (possibly lasting several days or even the entire stay), in which the informed tourist who is prepared for such a programme, merges with the cultural and church life so that they can live unique experiences concerning the traditions and the specificity of the life of the inhabitants residing in the visited areas.

Some of these guesthouses are located in the periurban area of Gura Humorului, which reflects a shift towards a blending of the rural tourist values and those offered by the opportunity to practise winter sports on professionally landscaped slopes, to visit museums and urban institutions. These guesthouses meet the need for accommodation in the urban area and at the same time they have characteristics specific to rural tourism: they offer cosy and authentic spaces, a cuisine particular to that area, the direct contact with the natural and village environment, the access to rural activities and occupations. Thus, we can identify a first relationship between the modern and traditional components of rural tourism. This relationship is determined and influenced by the level of attractiveness of localities, which represent additional options for ensuring accommodation for the tourists who, visiting the area, appreciate and look for its authentic features.

The positioning of guesthouses inside or outside the rural areas is a fundamental condition of rural tourism; the rural specificity is also conditioned by the type of the activities carried out as well as by the objectives aimed at by means of them. The main reasons for the placement in these areas are: the particular natural landscape, specific to mountainous areas, but also the characteristics related to the possibility of rural entrepreneurs to get involved in a tourism activity. The two guesthouses situated outside the village borders (in Vama and Vama – Molid) had as a main objective a unique offer of accommodation and recreational activities carried out in the middle of nature (especially, the forestry activities). There are diverse traditional components of the tourism in the rural areas, from the traditional, authentic rural locations with annexed farms and visits to the local craftsmen to the new, modern buildings (9 guesthouses having new locations), with few internal rural elements, most of them without their own farms, but which exploit the rural space; the latter have found a market niche that is specific to other forms of tourism (for example, to the passage tourism by building a restaurant with a larger capacity).

Table 2

The distribution of guesthouses by groups according to the number of beds and rooms/apartments for accommodation

Category of guesthouses	Number	Rooms	Apartments
4 - 10 places	14	2-5 rooms	1 apartment
11-15 places	14	3-7 rooms	1-2 apartments
11 - 20 places	9	5-10 rooms	1 apartment
more than 20 places	13	8-15 rooms	1 apartment

Source: Personal processing according to www.ruraltourism.ro

From the point of view of accommodation, the studied sample is a diverse one, the guesthouses ranging from those that have 4 beds and 2 rooms to those with more than 20 beds and 10 rooms. (Table 2) As it can be noticed, based on the allocation that was made, the rural guesthouses with less than 15 beds (Figure no. 1) are prevalent. This situation is normal for the rural tourism which ensures its effectiveness from the additional charges related to specific rural activities or from ensuring the return on the specific rural products by means of direct sales to tourists. However, we can notice that the hosts also turn towards modern tourism, through the existence of some apartments which, while not being particular to traditional guesthouses, meet the requirements of tourists with higher expectations in terms of the size of the accommodation place.

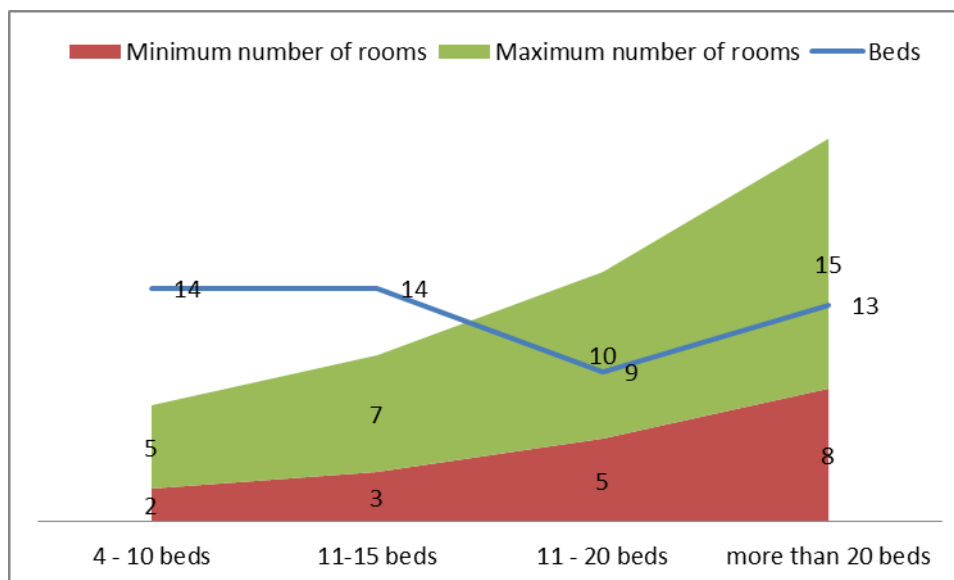


Figure 1. The distribution of beds for accommodation according to the size of tourist locations

Source: Personal processing according to www.ruraltourism.ro

The efforts of tourism entrepreneurs to meet the needs of a wider range of tourists make them provide, to the extent of available funds, two types of tourism products, at least from the point of view of accommodation:

- a product including one stay in traditional establishments, at least classic ones, specific to that region (even rustic ones – for example, the preservation of a traditional house or the reconditioning of “a barn” with all the preserved facilities) and
- a tourism product including accommodation in new buildings with modern equipment and facilities. Five such guesthouses, namely 10% of the studied sample, are included in this category.

Almost all the analyzed guesthouses have gardens, yards, orchards and even their own farms.

Table 3

The structure of rural holdings

Structure of the holding	Number
Courtyard	50
Garden	24
Orchard	16
Personal farm	32

Source: Personal processing according to www.ruraltourism.ro

Table 3 presents the situation of the guesthouses which, by the existence of these components and their number, fall into the category of traditional establishments that have large spaces available for tourists, fresh and green vegetable and animal agricultural products, as well as specific activities related to the rural life, from the farm or to the traditional life.

Out of the total number of guesthouses, 12 have a complex structure, with all the components (yard, vegetable garden, orchard and their own agricultural farm), 9 of them having three such components, in general: yard, orchard and personal farm. Most of the guesthouses has their own garden and farm which give hosts the possibility to provide their own food products to tourists. The studies conducted indicate that, out the total of 50 guesthouses taken into consideration, 47 also offer meals, most of them providing three meals a day, and at least half of them provide raw materials from their own farm, the rest being

purchased from the region. The traditional meals and feasts in the open air are also part of the packages offered by rural guesthouses so that 10 such guesthouses organize festive evening events with a specific local character during the tourists' stay. The package offers provided on the occasion of holidays, especially on Christmas, New Year's Eve and at Easter also include festive meals that are at the center of the structure of the products offered; the other activities are intertwined with them and supplement their traditional value (slaughtering the pig and preparing the pork or lamb, preparing and preserving food, welcoming carol singers, attending the religious ceremonies, etc.).

Moreover, regardless of the cuisine-related component offered by guesthouses, 19 of them make available to tourists the barbecue and terraces for having meals and 17 of the guesthouses hold for tourists campfires and recreational activities specific to this custom. Although preparing the food using the barbecue is not necessarily a specific rural occupation, being a common activity by its nature, the activities entailed by these occasions and the meals prepared under these circumstances place the tourist packages within the traditional field.

The activities of picking, processing and preserving wild berries, mushrooms and medicinal plants are both traditional and general activities related to the knowledge acquired about the environment and its ecosystems. This activity is carried out by about half of the studied guesthouses (24), reflecting, on the one hand, the interest of tourists in looking for and picking with their own hands such products and, on the other hand, the hosts' availability to guide and advise tourists to identify, harvest and prepare natural products according to local customs.

The large number of guesthouses that have their own farms as well as the agro-zootechnical specificity confer a highly rural character to local tourism products; thus, the peasants' daily, common operations are transformed into recreational, entertaining and relaxation activities for tourists. Visiting the farm (25 offers), a nearby sheepfold (10 offers) and tasting their specific products, are elements that lead to the highly traditional character that is conferred to the practised tourism activity. On the other hand, by the inclusion of the tourists' visits to these farms in the tourist programmes, even by taking part in the activities covered by them, the traditional practices of rural activities are kept and hence, the biological quality of the products obtained is maintained (which is otherwise lost in the process of industrialization and by the intensive activities).

The specific local activities are also found in the field of crafts, of the transportation by traditional means of transport (the sleigh, carriage or the cart pulled by horses) or of other activities specific to the hosts' profession. Table 4 presents the situation of the main categories of specific rural activities carried out in the rural households and underlying some recreational and cognitive activities from the tourists' programme. In some cases, these activities are supplemented or replaced by general recreational sports activities without a local specific character, but with an important share in all the contemporary tourism products. From the point of view of the provider, many of these activities involve only minimal investment or low organizational efforts and the effects obtained are important from the tourist's perspective.

Table 4

Rural crafts activities among the offers provides by rural tourism

Traditional activities	Number of guesthouses
Rides by carriages, carts or sleighs (in winter)	33
Visits to craftsmen (weavers, sculptors, egg painters, painters, twiners working with wickers, etc.)	32
out of whom when the host is:	
- a local craftsman	4

- a forester	2
- a beekeeper	1

Source: Personal processing according to www.ruraltourism.ro

Practising summer or winter sports inside or outside the guesthouse, going hiking and on trips in the area, cycling and climbing as well as board games are activities mentioned in the packages offered by most of the tourism operators. (Table 5)

Table 5

Sports and recreational activities offered by rural tourism	
Sports and other activities	Number of guesthouses
Hiking, trips	37
Horse riding	5
Cycling	2
Sports practised with equipment on the grass surface	3
Badminton, tennis	3
Table tennis, billiards	3
Sledging, personal ski	6

Source: Personal processing according to www.ruraltourism.ro

The combination of these specific general or local activities, of the services providing tourist assistance (with the hosts' close involvement) with the activities of supervision and tourist information lead to a wide range of services that offer the tourism product values that are specific but also diverse from one provider to another – from the highly traditional to the classical, general values. Nevertheless, the existence of some particular activities and components related to the hosts' profession, to their qualities, to the area in which they are carried out or to the specificity and the components of the guesthouse, entail the traditional characteristics of tourism products and the authenticity of the package offers made by rural tourism. In the studied sample, such examples of specific components are listed: "sweets made by Mary", " dining accompanied by the hosts' stories ", "the cranberry drink made by Mrs. Maria ", " Lăcrămioara's traditional cakes ", "royal meals", "Bukovina's specific food ", "traditional food", "feasts in the open air", "the traditionally furnished barn".

The analyzed study indicates the highly traditional character of the guesthouses and of the offers provided by rural tourism and the tendency of the tourism operators to increase the return on all the elements of the natural potential and of the village in the Bukovina area.

4. Conclusions

The specificity of rural tourism is strongly linked to the traditional character of all the components of the provided tourism product. The traditional component of its structure is determined by two aspects: the traditionalism availability and the tourists' preference for traditionalism. As regards the first aspect, from the study conducted, we can conclude the fact that the rural guesthouses in Romania have a potential that is rich in natural and anthropic elements characteristic to most of the Romanian villages. The accommodation in old and refurbished or reconditioned houses, the rural specific activities, the traditionally prepared food are only some of the traditional offers made by the rural tourism operators in the analyzed region. The second aspect that triggers the traditional component of the tourism product is determined by the tourists' preference; they express two types of needs: the one related to knowledge that makes them choose the authentic and the traditional character and

the one related to comfort and modern facilities to which they are accustomed. The rural tourism product results from this mixture of potential aspects, preferences and strategies of the tourism operators and has the following characteristics: it complies with the legal criteria related to the classification of the tourism establishment, includes authentic and traditional components specific to the area, village and even the host family, increases the value of the traditional component as an element for the diversification of the tourist offer in relation to the competitors in the sector, uses the modern components in those places where the tourist searches for them or where it streamlines the tourist activity.

If, through traditionalism, rural tourism acquires its specificity and sustainability, through modernism, it creates the connection with the characteristics of the current period, improving the efficiency of the tourism business and opening new opportunities in order to increase the value of the traditional elements.

Acknowledgement

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RESEARCH ON THE IMPACT OF TECHNICAL, ECONOMIC AND ENVIRONMENTAL IMPACT OF ENERGY MANAGEMENT SYSTEMS FOR INTEGRATED WASTE

Abstract:

The scientific study aims to analyze the technical and economic processes, management methods specific knowledge society manifested in the integrated systems for energy management of waste, determine the environmental impact of waste energy recovery activities and propose some innovative technical solutions minimize this impact. Another objective of this paper is to establish regularities and economic implications of energy management for achieving waste electrical and thermal energy from renewable cheap thereby reducing the final cost price of energy and changing technologies that exploit renewable superior.

Keywords: waste, energy, management, pyrolysis, plasma processing, knowledge-based society

1. Introduction to specific management methods applied knowledge society mainframe systems for waste processing.

Knowledge society appears as forms of collaborative work between individuals in order to achieve higher goals than those that can be achieved individually. Activities carried transforms society of individual tasks in large projects that require large teams where members have technical skills and specialized social economic [1].

Knowledge economy is the main pillar of the knowledge society, the concepts of knowledge, the development, the interaction between the various components of society should be taken into account in a global vision, with knowledge of information are the main forces of the modern economy [3,4] .

The dynamics of individual and business are aggregated to the macroeconomic effects, defining behavioral change business development, changes in governments are called upon to respond to the application of legal and institutional frameworks use new stimulus specific policies and management [2].

Management study management processes and management relations to the discovery of principles and laws that govern the design and management tools to enable the objectives in terms of efficiency.

Management activity determines the future state of the system (business / organization) and has the following functions:

- forecasting determines the future state of the system by forecasting which is a quantitative and qualitative study on the future strategy for establishing a set of rules that determine the way to be followed and planning which involves developing an action plan;
- organization activity that leads to the creation of a system architecture is based on a structure of elements, and is a process that is a sequence of activities;

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- forwarding, is the use of means non coercitive for staff involvement through staff training requires the acquisition of specific operations, motivation by creating the desire for action and command is the order that triggered the action;
- coordination is the introduction of additional orders requiring harmonization of conflicts, synchronization by keeping pace and balance for finding new proportions;
- control present the state goals and has the following components: preventive identifying symptoms in the process force objectives, audit includes indirect control over the company's objectives;
- evaluation of the activities to the objectives initially set by measuring achievements, comparing achievement of original objectives, determining the causes of interference, making corrections for removing negative cases. Function must have a corrective, but with as much as a preventive with high adaptability.

Waste management raises very complex undertaking requiring coordinated action at the local level to the regional civil society cooperation with local authorities, government representatives and also cooperation between countries to find the best method of waste management that to minimize their impact on the environment is important to report to the appropriate scale of time and space and of course be taken into account cumulative effects.

General principles of waste management are concentrated in the so-called "waste management hierarchy", the main priorities are prevention of waste and reduce their harmfulness in case you can not achieve neither waste should be reused, recycled or used as source of energy (incineration) and finally waste must be disposed of safely.

The waste hierarchy as presented in the Framework Directive 2008/98 / EC on waste, as applicable order of priority.

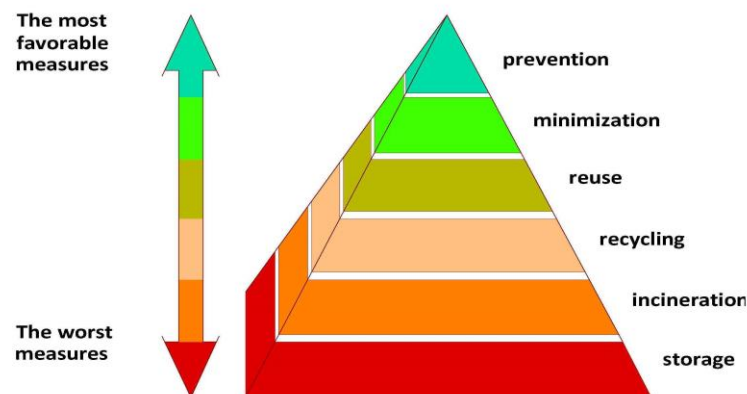


Fig. 1 Pyramid priorities in waste management

In the legislation and policies to prevent waste management identified the following descending order of priority:

- *Prevention of waste production* is a top priority in their management hierarchy, increased economic activity means an increase in waste generation, waste prevention objectives are reduction, reduction of hazardous substances in material flows and increasing resource efficiency.

Prevention should be applied primarily high-volume waste streams, hazardous waste and waste containing hazardous household waste reduction, however, is a much more complicated task because it involves reducing consumption in general, and changing patterns of consumption, which in turn, requires making changes in habits and lifestyle of the people.

At the national level were initiated programs enroll in preventing or reducing waste, legislative initiatives and pilot programs, however, are insufficient for the impact to be visible, requiring awareness of the importance and practices relating to waste prevention;

- *Preparation for reuse involves checking, cleaning or recovery* by which products or components of products that have become waste are prepared for reuse, without any pretreatment operations;

- *Recycling* is the recovery operation whereby materials are reprocessed into products, materials or substances and are used for the same purpose for which it was designed for another purpose, it includes the reprocessing of organic material but does not include energy recovery and conversion to be used as fuels or for backfilling operations.

Material recycling involves replacing the use of primary resources from waste materials, but recycling itself requires a number of previous activities: collection, transport waste, intermediate processing involving sorting, crushing and compacting etc.

- *Energy recovery from waste and other recovery activities* are various operations that waste is used to replace other material that would have been used to perform a particular function, or waste being prepared to meet that function.

Waste combustion technologies have been developed over time from simple waste disposal facilities, the facilities for obtaining energy from waste and the introduction of new emission control technology, which is a method that is gaining increasingly more interesting strategies manage- waste.

Obtaining energy from waste (Waste to Energy - WTE) involves burning waste and uses waste energy content to produce electricity or heat and electricity to obtain the heat being used (recovered and exported) for various services (heating, hot water supply).

Another method of energy recovery incineration of waste is defined as waste combustion operation with the primary purpose of generating energy or material products, which usually wastes are used as fuel or additional heat treatment of waste for disposal .

- *Disposal of waste in landfills*, the ecological disposal is the least desirable option in the waste management hierarchy, it continues to be the most common method of waste disposal in some countries, despite the fact that it has the most negative effect on environment and human health.

Currently, environmental policies rely increasingly more on addressing the full life cycle, which seeks and takes into account the negative impacts of the use of materials and energy throughout the entire life of the product.

EU Thematic Strategy on the sustainable use of natural resources is a good illustration of the way, taking into account the life cycle of a product, avoid impacts move from one stage of life to another product environmental impact is taken into account throughout the entire life cycle of products and services in order to avoid or minimize environmental load displacement between the different phases of the life cycle and from one phase to another.

Waste management planning is an important tool for the implementation of policies and regulations related to waste that may reveal incentives to divert waste from landfill to recycling and waste resources exploitation content.

The main elements in waste management planning are:

- involvement of stakeholders in the general public in the process of waste management planning;

- setting specific targets economic sectors, specific flows of waste and waste treatment;

- improved statistics on the generation, transport and waste treatment industries and relevant waste streams;

- planning and allocation of responsibilities to ensure sufficient treatment capacity;

- defining responsibilities and its inclusion in the plan, together with a description of ways and means of implementation.

Product life cycle, from resource extraction to production and consumption to waste disposal is shown in the following figure:

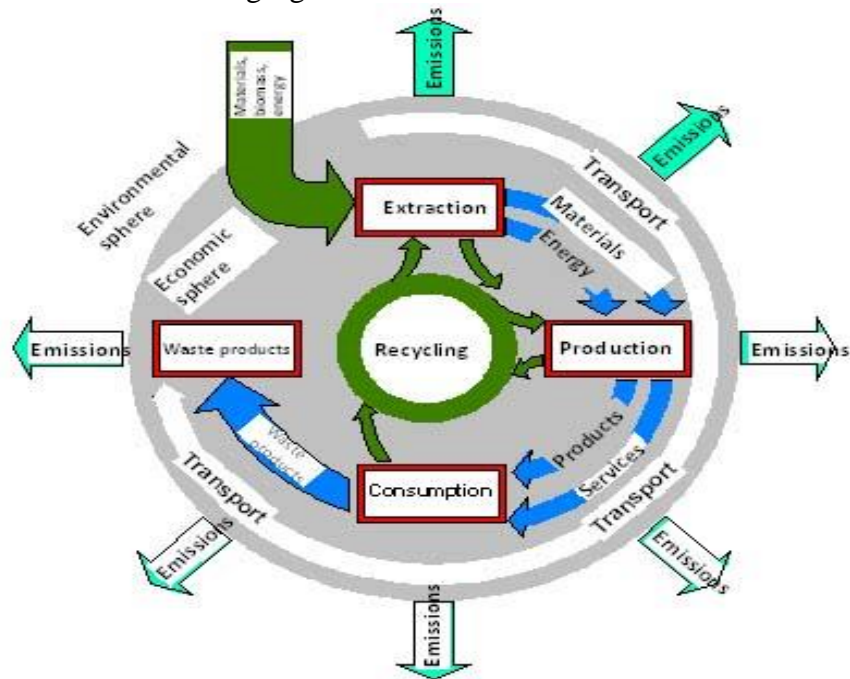


Fig. 2 Life cycle from extraction to production, consumption and waste

2. Methodology and objectives in the research

The main objective of the research is the study of technical processes and economic relations manifested in the integrated systems management for managing waste energy.

In the context of increased global energy crisis to find new sources of electricity and heat is a priority for European research, waste by using them in the production of electricity and heat is a valuable alternative to the use of coal or natural gas.

The first secondary objective is to determine the environmental impact of waste energy recovery activities and propose innovative technical solutions to minimize this impact. Suggested homework through research and legalities permit identification of technical and economic principles that govern processes, developing new methods and techniques to increase the competitiveness of energy-waste processing facilities.

Waste has a negative impact on the environment, finding and innovative methods and technologies for destruction and use of energy is a priority for research.

The second secondary objective is to establish regularities and economic implications of energy management of waste electrical and thermal energy to obtain a cheap renewable source reduces the cost price of energy and high recovery technologies change profoundly positive implications in daily life and politics financial families in villages and towns.

Methods of achieving knowledge in energy and light are different theoretical developments and additions, and natural phenomena, social, economic target is in a continuous transformation, are distinguished by shape, frequency or intensity of expression, cohesive or interdependencies.

Energy management, applied in a company, whose main objective is to ensure a judicious and efficient use of energy to maximize profits by minimizing energy costs, increasing in this way the market competitiveness of the company.

Secondary endpoints resulting from the application of energy management program, refer to:

- increasing energy efficiency and reducing energy consumption in order to reduce costs;
- achieving better communication between departments, the specific energy issues and their responsibility on energy management;
- the development and use of a continuous monitoring system energy consumption, reporting of consumption and development of specific strategies to optimize their consumption;
- finding the best ways to increase financial savings from energy efficiency investments in specific production processes by applying the best solutions known worldwide;
- development interests of all employees in energy efficiency and educating them through specific programs to reduce energy losses;
- ensuring food safety in power installations.

Experiences in the analysis of many energy management programs implemented in various sectors has shown that:

- can obtain energy and money savings of 5-15% in a very short time, costs minimal or no cost, just by applying an aggressive energy management;
- can obtain energy and money savings of up to 30% lower cost and medium with a short payback period, the application of such measures is frequent;
- by making expensive cost investment in modern technology and equipment can get 50-70% savings, payback periods in these cases reaching up to 5-6 years.

Implementation of integrated energy management waste affords the following technical and economic and social benefits:

- *improve environmental quality* by limiting global warming by reducing CO₂ emissions from fossil fuel combustion is one of the main factors to disorder global climate, greenhouse effect due to the emergence and growth temperature, the direct effects of to disorder the entire ecosystem, reducing energy consumption and energy production from renewable, non-polluting, as applied to a larger scale, can contribute significantly to reducing and limiting global warming and reducing acid rain from burning fossil fuels for energy production, containing in addition to CO₂ emissions and nitrogen oxide and sulfur, in combination with water vapor clouds lead to the occurrence of acid rain.

- *improving economic competitiveness by reducing production costs*, energy costs are an important element in cost structure of most products resulting from production processes, reduce energy consumption ultimately lead to lower production costs and thus to increase the competitiveness of products.

Modern principles of integrated energy management systems to process waste energy are:

- reducing the intensity of energy consumption by applying energy efficiency programs in the field of waste processing, energy intensity per unit of product will decrease, which will lead to a significant increase market competitiveness of the product, energy intensity in Romania is among the most major European space, as results from the comparative energy intensity with other countries in the European area;
- social benefits by applying energy efficiency programs has a social aspect by redistributing working capital effectively involved in monitoring the implementation of these programs;
- improving energy security by reducing imports of localities fuel (oil, gas, coal);
- reducing vulnerability to lack of energy, any tendency of growth leads to an increase in energy intensity, thereby causing an increase in import dependency impact on the national economy and especially political and strategic risks caused by reliance on a single supplier of natural gas and oil prices upward because of developments.

Scientific debate on sustainable development has highlighted three basic rules of management, these rules were originally formulated management of economically, in order to

provide the basis of a sustainable resource, but were made to specify the size ecological sustainability [7]:

- the use of renewable resources should not exceed the renewal and / or the rate of regeneration.

- use of non-renewable resources should not exceed the rate at which resources are developed substituted (should be limited to a level that can be replaced either by physically or functionally equivalent renewable or consumption may be offset by increased productivity of renewable resources or non-renewable).

- outputs of substances in the environment (pollution) should not exceed the assimilative capacity of the environment ("absorption capacity").

These management rules can be found in various social policy documents, using these three basic rules of management allowed the development of operational activity commodity defined as the carrying capacity of resources, something that defines the structure and size of the industrial metabolism of the European Union, industrial activity can be continued long term without damaging the natural functions (Target Material Flow Balance).

The structure of economic management under the minimum requirements listed above includes three basic elements:

- raw material supply energy from natural resources will rely heavily on biomass cultivation;

- increasing extensive economic sphere is about to end and evolves toward a steady flow increase - decrease production stock will be minimized;

- extraction of non-renewable natural resources will be minimized use of these resources will depend heavily on recycled materials.

3. Integrated energy management of waste

Collection of waste and biomass from the public and businesses can achieve integrated points placement as containers for recyclable materials (glass, paper and plastic) and box pallets for biomass is in a common collection of material lifting recoverable fractions thus effectively organized. The collection is type "collection by collecting points".

Technical and economic analyzes clearly show that the availability of citizens to bring recyclable materials from collection bins decreases significantly with increasing length of the road to collection containers.

It is proposed to separate household waste since housing in different fractions: domestic organic waste (wet), paper, cardboard, glass and plastics, biomass, excluding hazardous waste and other bulky waste (furniture, appliances, etc.) will be removed upon request.

Selective collection and sorting to be done in such a way as to obtain a higher purity of the material and thus a quality class.

The transport of waste is performed when compacting garbage waste and other special means for waste biomass.

The collected waste will be transported for processing by sorting / baling, economic and energy recovery or composting storage platform.

Waste sorting and recovery is performed in primary sorting station is designed to prepare primary sorting and recovery of packaging waste as PET, plastics (PVC, polyethylene), glass, wood or metal.

Until recovery bales recyclable products are stored in the finished goods warehouse platform that can not exploit waste collects in containers located at the end of the strip and transported as non-recyclable waste composting platform.

Biomass wastes are land filled in areas designated, covered, surrounded by walls and fences so as not to be scattered by the wind or animals.

Depending on the technological requirements for processing classical or plasma pyrolysis the waste will be transported to waste energy conversion facility.

Physics and energy conversion and biomass waste.

Currently, in the EU and worldwide, there are many researches on bio-gas production using waste from industry, agriculture and forestry or household waste. It requires neutralization process organic waste by heat treatment plasma theoretical and technical depth to be in Romania.

Organic content of municipal solid waste, industrial, agricultural and forestry largely conditions the choice of techniques for neutralizing their use allows plasma waste management regardless of their degree of contamination and no additional mechanical or biological treatment.

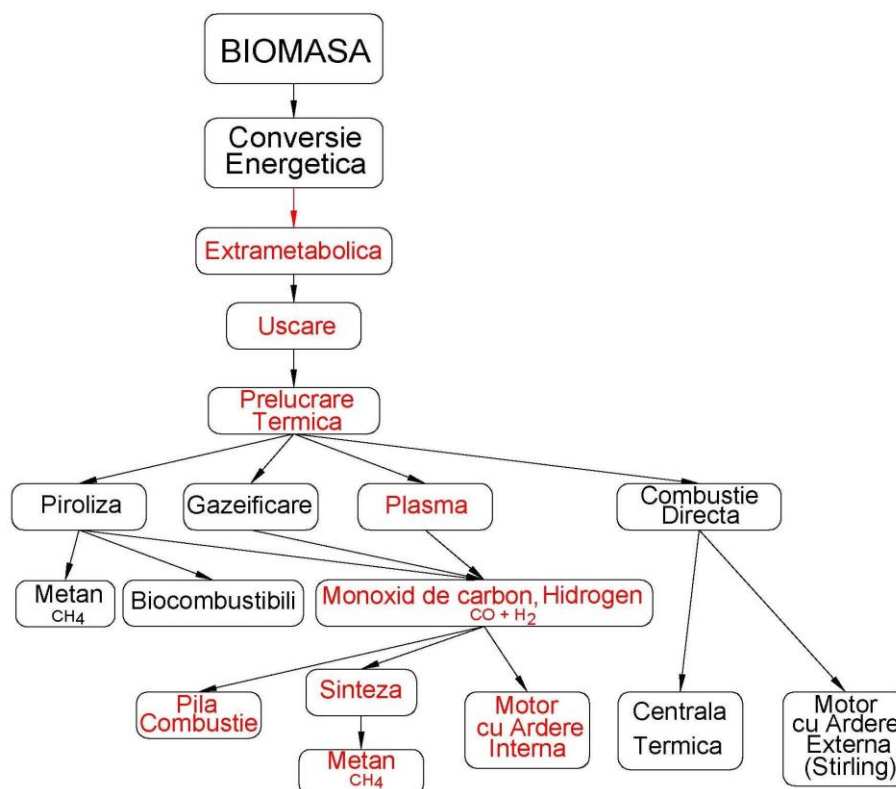


Fig. 3 Scheme of modern technologies for processing waste biomass

In modern management of waste, waste energy conversion and physical burden of treating his residual waste that can not be recovered, so as to reach:

- inert residual waste, minimize emissions to air and water;
- destruction of harmful organic materials, the concentration of inorganic materials;
- reduce the volume and mass of waste deposited;
- using the calorific value of residual waste in order to protect energy resources and obtain electricity and heat;
- transfer of residual waste in secondary raw materials in order to protect other resource materials.

The main methods of thermo chemical treatment of waste are:

- direct combustion - heat production;
- the gasification - is obtained by a gas mixture of H₂, CO, CH₂;
- pyrolysis - thermal process taking place in the absence of oxygen, producing heat and combustible gases, CH₄, CO, H₂, C obtained from cellulose at 700 0C which results: $C_6H_{10}O_2 \rightarrow CH_4 + 2CO + 3H_2O + 3C$;

- plasma gasification - results in a vitrified mineral and waste gases such as CH₃, CO₂, H₂ can be used as fuel gas or fuel synthesis.

Thermal conversion of waste and biomass by plasma gasification is a fourth generation at the top level technology.

Plasma is the term given to a gas that has become ionized. Gas atoms ionized gas is formed which have lost one or more electrons and become electrically charged.

The interaction of the electric discharge gas and process gas temperature increases to a value significantly greater than 5500 °C.

Plasma torches can be supplied with various process gases from chemical compositions air, oxygen, nitrogen, argon and the like. This flexibility allows adaptation plasma system for different applications.

Plasma waste treatment technology increases the energy produced by the second process gas to ten times longer than conventional combustion of waste.

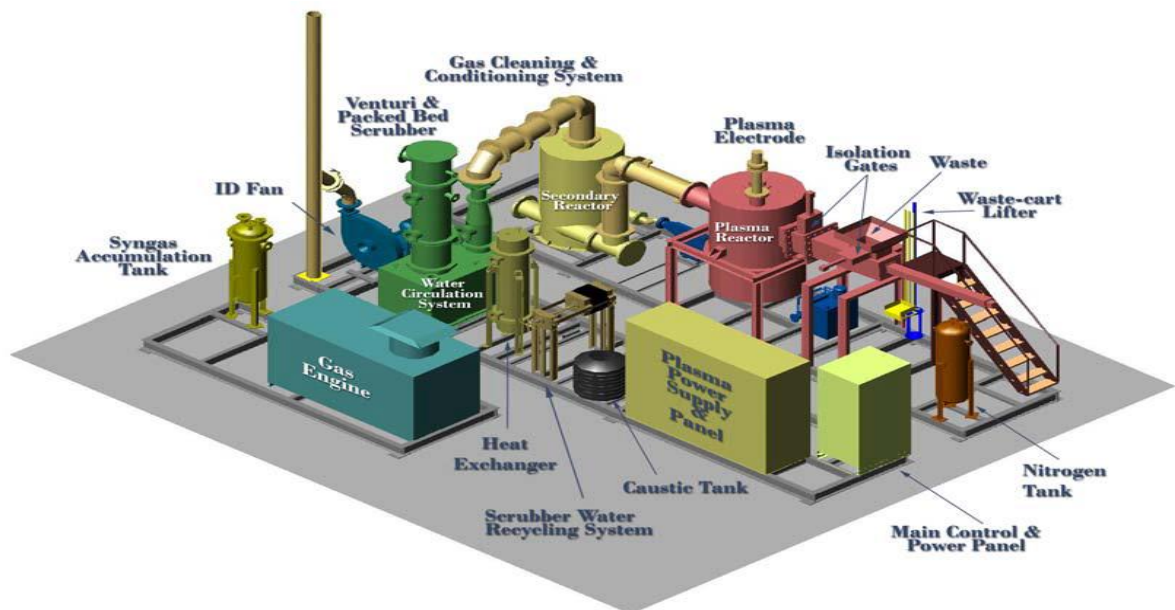


Fig. 4 The Plasma gasifying waste

Gasification is a process that converts carbonaceous materials, such as coal, petroleum coke, municipal solid waste or biomass, in a synthesis gas consisting mainly of carbon monoxide and hydrogen. Gasification occurs when a carbon-containing raw material is exposed to high temperature and/or pressure, in the presence of controlled amounts of oxygen.

The synthesis gas may be used as a fuel to generate electricity or steam or can be used as a base precursor in the chemical process for the production of high energy value.

Plasma technology is a very efficient heating process, the machine can operate with a minimum of maintenance in different industrial environments.

Plasma torch provides a high degree of flexibility to the combustion burner, since it allows control of the temperature, independently of the flow of fuel and oxygen from the process.

In general, the greater the temperature difference between the heat source and the material to be heated, the faster you can get syngas.

Plasma gasification and vitrification reactor is a combination of a moving bed gasifier type with a plasma torch.

The benefits of this type of reactor waste plasma are:

- the ability to accept a wide range of fuels with limited preprocessing requirements;

- operation at ambient pressure allows simple supply and maintenance systems online plasma torch;
- low gas velocities in order to allow greater flexibility and expensive treatments to remove starting material;
- ecological function as synthesis gas that is created has very small amounts of NO_x, SO_x, dioxins and furans;
- inorganic components are converted into molten slag, which is removed in the vitrification product safe for use as a construction aggregate;
- high reliability plasma torches have no moving parts, consumables are easily replaced by maintenance personnel;
- lower costs of capital and operating as air is used as oxidant.

4. Conclusions on embedded systems equipped with plasma energy management of waste and biomass

Raw materials and energy inputs in economic activity, the volume and nature of the waste obtained from industrial activity and changes in stocks of finished goods are factors environmental pressures.

Limited knowledge of specific environmental impacts of raw materials used in manufacturing process and causal links between manufacturing technologies, materials and energy resources, and inability to obtain and analyze this information on medium and long term can lead to reasoning that a strategy economic development based on precaution intended to reduce the volume of resource flows through resource recovery and better use of renewable raw materials coupled with the use of alternative energy sources based on energy waste will reduce the impact of economic activity on the environment.

Technical and Economic Assessment scientifically volumes of raw materials and energy used in economic activity is conducted at an appropriate level and requires laborious research and further analysis.

Flow analysis raw materials and energy in the EU and acceding countries and the collection and analysis of information about the volume and interdependencies between various sources of non-renewable and renewable raw materials and how industrial waste energy recovery allows the development Improved economic activities in Europe.

These macro-information can provide some features of the general industrial production and further analysis focused on specific environmental and economic impacts of different sources of energy and raw materials and cause-effect relationships can refine your results by allowing optimization of business processes.

Plasma gasification is a clean and efficient option to convert various raw materials into energy in an environmentally responsible manner.

The plasma gasification process, heat is used to break the molecular structure of any material containing carbon, municipal solid waste, tires, hazardous waste, biomass, river sediments, coal and petroleum coke, and convert them into gas synthesis, which can be used to generate electricity and heat.

Gasification occurs in an oxygen-poor environment so that raw materials are vaporized, not burned.

Due to the high operating temperatures in the plasma gasification observed:

- ash appears to require treatment or disposal in a landfill;
- metals and non-combustible inorganic materials are melted in a medium type slag that can be used to recover metals or construction aggregate;
- plasma gasification facility will have very low emissions of NO_x, SO_x, dioxins and furans;

- plasma gasification process CO₂ can be captured and used in various industrial purposes.

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CUSTOMER-BASED BRAND EQUITY – AN INNOVATIVE APPROACH

Abstract:

Brands are an integral part of today's marketplace. The area of brand equity has received significant research attention in recent years. The fields of brand and innovation management are strongly interrelated. Innovation plays a significant role in establishing brand equity. Strong brands are triggered by innovation, and they also represent a significant source of innovation. The purpose of this article is to summarize the existing literature on brand equity, customer-based brand equity, the relationship between brand equity and innovation and the influence that brand equity has on the purchase decision.

Key words: *Brand equity, innovation, marketing perspective, accounting perspective, purchase decision.*

1. Introduction

Since there are sellers and buyers, producers have tried to differentiate their goods and services from those of the competitors. Yet, branding started to develop in the 18th century when producers began to use names and images in order to strengthen brand associations (Farquhar, 1989). Brands are important incentives of consumers' choices. They are among the most central intangible assets enterprises possess and often can make the difference between very similar products. According to the American Marketing Association (AMA) a brand is a “name, term, design, symbol, or any other feature that identifies one seller's service as distinct from those of other sellers.” This definition is very narrow. It is much more appropriate to see a brand as “a set of mental associations and relationships built up over time among customers or distributors” (Kapferer, 2008), as these, often long-term relationships between brands and consumers are one of the main sources of brand equity.

The brand represents a promise a company makes to the customer of what the product is going to deliver. There are two stages which helped marketers define the brand: the first one emphasizes its identification role, whereas the second one adds up new elements that lead to the concept of brand equity.

Brand equity has risen considerably in the third millennium. It is a core concept of marketing. The information pertaining to brands is linked more or less directly to consumer's purchase decisions. The concept of brand equity has been thoroughly analyzed by marketing scholars and practitioners due to its very important role as a key intangible firm asset (Aaker, 1991; Keller, 1998). It is considered an essential driver of customer equity, which represents the total combined customer lifetime value of all of a company's customers (Rust et al., 2004). Brand equity thus represents the customer focused portion of a larger framework which also includes customer equity and brand value.

A basic premise of brand equity is that the power of a brand lies in the minds of consumers and in what they have experienced and learned about the brand over time. In order to create viable brand equity, it is important to identify the various associations that customers

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have with the brand as well as perceived quality, customer awareness and the level of loyalty in a way that is different from competitors (Leiser, 2004; Atilgan et al., 2005). Just like other intangible assets, the equity level of a brand is able to provide the qualities that are necessary for the creation of a sustainable competitive advantage. Brand equity adds value to the firms' customers and, at the same time, it helps the company gain sustainable competitive advantage (Delgado-Ballaster and Munera-Aleman, 2005). However, one must be acknowledge that the development of brand equity represents a long and complex process, but once achieved, it cannot be transferred to a different organization with ease.

2. Research hypotheses and research methodology

Marketing literature analyses brand equity from different perspectives according to the researchers' background and field of interest. This article aims to offer an innovative inductive and deductive analysis of the most relevant present-day literature on brand equity, its relationship with innovation and the influence that it exerts on purchase decision. This study reviews the most significant literature on the above mentioned subjects starting from 1989 and ending up in 2014.

- Hypothesis 1: Innovation positively influences customer-based brand equity
- Hypothesis 2: Brand equity dimensions positively influence purchase decision at the consumer level

3. Economically-based marketing models

In marketing, brand equity refers to the value of a brand that is well-known and conjures positive mental and emotional associations. For any given product, service, or company, brand equity is considered a key asset because it helps it remain relevant and competitive. Brand equity can manifest itself in consumer recognition of logos or other visual elements, brand language associations made by consumers' perception of quality, and value among other relevant brand attributes.

When consumers trust a brand and find it relevant, they may select the offerings associated with that brand over those of competitors even at a premium price. For example, Mercedes-Benz can sell cars at a higher price than their competitors because people associate the brand with quality and value. This is why brand equity is oftentimes directly correlated with a brand's profitability. Therefore, brand equity refers to a brand's power derived from the goodwill and name recognition that it has earned over time, which translates into higher sales volume and higher profit margins against competing brands (Subramaniam et al. 2014). It is perceived as a powerful tool which allows marketers to fully utilize available resources, and to avoid bleeding price competitions.

Various researches in brand equity from a consumer perspective resulted in different kinds of dimensions that can be linked to a brand. However, the best well-known models belong to David Aker and Kevin Lane Keller.

Customer-Based Brand Equity represents the differential effect that brand knowledge has on consumer responses to the marketing of the brand (Keller, 2003). Therefore, it is important for the brand to provide some value to customers in order for it to have a high equity level. This is because the power of a brand is determined by what customers hear about it over time. It also includes what they have felt, seen, or heard about the brand. Thus, brand equity can be divided into two sub-constructs: *brand knowledge* and *brand responses*. Here, brand knowledge is defined in terms of brand awareness and brand image, whereas consumer response to marketing refers to the customers' perceptions, preferences, and behavior arising from marketing mix activities. Furthermore, Customer-Based Brand Equity is enhanced by

creating favorable response to pricing, distribution, advertising and promotion activity of the brand.

The other widely accepted model states that brand equity is a set of brand assets and liabilities linked to a brand name and symbol, which add to or subtract from the value provided by a product or service (Aaker 1991, 1996, 2000). Connecting the brand to the concepts of equity and assets radically changed the marketing function, enabling it to expand beyond strategic tactics and get a seat at the executive table. This model posits that brand equity has four dimensions - brand loyalty, brand awareness, brand associations, and perceived quality, each providing value to a firm in numerous ways.

Ever since Aaker (1991) identified the explicit dimensions of brand equity and Keller (1998) identified the sources of brand equity, the concepts of brand loyalty, brand awareness, perceived quality, brand associations, and brand image have been well-associated with brand equity and widely tested empirically in related studies (Kim and Kim 2005; Boo et al. 2009). Brand equity impacts the way in which customers perceive the value of the company's product or service (Baldauf et al. 2003; Kim et al. 2008), increases the utility and value of a brand name (Zhang et al. 2009) and positively affects customers' loyalty and trust, preferences, purchase intentions, and brand choice.

One could conclude that brand equity from a marketing perspective represents a consumer-oriented approach that implies brand value to both consumers and companies. Customers benefit from enhancing their confidence and driving their satisfaction, and companies benefit by generating profits and capitalizing on their brands to further grow the business.

4. Economically-based accounting models

From a financial perspective, brand equity represents the monetary value of a brand to the firm (Simon and Sullivan, 1993). The financial value of a brand is, however, the final outcome of consumer responses to brands (Christodoulides and de Chernatony, 2010).

Studies that measure brand equity a firm's perspective consider that it encompasses most of the product market outcome and financial outcome measures of brand equity categorized by Keller and Lehmann (2003). Product outcome measures consist of marketplace performance indicators such as revenue, profit, or price premium, and they are usually calculated from observed market data (Ailawadi, Lehmann, and Neslin 2003). When calculated as a premium measure, they are computed with respect to a base brand that can be a generic or private label brand, the industry average, or a competing national brand with a lower equity relative to the other brands in the market. Financial outcome measures consider the value that shareholders and firms place on the brand as a financial asset, and may include various performance indicators of the brand's or firm's value observed in financial markets.

The firm-based perspective has naturally focused on measuring the added value in terms of cash flows, revenues, market share or similar measures. A typical firm-based measure calculates the incremental cash flow resulting from a product with the brand name compared to one without. One of the earliest firm-based measures of brand equity was developed by the Interbrand Group. It uses a subjective multiplier of brand profits based on its performance along different dimensions (Aaker 1991; Keller 1998). Simon and Sullivan (1993) use financial market information to calculate incremental cash flows attributable to branded versus unbranded products as the brand-equity measure while Mahajan, Rao, and Srivastava (1994) use the purchase price when the brand is sold or acquired.

5. Innovation and brand equity

There is a strong connection between innovation and brand equity. They are both significant dimensions that drive businesses today. Innovation represents a primary determinant of brand equity (Staake et al., 2009). When innovation lacks, consumers are likely to experience stress, irritation, annoyance, frustration, and sometimes even rage. These “symptoms” influence the way in which consumers evaluate the firm's innovations and have a negative effect on customer satisfaction. This leads to a loss of customers, a negative impact on the firm's brand equity, and damage to the firm's valuable brand assets (Liao and Cheng, 2014).

The brand allows ownership of the innovation, adds credibility and legitimacy, enhances visibility, and supports communication. Concurrently, successful product/service innovations strengthen brand equity because they may reinforce and in some cases broaden brand meaning, help to revitalize brands, act as an effective measure against private labels, and improve brand value and profitability.

Positive brand equity triggered by state of the art innovations influences future cash flows (Srivastava and Shocker, 1991), merger and acquisitions decisions (Mahajan et al., 1994), and stock price movements (Simon and Sullivan, 1993). Furthermore, the advantages of strong brand equity include consumers' willingness to pay premium prices (Keller, 1993), maximizing shareholder value (Bick, 2009), and enhancing brand performance (Oliveria-Castro et al., 2008). It has also been found to lead to more favorable customer reactions, such as increased satisfaction with recovery efforts (Hess et al., 2003).

In contrast, when customers feel betrayed by a brand they are more likely to display unfavorable responses towards that brand and its innovation. The role of brand equity amplifies the effect of perceived betrayal, especially for the customers who have high brand equity. Thus, a crisis may generate stronger perceived betrayal in customers with high brand equity (Seo and Jang, 2013).

6. The influence of brand equity on purchase decision

People are growing more and more attentive, choosing familiar and favorite brands. Therefore, if companies want to outdo their competition, they have to persuade consumers to positively appreciate and buy their products. Although consumers acquaint themselves with and are willing to buy a product, brand awareness is a key factor in influencing the purchase decision (Macdonald and Sharp, 2000).

Purchase intentions are driven by a pool of multiple criteria and outcomes from each criterion can diverge, making the process itself difficult to manage. Brands are like containers where these criteria are embedded and brand image is often a means with which to simplify the purchasing choice. So it becomes essential to understand which elements associated to brands are most valuable to the consumer.

When individuals want to purchase a product and the name of a brand comes to mind, it means that the respective product has a high level of awareness. Such a product will reach a high market share and its quality will be positively evaluated by the purchasers. Moreover, when consumers pick up a product, they are interested in the perceived quality and the awareness of the brand.

Perceived quality is beneficial in differentiating the products which become brands in the mind of the consumers (Aaker, 1991). Besides all this, companies have to create brand loyalty. Studies show that the cost of attracting only new customers is five times higher than the cost of keeping the loyal customers. Therefore, the higher the brand loyalty, the lower the cost that the companies have to pay will get.

The best-known purchase decision model (Engel, Blackwell and Miniard, 1995) separates the decision-making process in-between five stages: 1) problem recognition, 2) information search, 3) alternative evaluation, 4) purchase, 5) post-purchase behavior. Mention should be made that consumers' decision represents a series of processed results, starting from understanding the problem, searching for solutions, evaluating alternatives and taking decisions.

Engel et al. (1995) consider that the buying intention can be unplanned when people decide to buy a product or brand on location (in-store). This can be considered a purchase under impulse. One can also speak about a partially planned purchase, in which people decide upon the category and features of the product before buying it from a store. The individual attitudes and the unforeseen situations influence the buying intention (Kotler and Armstrong, 2004). Individual attitudes refer to personal preferences, whereas unexpected situations lead to a change in the purchase intention because something happens, for example the price is higher than the clients have expected (Dodds et al., 1991).

Brand equity can help a product to be taken into account even though it is below the level of the other brands included in the initial set. On the other hand, it can trigger off a feeling of loyalty which infringes on the probability of considering other brands, therefore bringing forth a cost of opportunity for the consumer. In other words, the buyer just thinks that this opportunity cost which switches from one brand to another is too high to be projected against. When consumers display loyalty for the brand, they substantially reduce the search for information, sometimes eliminating it completely, which gets a simplification of the decisional process.

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For example, in the automotive industry, car brands such as Rolls Royce or Aston Martin display a feeling of prestige or perceived status. One can also notice at this point the quality and the intrinsic equity of the consumer. As a consequence, the brand contributes to including a particular product into the initial consideration set. Some consumers may take into account only products that have a brand name because they think that the prestige or status associated with the brand projects itself upon them as individuals.

The brand and the equity of a particular product have an impact upon consumer's purchase in every stage of the decisional process. It can represent the main argument for buying a product and determines the purchase despite the other well-known values. The brand strengths are acknowledged and the factors that build and influence the perceptions of consumers represent an interesting field of research (Yoo, Donthu and Lee, 2000; Park and Srinivasan, 1994; Keller, 1993).

If marketing has one goal, it is to reach consumers at the moments that most influence their decisions; that is why it is important for them to be able to see the cars through the windows of show-rooms. Marketing has always sought those moments, or touch points, when consumers are open to influence. For years, touch points have been understood through the metaphor of a "funnel" - consumers start with a number of potential brands in mind (the wide end of the funnel); marketing is then directed at them as they methodically reduce that number and move through the funnel, and at the end they emerge with the one brand they have chosen to purchase.

But today, the funnel concept fails to capture all the touch points and key buying factors resulting from the explosion of product choices and digital channels, coupled with the emergence of an increasingly discerning, well-informed consumer. A more sophisticated approach is required to help marketers navigate across this environment, which is less linear.

Every day, people get feelings of brands from touch points such as advertisements, news reports, conversations with family and friends, product experiences. Unless they are actively shopping, much of that exposure is wasted. But what happens when something triggers the impulse to buy? Those accumulated impressions then become crucial because they shape the initial consideration set: the small number of brands consumers regard at the outset as potential purchasing options.

The funnel analogy suggests that consumers systematically narrow down the originally-chosen set as they weigh down options, make decisions, and buy products. Then, the post-sale phase becomes a probation period determining consumer loyalty for brands and the likelihood of buying their products again. Marketers have been taught to “push” marketing toward consumers at each stage of the funnel process, and thus to influence their behavior. But the qualitative and quantitative research in the automobile, amongst a number of other industries, shows that something quite different now occurs.

Therefore, the decision-making process is a more circular journey, with four primary phases representing potential battlegrounds where marketers can win or lose: initial consideration; active evaluation, or the process of researching potential purchases; closure, when consumers buy brands; and post-purchase, when consumers experience them.

In today’s decision journey, consumer-driven marketing is increasingly important as customers seize control of the process and actively “pull” information helpful to them. Traditional marketing is still important, but the change in the way consumers make decisions means that marketers must move aggressively beyond purely push-style communication and learn to influence consumer-driven touch points, such as word-of-mouth and on-line sites.

The experience of US automobile manufacturers shows why marketers must master these new touch points. Companies like Chrysler and GM have long focused on using strong sales incentives and in-dealer programs to win during the active-evaluation and moment-of-purchase phases. These companies have been fighting the wrong battle: the real challenges for them are the initial-consideration and the post-purchase phases, which Asian brands such as Toyota Motor and Honda dominate with their brand strength and product quality. Positive experiences with Asian vehicles have made purchasers loyal to them, which generates positive word-of-mouth that increases the likelihood of their making it into the initial-consideration set. Not even constant sales incentives by US manufacturers can get out of this vicious circle.

The growing complexity of the decision-making process forces companies to adopt new ways of measuring the consumers’ attitudes, the brand performance and the efficiency of the money spent on marketing activities all through the buying decision process. That is why validating an empirical research model for every industry is extremely important.

7. Conclusions

Brands represent some of the most valuable intangible assets of the companies and their value is continuously increasing. The value of a brand depends largely on its quality and on consumer based brand equity. Looking at the example set by most valuable global brands, we notice that brand equity is a strong base for managing brands and their value, but it must also be accompanied by the skills of the marketing managers, in order to identify and follow various trends and consumer preferences.

In the past several years the most successful brands were those that used innovations, based on easy-to-use and consumer friendly technologies. Innovation and brand equity are the main elements that guide the businesses of the present. They provide sustainable competitive advantage, ease the decision making process and influence consumer's buying behaviors.

A significant role is played by the brand's ability to communicate truthfully and mutually with its consumers. Social media is continuously developing and favors the strong brands in their attempt to build long-lasting relationships with the customers. The only companies that are truly successful are the ones that manage to convince their clients that their brand delivers on its promise and that it represents an essential part of their lives.

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ELEMENTS OF ORGANIZATIONAL LOGIC IN ROMANIAN PUBLIC ADMINISTRATION

Abstract

The present analysis aims to identify the features that the study on management administrative organizations develops in a context of the knowledge-based society. From this point of view, the present article aims to identify the elements of the organizational logic at this level, variables that - in our opinion - can be found at the confluence of the concept of management, in general, with the term of management of administrative organizations (with specific models enabled with the study variables: decision making process and decision, typology and construction of the organization, management of the financial, human, information resources, etc.) and with the type of decisional models (which enables new variables such as: rational actor model, incremental model or bureaucratic organization model), all of this variables applied in the counties of North-East Region (Iași, Bacău, Botoșani, Vaslui, Focșani, Galați, Piatra Neamț, Suceava City Halls).

Key words: *management of organizations, administrative organization, organizational culture, beliefs, values*

1. Dimensions of organizational management in public administration

The organisational management of administrative institutions It is a field in its own right that can be defined as the totality of processes, interrelations, mechanisms that are established between the dimensions of the administrative structures (internal to the administrative organizations) that are designed to solve issues of public interest, to formulate and implement community strategies of development.

Also called "the public management"², it brings together „the processes and management relations which arise between the administrative system components"³.

The study of the relationships, processes, mechanisms, structures and administrative organisations derives from the evolution of the public management, as a discipline, each approach bringing with it new paradigms and new perspectives on the above mentioned dimensions.

The public management - as a scientific discipline in its own right - appeared due to the concerns of the researches existent in the field of public administration in order to identify the best techniques and methods which can be used in this field. The studies of this type started in Germany and Austria (18th century), then in Austro-Hungary (19th century), who founded the Administration of the State. In our country the study of the public management was founded in 1990, with the change of the political regime being necessary to optimise the space of administrative reforms⁴.

Regardless of the prospects that we will apply to the public management - the scientific management theories, theories of bureaucratic level, human resources, organizational development, of contingency, organizational behaviour - we can synthesize three shpes in relation to which was outlined this discipline and the studies relating to them.

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² A. Adroniceanu, *Public Management. Study Cases.*, Silvy Press, Bucharest, 1999, p.6.

³ A. Adroniceanu, *Public Management*, Economic Press, Bucharest, 1999, p.4.

⁴ I. Alexandru, *Structures, Mechanisms and Administrative Institutions*, Silvy Press, Bucharest, 1996, p.36.

The three approaches are: the political approach, the legal and the managerial approach approach⁵.

The political approach links the public management from the political theory. Wallace Sayre argues that democracies must manage the issue of total control, and at the administrative level, on this dimension must be build the democratic rights and the freedoms pattern: representativeness, sensitivity and responsiveness⁶. The actors involved in administrative organizations are administrative staffs, but not only, but also politicians, seeking legitimacy and representativeness in front of the masses.

The legal approach is an extremely important dimension to the public administrations. Although its role was minimized for a period, however, the administrative organisations operate in a regulatory and legislative framework, extremely well-defined. No matter what are the political, economic problems, the dimensions of the administrative law are present and influence the decision-making process and mechanisms of this type. The administrative organisations turns into bureaucracy bodies rather predictable sometimes, a way that means complying with the rules, with the legislation.

The managerial approach is closely linked to the economic theories, to the economic principles that are transposed at the administrative level. It is based on values such as efficiency, effectiveness and brings in the first stage the actor involved in the decision-making process and emphasizes the process of communication and coordination.

Without overlap public policy domain and of public administration at the public management, we consider that in order to try to determine what is the organizational logic at the administrative level, we must take over all of these three approaches from which to take the specifics of each other.

Moreover, if we overlap these three approaches on the three paradigms used in general decision-making theory, or at the level of the public policies - the rational actor model⁷, the incremental model and the bureaucratic organisation model – elements of similarity exists. Thus, the rational actor model corresponds to the managerial approach, the bureaucratic organisation model⁸ - to the political approach (with all its political and administrative implications), and the incremental model⁹ to the legal approach (that preserves the bureaucratic routine and resumes it whenever it is necessary).

From this point of view the operationalisation of these three theories it is necessary in an attempt to determine which is the organizational logic in public administration through the view of the public management.

2. Elements of organizational logic at the administrative level

Within the administrative organizations, in order to identify what is the organizational logic at this level, we must start from the public management, from the totality of processes, mechanisms which shall be determined between the structures of organizations and from the management of the structures and of the resources enabled.

From this point of view, we have identified five dimensions to trace this logic as follows:

⁵ A. Androniceanu, *International Public Management*, Economic Press, Bucharest, 1999, p.28.

⁶ W. Sayre, *Decision Making in the Federal Government*, Brookings Institution, SUA, 1979, pp. 42-48.

⁷ The rational actor model is formulated by Anthony Downs, *An Economic theory of democracy*, European Institute Press, Iasi, 2009

⁸ The incremental model is formulated by Charles Lindblom, *Public policies elaboration*, Cartier Press, Bucharest, 2003.

⁹ The model of bureaucratic organisation is formulated by Graham Allison, *The decision essence. An explanation for the boughts crisis from Cuba*, Polirom Press, Iasi, 2010.

- the decision-making mechanisms
- the characteristics and topology of the decisions
- authority, actors involved and human resource management
- the resources management
- the communication at the level of the organization.

For each of these, we carried out three models mentioned: the rational actor model, incremental and bureaucratic organization model.

The rational actor model is a model that supports the activation of administrative problems and solving them in a linear manner that enables strategic decisions to be taken following a logic of efficiency in relation with which the individual counts (see **Table 1, 2, 3 and 4**).

Table 1**The decision-making mechanisms**

Rational Actor Model	Incremental model	Bureaucratic Organisation Model
a. Are involved, the singular individuals, or groups (s) clearly set out at the beginning of the process of decision	b. The singular individuals, or groups that may be involved (e) during the decision making	The institution as a whole or its representatives at the level of leadership
a. It matter the institutional process by which we take decisions.	b. It matter the resumption of the decisional process if somewhere there was an error.	c. It matter the coordination at the level of groups even if it is approaching to the routine.
a. It is searched for consensus among all	b. We are lookin for the partnership at least between some of those involved.	c. It counts the cooperation between its members, between groups.
a. The decision follows a dominant purpose.	b. The decision follows a combination of specific purposes.	c. It matters the interests of the group involved.
a. The majorities subject the minorities.	b. Everyone involved can make decisions.	c. There may be more minorities that identify with the working groups.

The incremental model involves a decision-making process which include the decisions already implemented, a dscontinuous process because they are involved political actors who activate a strong process of negotiation (**Table 1, 2, 3 and 4**).

Table 2**The typologies of the decisions**

Rational Actor Model	Incremental model	Bureaucratic Organisation Model
a. The decision shall be taken according to the motivation of efficient use of resources.	b. The decision shall be taken in order to remedy the damage.	c. The decision shall be taken only because as the routines.say so, strategically.
a. Tends toward what is new.	b. It is modeled after other decisions already taken.	c. It can be well modeled after other models.
a. Is precise.	b. is unprecise.	c. Tends to be precise.
a. The authority of the decision cannot be challenged.	b. The authority of the decision cannot be challenged, but it rarely happens.	c. The authority of the decision is challenged, being often required the negotiation.

Regarding the model of bureaucratic organization, it involves the activation of a decision-making process in which the bureaucracy is recognized, the hierarchies are complied by the staff, but the differences occur in the strategies because it can be involved a lot of minor actors. However, bureaucratic routines are familiar to this model (**Table no. 1, no. 2, no.3 and no. 4**).

Table 3

The human resource management

Rational Actor Model	Incremental model	Bureaucratic Organisation Model
a. The individuals make singularly decisions, or certain groups clearly established from the beginning of the decision making process.	b. Individuals, either singular or particular groups that may be involved (s) during the decision-making process	c. Institution as a whole or its representatives in the management
a. The actors are from the institution, administrative staff.	b. May be outside the institution.	c. Are clearly separated from each department, structure, group.
a. The group that takes the decisions has a unitary character.	b. Has a mobile character.	c. Has a clear structure.
a. The hierarchies are recognized.	b. The hierarchies are recognized, but are not rigid.	c. Are recognized and respected, but in practice are impossible to be realised.

Table 4

The management of the resources and of the informations

Rational Actor Model	Incremental model	Bureaucratic Organisation Model
a. The decision is made by an economic logic: its the costs and benefits.	b. With a logic of small steps, the economic logic belongs to the interests groups in the market.	c. The logic is clearly established by the regulations.
a. The information is clearly established, respected.	b. It's not necessarily clearly established, may be violated.	c. Can be both formal and informal
a. It counts the correct information from the start.	b. The information is on the way, it is resumed where errors occur.	c. Information is strict, with no errors, but may be on the way.

From here, there were applied all these operational dimensions in order to synthesize on each dimensions identified the characteristics of the organizational logic.

3. Metodology and sample

The present study is a prescriptive one and aims to identify the mechanisms and processes that the decision-making process enables at levels of Government under the three models of decision-making: the rational actor model, the incremental model and the model of bureaucratic organization. The questionnaire uses the three models based on some items in the form of closed questions that are designed to place the respondent in a decision making model.

The research sample is composed of 648 respondents, employees of the mayoralities of cities: Piatra Neamț, Iași, Bacău, Vaslui, Suceava, Botoșani, Galați, Focșani.

The sample is representative for the population of Moldova region, the civil servants employed in institutions of the Moldovian cityhalls being quite homogeneous, meaning an average of 1,51% from the total population of civil servants of these institutions (5317). The sample is representative and it is based on probabilistic process, trying to ensure that "each element of the population has equal opportunities to sample"¹⁰. In relation to the size of the sample, the probabilistic error is most likely somewhere around 6%¹¹.

¹⁰ V. Miftode, *Treatise on sociological methodology*, Lumen Press, Iasi, 2003, p. 256.

¹¹ *Ibidem*, p. 257.

4. Results

The decision making process is outlined differently at the organizational level. Of the total valid responses - 91.5%, - 64.2% says that the decision-making process involves the following steps: define the problem - identify the purpose - makes all the alternatives - identifying the best alternative - at the end to reach the best choice; 17.6% said that the decision making process involves defining the problem - finding alternative also implemented, which is known to the actors - redefinition of the problem from this perspective - the implementation of the alternative - if it's not functional, the actors seek the alternative that does not differ by the previously ones practiced; 9.7% starting from defining the problem - looking for an alternative after a negotiation process - optimal solution, recognized by everyone based on routines - and its implementation. (see **Table 5**: Steps in decision making process).

Table 5

Steps in decision making process

		Frecvency	%	Valid %	cumulative %
Valid	define the problem - identify the purpose - makes all the alternatives - identifying the best alternative - at the end to reach the best choice	416	64,2	70,2	70,2
	defining the problem - finding alternative also implemented, which is known to the actors - redefinition of the problem from this perspective - the implementation of the alternative - if it's not functional, the actors seek the alternative that does not differ by the previously ones practiced	114	7,6	19,2	89,4
	defining the problem - looking for an alternative after a negotiation process - optimal solution, recognized by everyone based on routines - and its implementation	63	9,7	10,6	100,0
	Total	593	1,5	100,0	
Missing	97,00	55	5		
	Total	648	00,0		

26.1% declared that their job matters institutionalized process by which the decision, 25.9% support the resumption of whether an error has occurred somewhere, and 19.6% of respondents focus on coordinating work across groups even if it is close to the routine of non-response rate was 28.4%. In decision-making mechanisms activated based cooperation between members, between groups (not involving total consensus) - 40.6%, the consensus of all - 20.2%, the partnership at least of some of those involved - 10.5% . Of all respondents, 40.4% said that decision-making process is based on a dominant purpose, 15% say that what matters are the interests of the involved group, and 9.7% - a combination of private purposes. 34, 7% of respondents claim that the decision making process of the working department, the majorities subject the minorities, 19.8% say that everyone involved can make decisions, and 10.6% say that there may be more minorities that can influence the decision of the working group within the department.

In terms of the features and the types of decisions, 55.4% of respondents stated that the decision is taken by the motivation of efficient use of the resources, 10.2% said that the decision is taken to fix the damages, and 5.6% claim that decision supports daily routines. In relation to the novelty of the decision, 16% said that the decision tends to what is new, 12.2%

said that the decision is modeled after other decisions implemented, while 37% say that decisions can be new and modeled after other models. 31% say that the purpose of the decision is to achieve the greatest gain, 22.7% stated that the purpose of the decision shall identify the purpose of the group involved in decision making process. And 8.3% said that the decisions are taken if they have political support. Also, of all respondents, 30.1% said that the decision is accurate, 4.5% say that it is inaccurate, and 25.5% say that tends to accuracy. It should be noted that, in this case non-response rate is very high: 40%. 21.1% claimed that the decision can not be challenged, 36.6% declared that the authority's decision can be appealed, but it happens rarely, and 5.7% said that authority is contested decision, often requiring negotiation.

From here on, we can formulate a set of assumptions for the authority, the actors and human resource management. In general, in the administrative organization, the decisions are taken by the institution as a whole or its representatives at management level - 69.4%, 16.8% say that individuals, in singular, are involved in the decision making process, 7.9% - declare that both individuals and the groups involved in decision making process take them, non-response rate was 5.9%. 73% of respondents stated that the decision makers are clearly separated from each department or group structure, 18.1% say they are from within the institution, but are not clearly defined, in general administrative staff and 3.5% states that decision makers can be from outside. Regarding the way in which the decision-making entity builds from the perspective of the hierarchies established between decision makers, 63.1% said that the decision hierarchies are recognized by the group, 21.1% say that the hierarchies are recognized, but are rigid and 6.2% say that hierarchies are recognized and respected, but in practice this is impossible. Regarding resources management, 41.4% of respondents stated that decisions are taken by an economic logic: of the cost-benefit, 33.2% are supporting the logic of the clearly regulations established and 8% support the logic of the small steps because the economic logic belongs to thr groups of interests from the market.

In terms of communication within the organization, of the information flow, 45.5% say that in the administrative decision making process, it matters from the beginning the correct information, 15.1% say that information is in the process and it is resumed if errors occur, and 10.2% say that information is strictly, without errors, but can be changed during the process. In terms of communication within the organization, 57.7% say that it is clearly established, respected, 25.9% say that it is both formal and informal, and 6.3% say it's not necessarily clearly established, it may be violated. In general, at the institutional level, the communication can be directed from the actor to the citizen and vice versa - 42.9%, it is equal, between similar groups - 29% ot it is directed only from the actor to the citizen - 15,6%.

Conclusions

Analyzing the results identified above on each dimension, it can be observed that the rational actor model is the one that defines the logic in the administrative organizations. The main features of this model are: the decision-making is a logical route and irreversible (starts from the problem definition to its implementation and evaluation of the alternative identified above in relation to the economic criteria), the decision-making mechanisms are institutionalized, the decision tends to new, the actors are recognized as independent individuals, but yet most important, the information management requires that the information process to be clear, precise (and the communication process itself), the groups are defined individually at the level of the organization.

However, it appears a series of incremental influences or of the bureaucratic organization model at the organizational logic: the decision making process can be resumed if

it is necessary, the environment is characterized by uncertainty and the errors are not excluded, there are formal elements (strictly bureaucratic), and informal (related to non-administrative actors that can be involved in the decision making process). There is a symbiosis between the organization's economic dimension of the selection of the criteria for the decision evaluation and the compliance of the bureaucracy, of the regulation and of the specific legislation.

Beyond all these results obtained from the empirical analysis, it can be concluded at a higher level of generality that organizational logic at the administrative level can be shaped through the activation of decision theories (the rational actor model, the incremental and the bureaucratic organization model), emphasising in the main features of the rational actor model. As we specified above, the other models are activated in some measure on different dimensions, which highlights once again the evolution and the influence of existing approaches to public management level.

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FAIR-VALUE ACCOUNTING – BETWEEN INNOVATION AND NEED

Abstract

This article deals with the changes that occurred in accounting in the recent period. Although the transformation has taken place in a slow pace, it is still evident. One of the main factors that contributed to it is the globalisation. Mainly, capital markets have an increasing importance nowadays, because companies tend to reach funds from investors all over the world. Starting from ideal models of accounting systems proposed by Müller (2013), defining features of each system are described. As we are talking about an ideal system, it is obvious that deviations from it are allowed, and this could be subject for further research. Taking the described classification, one could notice the preference of the accounting regulators for the fair-value accounting, which is also accused for exacerbating the downturn of capital markets in the recent global financial crisis.

Keywords: *accounting system, fair-value accounting, innovation, performance.*

1. Introduction

The comparability of data from financial statements has always been a concern for accounting professionals, commentators, and regulators. The idea of different converging accounting standards has known a recent ascending, but it has rapidly developed and spread over the world.

The rhythm of globalization from the last decades has lead companies, but also information users to reach a greater clarity, simplicity and comparability of the understanding of organizational and evaluation of economic performance processes at a global level.

Although the idea of accounting harmonization at a global level has known a wide acceptance, it can be just partially explained by the need for comparability of financial data and financing from the international capital markets. The path of accounting harmonization was not always smooth and demarcated by technical resolution concerning the comparability, arguments pro efficiency of different accounting standards or cost-benefit analysis of convergence options.

First regarded with scepticism (Bhimani, 2008), IFRSs have known a large acceptance at worldwide level. The turning point was represented by the reporting crisis from 2001-2002 with the collapse of the giant Enron, when inappropriate accounting practices were unveiled. The crisis has generated disputes about the adequacy of American generally accepted accounting practices (GAAP), as they were very detailed and thick.

A long period of disputes followed, with comments and suggestions regarding the best suitable accounting principles. Finally, a consensus was reached when it was established that for listed companies should be used international financial reporting standards (IFRS) in financial statements. IFRSs are elaborated by IASB – International Accounting Standards Board, created in 2001. IASB is the independent body for standards` normalization of the IFRS Foundation.

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IFRSs are the international reporting standards used at global level, but in the same time they allow the “personalisation” in their implementation. They can be shaped by each company’s needs, leaving room for adjustments.

Still, IFRSs are subject to criticism, too. Some authors suggest they are too complex, burdening and expensive (Guerreiro et al., 2008; Callao et al., 2007). Others refer to the negative influence on the financial reporting relevance (Callao et al., 2010; Hung and Subramanyam, 2007), and local comparability, as a consequence of “double standards system” (Street and Larson, 2004; Callao et al., 2007).

Profound changes have taken place lately among the accounting standard setting, and IFRSs are just one of them, but, in the same time, the most important. The adoption of IFRSs at international level has been declared by some “an accounting revolution”, “a paradigm shift”. This approach could be exaggerated, but still we are witnessing a qualitative and systematic change, and not some random, not connected transformations, which could leave the fundamental nature of accounting system unaffected.

There are two important aspects of the fundamental shifts, i.e. innovation, in this sense. The first aspect concerns the “government” of international accounting standards’ creation. Since the privatization of standards’ creation, the countries gave up their sovereignty and transferred this right to a private international body, i.e. IASB. The second aspect concerns the shift to IFRS and the increasing use of fair-value accounting (Müller, 2013).

In order to justify the second paradigm shift in accounting, Müller proposes two ideal accounting systems. They are built on accounting principles’ particularities when preparing annual accounts. The change we are talking about could be related to the rise of *financialization*, i.e., the rising importance and size of financial markets.

The literature on accounting and financialization contains an enormous series of subjects. The relationship between financialization and accounting was also studied. Newberry and Robb (2008) speak about the companies’ complicity in “cheap financial dodges” (Froud et al. 2000, p. 19) in order to “make the numbers” more attractive for investors on capital markets. Another debated aspect concerns the rising importance of financialization and the shift to IFRS, namely the fair-value accounting (Andresson et al., 2006, 2007; Nölke and Perry, 2006, 2007; Walker, 2010). In the present article are exposed the politic and economic frameworks of the paradigm shift in accounting. The understanding of the general tendencies of accounting standardization helps us understand why IFRSs and fair-value accounting have a greater importance nowadays.

2. A real accounting revolution?

Although accountants are considered a conservative bunch, recent transformation have lead to comments from academia, but also from the accounting professionals, regarding the fundamental upheaval. In 1999, Nobes, former British IASC delegate, proclaimed “The begging of the end of conventional accounting”, referring to the expansion of fair-value accounting. In another context Damant predicts “a new era” in accounting and argues that constant application of fair-value in international accounting standards and the shift of financial information on investor’s usefulness will have revolutionary consequences (Damant, 2003).

According to Thomas Kuhn’s theory of scientific revolution (1996), natural sciences don’t make progress by the gradual increase in the sum of knowledge, but through periods of upheaval when the sciences are thoroughly redefined, followed by periods of “normal science” (Barlev and Haddad, 2003; Dodd et al., 2008, p. 43).

The so-called accounting revolution did not start in practice, but at the academic level. In the early 1960s a few accounting scientists from the United States of America have tried to bring in elements of fair-value in practice (Zeff, 1999, pp. 93-95). The approach, however,

failed due to practitioners and SEC's (Securities and Exchange Commission) resistance. In time, however, these ideas have been accepted both by practitioners and standard-setters.

Starting with the '90s we can find references on fair-value both in academia and, more important, in accounting standards. Moreover, many recent articles are published by people involved both in academia and in standard setting (Christopher Nobes și Richard Barker), people actively involved professionally in standard setting (David Damant). This sounds hopeful for fair-value accounting, since the subject is debated by scientists that have influence in practice.

Accounting changes did not take place overnight. Moreover, standard setting bodies can not cancel suddenly accounting practices. They have to organize a public debate on the changes, even if the debate is not public in the sense of including the general public, but the professionally and commercially "public", as their activity is affected by the transformation. For this reason, IASB and FASB (Financial Accounting Standards Board) must consider economic players from different places all over the world when creating the standards. The influence of certain changes often goes beyond company's economic activity due to the economic interconnections, if we refer to the recent global economic crisis. In the recent discussion on the crisis are also involved high-ranking politicians, criticising in particular the fair-value and its opportunity in the measurement of financial instruments.

IFRSs consist from old standards, adapted after American GAAPs, and from new ones, which are the shared work between IASB and FASB. Moreover, IFRSs are subject to continuous review process or creation of new standards.

3. Historical cost accounting versus Fair-value accounting

Historical cost and fair-value can be separated by three dimensions. There is a logical connection between them, and choosing one of them will strongly determine the value for the other two.

A. *Assets measurement*

Littleton (1935) proposes two financial evaluations: value or cost.

When completing annual accounts, one of the two evaluation methods can be used, depending on the choice of the assets evaluation: should they be recorded and carried at historical cost, or should some form of current value be used? In the past, the common valuation was the historical cost, although few elements of fair-value were allowed (the principle of the minimum cost between the historical one and the market one, a prudence principle).

The use of fair-value has known a large expansion in the latest decades, mostly thanks to IASB. According to IASB, fair-value can be defined as follows: "The amount for which an asset could be exchanged, or a liability settled, between informed, willing parties in an arm's length transaction." (IFRS 9 *Financial instruments*, Appendix A). Fair-value accounting offers many measurement options at market price. The choice of a price can take place according to measurement date, or choosing between entry or exit price (Bryer, 2004, pp. 8-9). Problems can occur when there is no market for the measured assets, or the market is illiquid or otherwise "distorted".

By contrast, the historical cost supposes "following" the costs from the entry to their eventual regrouping, until their exit from the unit.

„ (...) accounting for costs involves three stages: (1) ascertaining and recording costs as incurred, appropriately classified; (2) tracing and reclassifying costs in terms of operating activity; (3) assigning [i.e. matching] costs to revenues. The third stage is crucial from the point of periodic income measurement." (1957, p.69)

Historical cost is largely described by Scmalenbach. He recorded little about measuring income but treated historical cost as default measurement (Schmanlenbach, 1962, p. 224).

B. *Income measurement*

There are two approaches regarding the methods of income determination: the asset-liability- and the revenue-expense- approaches. The former concerns the income (or firm performance in general) in terms of total assets and liabilities, the latter as the balance between revenues and expenses.

Opting for fair value involves, as a logical consequence, following the asset-liability approach in determining the income. On the other hand, historical cost approach is closely related to revenue-expense approach.

The option is subsequently related to different ideas about the *purpose* of the financial statements. When a company gives priority to *wealth* as a performance indicator, fair value is chosen as reference. On the other hand, when the focus is on *comparable periodic performance*, in the sense of business efficiency, revenue-expense approach is appropriate.

In order to appreciate the regular performance under the asset-liability approach, every increasing company's wealth is recorded as profit. In the view of revenue-expense, the difference between periodic efforts (expenses) and achievements (revenues) is the profit (or loss) (Wüstemann and Kierzek, 2005, pp. 77-78).

The income statement is focused on the amount of money resulted from selling goods or providing services, which are then compared to the costs of production or providing the services. So the profit or loss of the firm is the result of its operations, more or less successful. In the asset-liability approach, the profit or loss are defined in terms of the value change which can occur in assets and liabilities. In this case, the income or expense is regarded as „a *residual* from recognizing and measuring increases in assets and decreases in liabilities” (IASB, 2007 a, b, para. 14).

The asset-liability approach has a wider definition of income and expense and includes many elements which are not recognised in the revenue-expense approach. Indeed, the IASB Conceptual Framework groups in the definition of “income” operating income, non-current gains (or losses), and, more important, unrealized gains or losses from re-evaluation of assets and liabilities. In this context the connection with fair value becomes relevant. This paragraph from the Framework has fuelled many debates in the context of the recent global economic crisis, because the use of fair value measurement in financial instruments is accused by some that has worsened the financial sector's downturn.

The connection between (a) fair-value and asset-liability approach and (b) historical cost and revenue-expense approach (Dichev, 2008; Krumwiede, 2008, p. 34; van Mourik, 2010, pp. 197, 207) is strengthened by the fact that they suppose different relationship and hierarchy between income statement and balance sheet. In the case of historical cost, the balance sheet is rather a passive or auxiliary document because it only records and “stores” results of past activities and transactions recorded in the income statement and balance sheet. Most assets can be seen as deferred costs in this case because their costs are spread over several accounting periods. The balance sheet represents a “parking lot” for hanging items awaiting release in the form of income (Schmalenbach, 1962, pp. 66-75; apud. Paton and Littleton, 1957, p. 25).

In fair value accounting, the balance sheet becomes more active and it does not represent a storage place for past operations because it records assets at liabilities at current market prices. This also makes it more volatile. The hierarchy between it and income statement is reversed – according to the notion of profit as the change in net worth - income statement is “forced” to follow re-evaluations that are recognized in the balance sheet. Therefore, many standards requiring fair-value also require that changes in fair values are

recorded in the income (e. g. IAS 40, IAS 41). This changes the basic idea of accounting profit's source because the focus shifts away from the operating results (Bignon et al., 2004, p. 22; apud. Biondi and Suzuki, 2007, p. 590).

Permission or requiring of unrealized income or losses gave rise to controversy and criticism, both in academia and in the political and professional environments, especially for having introduced artificial volatility in earnings. Therefore, fair-value accounting is so blamed in the current global economic crisis. Due to the use of fair-value at an increasing scale and in order to correct the problem of volatility, a new concept of income was proposed, namely "comprehensive income", together with a new format of income statement (Camfferman and Zeff, 2006, p. 392; Whittington, 2005, pp. 147-148).

C. *Theory of the firm*

The third and perhaps the most important key dimension regarding the differences between historical cost and fair-value is the company's vision. There are two options in this regard: the entity theory and the proprietary theory (Edwards, pp. 72-74; Gynther, 1967, Zambon and Zan, 2000, pp. 808-810). The first approach sees the entity as an investment of the owner / owners and it is not separated from the latter. Therefore, accounts are prepared from the owner's view. By the other hand, the entity assumes that the firm is separate from the owners and all assets (liabilities) are owned (owed) by itself, as is the income (or loss) are generated by their use.

Entity theory: assets = equity + liabilities

Proprietary theory: equity = assets – liabilities

The notions of "equity" and "liabilities" are not interpreted in a similar manner in the two theories, but they show the point of view from which the balance is realised. In entity theory the right side of the equation shows company's funding sources. From this point of view there are no major differences between equity and liabilities, as they are both external claims on the reporting entity. The equation can be rewritten as: assets = liabilities (i. e. external claims). The proprietary theory gives us a vision of balance sheet as the difference between assets and liabilities in order to discover company's residual amount.

From the entity point of view, what matters is continued revenue generation to cover claims from external groups such as creditors, the state authorities etc. Therefore, this view is based on income and profit or loss-account. The owner's point of view gives clear priority to a single group of people, and has an affinity for the shareholder. The priority for the company is to create value to satisfy investors (Gynther, 1967, pp. 279, 282). The entity theory does not support any specific investor so that this approach is more suitable for communication to a wide range of investors.

There is also a link between entity theory and historical cost. Reporting entity is less concerned about the purposes of evaluation, but is more interested in determining the efficiency of the company by reporting earnings to the efforts used to achieve them.

As for proprietary theory, when net worth is the reference of company's performance, accurate and current measurement of assets and liabilities is of great importance.

„A proprietary view supports a view of income as being the net change in assets and liabilities over the period. Taken to its logical conclusion this could mean that all assets and liabilities should be measured at current value, and the profit for the year would include value changes as well as transactions and non-recurrent items”. (van Mourik, 2010, p. 207)

We might expect the IASB (and FASB) to be follower of proprietary view, but existing standards and ongoing discussions do not provide conclusive indications. In the Conceptual Framework Project of IASB and FASB the preference is clearly expressed for entity theory (IASB, 2008, paras. OB5, BC1.11 - 1.16). This is due, apparently, to the purpose of meeting the needs of a wider range of users than the capital providers.

Official statements of standard-setters are ambiguous, but they showed an “explicit preference” for proprietary theory. Depending on what theory they adopt, they will give different answers to specific accounting issues (Lorig, 1964, pp. 570-572).

4. Ideal systems

After reviewing the dimensions according to which one can distinguish between historical cost and fair-value, we can draw the line and present the model developed by Müller (2013). The author proposes two ideal accounting systems - one based on historical cost accounting (HCA) and another based on fair value accounting (FVA).

Table 1

Accounting ideal types

	Ideal Type 1 (HCA)	Ideal Type 2 (FVA)
Asset measurement	Historical cost	Current value (as exit price)
Income determination	Revenue-expense approach	Asset liability approach
Theory of the firm	Entity theory	Proprietary theory

Source: Müller, 2013

The accounting revolution can now be interpreted as a shift from accounting system type 1 (HCA) to accounting system type 2 (FVA). The first accounting system was common for listed companies from 1900 until 1990. The second system prevails since 1990 and now aims to become the global standard, both because of the IASB and FASB, as well as political and economic conditions that allowed the revival of monetary capital. IFRS, however, are not a pure fair-value accounting system; they are still a hybrid but with a tendency to strengthen FVA characteristic elements.

Of course this classification is not complete and some elements may be overlooked, but the purpose of the classification is not to gather the whole range of features, but rather to highlight the essential ones, so its purpose is to simplify (Rudner, 1966). The systems presented are not pure ones, so this enables discussions on matters that do not fit neatly into one of the systems.

5. Conclusions

The recent history is characterized by capitalism with expanding financial markets and investment in non-financial markets. In this context, fair-value accounting is the trend in financial accounting. It is, in other words, the *financialization of accounting* (Chane-Alune, 2006, p 28).

Analyzing the changes that have occurred in accounting, one can realize they did not take place in a short period of time and are always incomplete. However there has been a systematic qualitative change from historical cost accounting to fair-value accounting, particularly in order to meet the changing economic factors. Fair value accounting has known a wide acceptance throughout the world, but nevertheless it is the target to criticism, if we refer to the global financial crisis that hit the world recently. Accounting professionals and academia actively debate this issue by proposing new solutions. For this reason, changes in accounting will know no end, as standards, both new and old ones, are object of systematic reviews and changes.

The classification of ideal accounting systems leaves room for further research. IFRSs and the Conceptual Framework of IASB and FASB can be studied in order to see to what extent their concepts are diverging from fair value accounting. Differences can be analyzed in connection with the re-politicization of accounting standards bodies and the global financial crisis turmoil (Bengtsson, 2011); or as a result of effective lobbying by large industries, whom specific operations do not lend themselves to fair value accounting.

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CORPORATE REPUTATION’S PLACE IN MEASURING BUSINESS PERFORMANCE

Abstract

The growing research interest into corporate reputation is explained by its potential to create, maintain and increase financial performance. Favorable corporate reputations are intangible assets that offer a strategic competitive advantage to firms, explaining the relationship between reputation and profits. A new paradigm appeared while considering this dependence: does corporate reputation lead to value creation or does profit come first? Researchers investigated if profit is a cause or an effect of a good reputation, but opinions are different. This paper illustrates how a good reputation can increase a company’s performance by offering an overview of existing studies in the field.

Key words : Corporate reputation, business performance, intangible assets, business strategy

1. Introduction

Two of the most important issues for companies are the management and cost to industries and their stakeholders of access to resources. These costs can be environmental, social, economical, political or reputational. The capability of companies to earn trust of stakeholders is critical to their sustainability and corporate reputation plays a significant role in this.

Research on corporate reputation has identified antecedents and consequences of reputation to better explain how a firm may benefit of the best strategically position. While financial performance has been identified as a major predictor of reputation, it accounts for possibly 36 to 59 percent (Brown and Perry, 1994) or only 15 percent (Roberts and Dowling, 2002) of the variance in reputation. More recent researchers have created new constructs as possible predictors of reputation that tend to dichotomize tangible and economically related resource assets versus intangible resource assets, such as competence and sympathy and perceived quality and prominence (Rindova, Williamson, Petkova and Sever, 2006).

There is an increasing interest in corporate reputation as a source and its influence on the sustainability and competitiveness of companies. It is anticipated that the paper assists companies in understanding why reputation is vital for their performances and facilitates the management of reputation within the context of changing societal expectations of business.

2. Overview of Corporate Reputation

The concept of corporate reputation has been given a lot of research in the fields of Marketing and Management, starting with years 1970-1980. If at the beginning it seemed hard for researchers to find a definition for this concept, nowadays the literature provides thousands of definitions for it. Attention was mostly payee after Fombrun and Shanley’s

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(1990) seminal article. Recent reviews and meta-analyses of reputation research document consistent and divergent findings (Large, Lee & Dai, 2011; Walker, 2010).

Defining reputation is a challenging task given it is difficult to conceptualize (Nguyen and LeBlanc, 2001) and does not lend itself to discrete measurement. Organizations must consider that their reputation is a powerful means of measuring their overall performance in their market place, keeping in mind that this asset can contribute to value creation.

Schultz, Moritsen and Gabrielsen (2006) considered that reputation is a derivative of all organizational actions and components, being hard to isolate a unique variable and to interpret it as the one that influences the most the perception of stakeholders. Thus, reputation is the sum of the organizational representations during the time in the perception of the public (Grunig and Hung, 2002; Yang and Grunig, 2005) and it is developed by using a bilateral communicational complex between the company and its stakeholders (Rindova and Fombrun, 1999). Moreover, reputation is judged in the context of competitive market (Fombrun and Van Riel, 2004; Shapiro, 1983; Schultz, Moritsen and Gabrielsen, 2006), it hasn't the same value for all stakeholders, it is not a standard.

Corporate reputation is a multidimensional construct, where a firm's reputation emerges from multiple constituent groups (e.g. customers, investors, employees, general public) and their interaction with each other (Fombrun and Shanley, 1990). These multiple constituents use various criteria, economic and non-economic, to arrive at an overall general assessment and reputation of the firm that is "a perceptual representation of a company's past actions and future prospects that describes the firm's overall appeal to all of its key constituents when compared with leading rivals" (Fombrun, 1996).

Being an intangible asset, corporate reputation creates an important strategic competitive advantage over its rivals because it is a resource that helps a firm to differentiate it from others, is rare, difficult to imitate by other organizations and without a substitute (Barney, 1991).

The definition of reputation has evolved (Walker, 2010), but "a definitive of the construct has yet to emerge in spite of numerous attempts to describe and integrate the definitions in use" (Lange, et. al., 2011). As expected, having different points of view in regard to reputation has led to different ways of measurement. Wartick (2002) suggested that a scale to measure reputation would be misguided because it does not start with a clear definition. Moreover, reputation is often confused with the concepts of identity, image, prestige, esteem.

Charles Fombrun's analysis (1996) contains five principles to be taken into consideration when measuring corporate reputation: distinctiveness, focus, consistency, identity and transparency. Walker (2010) extends and refines this definition by identifying five attributes: 1.) it is based on perceptions (internal and external); 2.) these perceptions are all from stakeholders; 3.) reputation is inherently comparative; 4.) reputation can be positive and negative; 5.) reputation is stable and enduring.

Views on the nature of corporate reputation construct diverge (Cornelissen and Thorpe, 2002). These range from an aggregate perceptual judgment by all stakeholder groups, based on the organization's past actions (Dolphin, 2004) to the view that an organization may have multiple reputations, as each stakeholder group will consider a different set of attributes (Caruana, 1997; Wartick, 2002).

3. Financial view of corporate reputation

The different facets of reputation have been studied in order to establish how companies can get the best of this competitive advantage. Two of the major objectives of every business is to gain profits and to increase corporate performance. Thus, studies for

reputation focused in the last decades on financial aspects and ways to use reputation for value creation.

Firms with favorable reputations are more likely to achieve and sustain a superior financial performance over time (Sabate & Puente, 2003). Good corporate reputations are critical not only because of their potential for value creation, but also because their intangible character makes replication by competing firms considerably more difficult. Corporate reputation can be a key contributor to an organization's success and it can just as easily be a contributing factor to an organization's failure (Ladipo & Ranhim, 2013).

The view that corporate reputation positively impacts on firm performance has been documented. In fact, even accounting literature backs the notion that corporate reputation causes an enormous amount of wealth encapsulated in what is called goodwill, while some conventional wisdom assert that the reputation which organizations orchestrate for themselves do cause sustainable profits (Iwu-Egwuonwu, 2011).

Wang and Smith (2008) focused on determining "if a market value premium is associated with reputation and an evaluation of whether the market value premium, if it exists, is derived from superior financial performance or lower risk" and they found that "indeed high reputation firms do enjoy a market value premium". They concluded that the behavior of reputable organizations creates intangible assets that are as valuable as would distinguish them from their peers in the industry. This result supports impression management theory to the extent that those businesses that effectively direct their reputation management efforts 'will receive tangible economic and other benefits like an increase in the wealth of shareholders.' Their findings also indicate that "high reputation firms experience superior financial performance and a lower cost of capital or lower risk." They further show that "high reputation firms are more profitable on several dimensions such as industry-adjusted sales to total assets and return on assets. They also have lower risk because they experience lower volatility in sales and net income; have less likelihood of bankruptcy and lower price volatility.

It can be stated that reputation has a value, even if it cannot be expressed financially and its reduction represents a business risk. Most companies don't know about the drivers of corporate reputation and how to protect against devaluation risk. The severity of this damage and the cost will depend on the influence of the stakeholder group and its impact on the organization. Fombrun (2012) considers that reputation can be managed and every company should have a department specialized in this field. His arguments are based on nowadays economic landscape: "Not only do we know that reputation can be successfully measured, but research confirms that a good corporate reputation engenders positive support from stakeholders. We also know that positive support, such as recommendations, drives business results."

4. Corporate reputation and business performance

While the focus on the paper is to emphasize the relationship between corporate reputation and business performance, some researches should be taken into consideration.

Flatt and Kowalczyk (2011) conducted a study to establish the relationship between corporate reputation persistence and its diminishing returns by using a sample of 103 firms and their activity during 3 years. Results showed that a firm's prior reputation is persistent, but diminishes over time and prior financial performance had an increased effect over time. Furthermore, firm's performance helped to increase a firm's change in reputation, while prior reputation had a greater stabilizing effect.

Taghian, D'Souza and Polonsky (2010) created a model to emphasize the link between business performance and corporate reputation. The model includes three reflective

constructs: 1.) Corporate reputation, which represents the level of awareness of customers of (a) product characteristics- perceived as being unique, of high quality and value for money; and (b) company - being socially responsible, innovative and a leader in their industry; 2.) Market share, which reflects a measure of the company's change in market share of their main product in comparison to their major competitors' and in comparison to their previous year's market share; and 3.) Profit, which reflects a measure of the overall organizational profit, marketing profit and return on investment. In this case, profit measures the change in profit as compared to the previous year. Results indicate that corporate reputation is associated to the market share performance, but only at a moderate level, implying that there are other marketing initiatives that would influence performance more directly and effectively, that is, reputation alone is not sufficient to drive organizational performance, and increased reputation does not necessarily lead to increased profitability. Also, a socially responsible reputation may simply become one of the overall attributes that consumers expect modern organizations to deliver along with the traditional product core features. Therefore, a purposeful formulation and sustained communication of a corporate reputation, potentially, strengthens other marketing initiatives in achieving successful

Roberts and Dowling (2002) study's results consistently suggest that superior-performing have a greater chance of sustaining superior performance over time if they also possess relatively good reputations. Authors place reputation building in past, on the same time with financial performance. While reputation is built and gets a better value, financial performance follows its increasing trend.

Fombrun (2012) offers a practical perspective of a weak reputation during crisis moments: "Rupert Murdoch appeared before the Leveson Inquiry into media ethics and apologized for his short comings during the News of the World phone-hacking scandal. The Guardian reported that he said it had been 'a serious blot on my reputation'. He admitted that he had failed, but that he didn't personally know about the extent of hacking. This blot on reputation manifested itself through share prices, which dramatically decreased from April 2011 to April 2012, when Rupert Murdoch appeared before the inquiry. Reputation Institute tracks the link between financial performance and its own reputation measurement system. This shows that in 2011, BSkyB's reputation was 'average' with a score of 63 out of 100. In 2012, it dropped to 53 with governance and trust in particular suffering".

The examples provided shows how corporate reputation affects profits as part of business performance, using studies conducted from different countries and for different industries. Whatever is the place of reputation in the life of a company, its link to performance exists and it can be established by conducting a research for a specific example.

5. Conclusion

Corporate reputation plays an important strategic role for every company, being an intangible asset with the potential of value creation. Recent studies are focused on this aspect of reputation because in a very competitive marketing, it is critical to find inimitable assets that can provide more income to the company.

While reputation refers mostly to the perception of stakeholders, its definition can't be general one and so, different scales of measurement and interpretation have been created. Each one explains the details for specific situations and moments. Thus, we agree that offering examples for the relationship between reputation and performance is an important for understanding it.

Some companies invest in their reputation and create a strong one in order to sustain their market position or even make it stronger. Examples from the paper show the perspective of analysis for corporate reputation and the moments in which the connection to profits is

made. A weak reputation can have disastrous consequences for companies; earned trust is hard to maintain, but ensures sustained performance.

The value of reputation can't be defined precisely, but its potential can lead to greater value of the company. Thus, this relationship is a strategic chance to place companies on better positions on market and to maintain it by using the advantages offered.

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ALECU IONEL CIPRIAN¹

DEVELOPMENT OF QUALITY ASSESSMENT MODELS USING TRAPEZOIDAL FUZZY NUMBERS WITH ASSOCIATED INDICATORS

Abstract

Developing evaluation methods for the service quality has become a priority in the society based on knowledge. In this article we will focus on the assessment process of service quality. Both declaratively (political assumptions, image promotion, etc.) and in an assumed manner (by laws, methodological rules, quality standards etc.), the quality of social services is a constant concern for the managers of the knowledge-based organization, and it directly concerns all the service providers and the beneficiaries of these activities. There is a debate within the knowledge-based society, concerning the fragile limit between what can be standardized and regulated.

From this point of view, the link between the need for nuancing in the assessment process and the degree of perishability of the quality features is straightforward and intuitive. By using the fuzzy numbers, we attempt to enrich the portfolio of instruments which can be used in the evaluation process of the services quality.

Keywords: *services quality, nuancing in the assessment process, fuzzy numbers*

1. The nuanced character of assessments concerning the quality of services

From our point of view the nuanced character of the quality assessment process is limited by the variability in the quality features between a reference level and a performance level. We refer to the reference level of service quality as those minimum quality standards regulated by specific rules. Starting from the law, the excellence of service is determined by the reference to the value of performance indicators that “exceed the reference level” and express a desirable standard at a given time. Most times these values are stipulated in the rules for the application of the law in force at a given time.

Thus, praxis, which usually exceeds the conceptualization in this area more than in many others, identifies and defines a reference level as a result of notable experiments, of statistical analysis relative to a certain specified period. We underline this aspect because we try to express the nuanced and relative character of these dimensions of quality.

When we refer to services it is necessary to point out the features that they define in general and thus to highlight the challenges to which a potential valuation model must respond to: the intangibility; the inseparability of production and consumption; the perishability / non-storing of the service; the strong client-provider interaction; the variability

The quality requirements for services must be clearly defined as variables easily observed and understood by the beneficiary and appreciated by reference to a system of standards / criteria.

We must emphasize that, epistemologically, there is a heated debate within the knowledge-based society, concerning the fragile limit between what can be standardized and regulated, on the one hand, and the practical low-homogeneity methods that services may materialize into in today's knowledge-based organization². There is continuous pressure of the ethical and moral norms accumulated by a society at a given time on the concepts of quality and the reference standards on the one hand and expectations on the other. This directly impacts the principles, models and assessment tools thus greatly limiting the comparability over time. The perishability of quality features becomes the status quo.

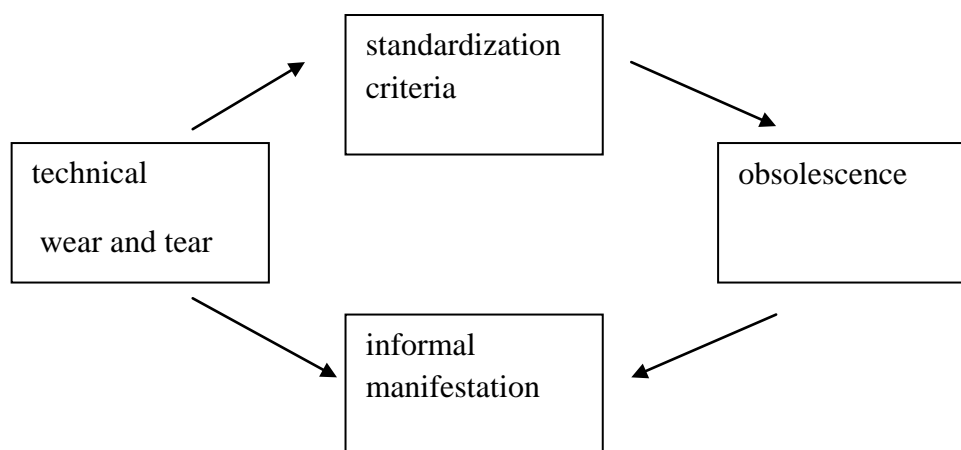
The link between the need for nuancing in the assessment process and the degree of perishability of the quality features is straightforward. We believe that this relationship is defined both in terms of technical aspects (in conjunction with the technological development, the value of the indicators that regulate the minimum level of rights in a state of law, the new international commitments undertaken etc.) and morally speaking (in the direct correlation with the

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² Alecu Ionel Ciprian, *Utilizarea numerelor fuzzy in evaluarea calitatii serviciilor sociale*, in the *Symposion* magazine, under the auspices of the Romanian Academy Publishing House, Tome IX, No.2, 2011, Iasi ,pp 522

assimilation of new principles that define the human development, with the gradual change of the perception of beneficiaries and the increasing of the beneficiaries expectations, etc.).

Drawing 1. Perishability factors of the quality features



All this represent a strong argument in developing a complex and continuous assessment system, allowing updates and periodic conceptual and methodological enrichment. It also requires the integration thereof in a quality management project clearly defined by policies with a greater time horizon (at least 5-10 years). From the stand point of view we advocate for the development of assessment models by using nuanced numbers to face such challenges.

2. Models of quality assessment

Within the quality management processes in the knowledge-based organization different methods and techniques for assessing the quality of services have been developed over several decades. They slowly integrate all the statistical tools for assessment and analysis of qualitative variables. We believe that these tools need new interdisciplinary adaptations through fuzzy techniques³ aiming at ensuring a higher degree of comparability, transferability and integratability.

We list some of these methods and techniques that we consider as distinct in terms of the principles and methodologies used as well as the degree of operability in various different fields of activity:

The Critical Incident Technique (CIT)⁴ – is very well known and appreciated in technical fields; it is based upon the analysis of critical incidents directly observed in the consumer's behavior of paramount importance concerning the studied issue that meet the methodologically defined criteria. This model is widely used within the services characterized by a high technological and informational level, where the human factor is replaced in most activities, the direct contact with the customer is limited to a rigorously structured interface (helpdesk, website, etc.).

Another special tool is the **Grönroos model**⁵ which analyzes the technical quality compared to the functional quality, focusing on how the service is perceived by its direct beneficiary. The model proposes the comparison between the expectations with the actual performance of the service. This principle was the basis in the European models in particular. The "Image" that the customer acquires is based upon two elements: the technical quality (or the physical outcome) and the functional quality (or interactive of the process).

³ Alecu Ionel Ciprian, *Utilizarea numerelor*, 526

⁴ Robert Johnston, *The determinants of service, quality: satisfiers and dissatisfiers*, International Journal of Service, Industry Management, Vol. 6 No. 5, 1995, pp. 53-71., MCB University Press

⁵ Christian Grönroos, *Service management and marketing. A customer relationship, management approach*. Chichester: Wiley, 2000

The model proposed by **U. Lehtinen and J.R. Lehtinen** (1991) aims at developing a tool for analysis allowing for the overcome of the abstract dimensions of quality⁶. From this point of view within the model three main functions are pursued: the physical dimensions of quality (- take into account the environment and the tools used – the play-out space, the instruments utilized, the furniture, the forms to be filled, etc.), the quality of interaction between the service provider and the service beneficiary, the quality of the organization (envisages the image of the organization, focusing on the culture elements of the organization);

The SERVPERF model proposed by **Cronin and Taylor** (1992) - analyzes the main quality features of a service.

This approach allows for a high psychometric evaluation of the quality performance of a service, with an impact on the results of operations and the conceptual stability⁷.

These attempts have somehow anticipated the future trends of the development of the methods and techniques of assessment and analysis of service quality.

We believe that somewhat different and complementary to the need for information and knowledge on the quality of services in the organization based on knowledge is the model developed by Kano and Taguchi who propose the dimensions of the quality for evaluation in relation to the customer satisfaction, namely the basic quality " the performance quality" and "the delight quality⁸".

A special **model** is the one proposed by **Brady and Cronin**⁹ (2011) which is based upon an hierarchical and multidimensional architecture, based around three axes: 1. the quality of interaction – seen as an analysis on three subgroups: attitude, behavior, expertise; 2. the physical quality of the environment – structured on the three subcategories of - ambient conditions, design and social factors; 3. The quality results – analyzed in terms of the following three elements sub-dimensions – tangible elements, waiting time, valences.

The multidimensional model **Dabholkar Shepherd and Thorpe**¹⁰ is considering the reliability, personal attention, comfort and the features of the service offered to assess the ratio consumer / beneficiary on each component and on the whole¹¹.

One of the most used models is the one proposed by **Parasuraman, Zeithaml and Berry**. The most popular and widespread form of use is known under the generic name of SERVQUAL¹² (developed on the platform GASP or PZB¹³).

As it is widely used in practice, the SERVQUAL model was granted much more attention and a much broader debate; many authors were excited about the nature of the principles underlying the analysis of the quality features, the free and informal character of determining the composition of the development directions which enables a broader integration of ethical and moral rules of the society in the management of knowledge based organization. We also note the ease of the mathematical device, as it is being developed around the principle of arithmetic mean (sometimes not even weighted).

SERVQUAL is the most used method for assessing the service quality and was experienced in a variety of specific contexts (ex: professional services, health services, tourism services, transport services, electronic library services, computer services, telecommunications etc.) (Parasuraman 2000).

⁶ Gi-Du Kang, Jeffrey James, *Service quality dimensions: an examination of Gronroos's service quality model*, Managing Service Quality(2004), Volume:14, Issue 4

⁷ Laura Martínez Caro, Ellen Roemer, *Developing a Multidimensional and Hierarchical Service Quality Model for the Travel and Tourism Industry.*, Bradford University School of Management, Working Paper No 06/18, July 2006

⁸ A. Pugna, I. Tauceanu, G. Negru Străuți, *Kano`s tridimensional model for quality evaluation*, Buletinul AGIR, n 2-3, București, 2009

⁹ Michael K. Brady, J. Joseph Cronin, Richard R. Brand, *Performance-only measurement of service quality: a replication and extension*, Elsevier Science, Journal of Business Research n.55,2002, p. 17– 31

¹⁰ Dabholkar, P., Thorpe, D. I., & Rentz, J. Q. (1996). A measure of service quality for retail stores. Journal of the Academy of Marketing Science. 24

¹¹ Maive Suuroja, *Service quality-main conceptualizations and critique*, Tartu University Press, Tartu, 2003

¹² A.Parasuraman, V. Zeithaml and L. Berry, *SERVQUAL: a multiple item scale for measuring consumer perception of service quality*, Journal of Retailing, Volume 64, Number 1, 1988, p 12-40

¹³ Alexandru Balog, Grigore Badulescu, *Modele conceptuale ale calitatii*, Theoretical and Empirical Researches in Urban Management, Year 3, Number 8, 2008

Although the SERVQUAL method was widely applied, the praxis resulted in widespread pragmatic criticism that were aiming at *the number of dimensions, the calculation of indicators, the measurement scale used*, etc. Initially, the model was divided into 10 categories of features (tangible elements-1, reliability-2, responsiveness-3, competence-4, kindness-5, credibility-6, security-7 access-8, communication-9, consumer / beneficiary understanding -10). Following suggestions on how to practically conceptualize dimensions and criticism concerning the limits of the calculation method of indices, the model was redefined on 5 categories that we also cover as follows: tangible elements (tangibles): physical facilities, equipment, staff and advertising (physical evidence of service); reliability (reliability) the ability to perform the service properly, safely and always at the promised level of performance; responsiveness (responsiveness): the desire to assist customers and provide them with a prompt service; confidence (assurance): the ability to inspire safety and confidence to customers, as well as competence, respect and honesty to employees; empathy (empathy): treatment with the proper attention of each client, the ease of contact and communication with the client.

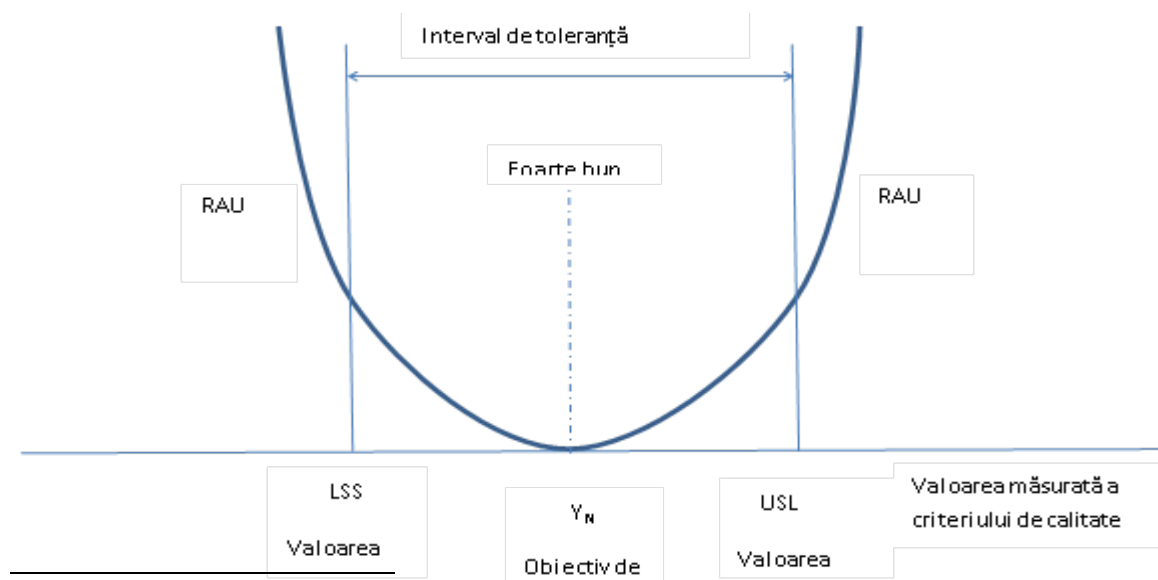
Based on a large number of experiments conducted and the information gathered from the practice of service assessment the relative importance of each dimension of service quality has been determined¹⁴: **tangible elements** 11% **reliability** 32%, **responsiveness** 22% **confidence** 19% and **empathy** 16% . Those shares are approximate and were obtained as average values from the experiments conducted by the authors of SERVQUAL. Depending on the type of service assessed and the experience of the evaluators in the field the service deals with, the shares may have different values.

3. The use of nuanced numbers in the quality assessment

One of the quality functions commonly used is the loss of quality function developed by Taguchi. Thus, it is considered that in case the quality features deviate from the optimal target, the costs expressed in monetary units increase in a quadratic manner (quadratic).

One can notice two convex functions on the two wings, and that the zero value is taken in the Y_n point. It can be easily transformed into a fuzzy representation of a bell shape, triangular or trapezoidal. It appears as a mirror image compared to the original definition. The interpretation is similar but the membership functions in two distinct wings represent decreases in quality, deviations from the ideal value which the value 1 takes. We propose an approach by trapezoidal numbers to cover the need for a high degree of comparability in time, on the one hand, and on the other hand to meet the challenges of the low degree of homogeneity of services.

Drawing 2. The Taguchi quality loss function



¹⁴ Revisoara Badulescu, Methods for evaluation of on-line public services, Theoretical and Empirical Researches in Urban Management, Year 3, Number 8, 2008

The trapezoidal fuzzy number that expresses the quality will be determined by the function of belonging $\mu_Q: \mathbb{R} \rightarrow [0,1]$, with the following format:

$$\mu_Q = \begin{cases} \mu_1(q), \text{daca } LSS < q \leq Y_n \\ 1, \text{daca } x = Y_n \\ \mu_2(x), \text{daca } Y_n \leq q < USL \\ 0, \text{daca } x \notin (LSS, USL) \end{cases}$$

The significance of service quality features and the categories of features may vary considerably depending on the nature of the services.

Within a Likert-type assessment, the standpoints can be assessed by using a scale of five degrees of comparability: very good, good, average, poor and very poor. From this standpoint we present a possible transformation of these standpoints using nuanced triangular numbers:

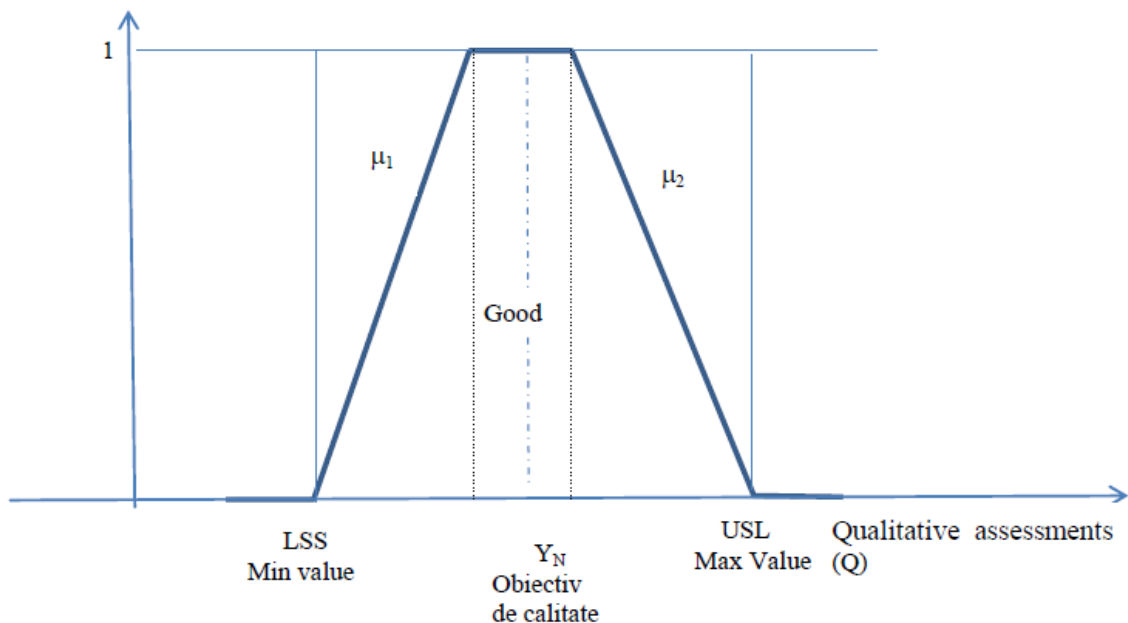
If linguistic variables are appealed to, we can obtain a representation if the following form:

- Very poor {0;00; 0,10; 0,30; 0,40; 0,60}
- Poor {0,10; 0,20; 0,40; 0,50; 0,70}
- Average {0,20; 0,30; 0,50; 0,60; 0,80}
- Good - {0,30; 0,40; 0,60; 0,70; 0,90}
- Very good {0,40; 0,50; 0,70; 0,80; 1,00}

Multiple item scales are proposed consisting of 7 or 11 elements in the nuanced developments. For the fuzzy subsets, scales of 11 elements are usually used, especially if logical operators are involved in the valuation model¹⁵.

The mode of operation with trapezoidal nuanced assessments can be defined by specific mathematical operations of addition, multiplication, subtraction, division and multiplication by a scalar.

Drawing 3. Nuanced trapezoidal representation of the Taguchi quality loss function



¹⁵ Antonio Maturo., (2009).. *Alternative Fuzzy Operations and Social Sciences.*, in *International Journal of Intelligent Systems.*, Vol.24, p 1234-1264

By the use of the fuzzy numbers in shaping qualitative assessments, theoretical developments brought from Zadeh (1975), V. Georgescu (1995), Tamura Hatono and M. Umano (1998), Gil Aluja and Teodorescu (1998), Lazzari and Martinez Panero (2001), Garcia-Lampresta and L. Lamazares (2003), O. Gherasim (2006) can be highlighted.

We briefly introduce elementary trapezoidal fuzzy numbers with associated indicators with indicators and the operations to which within our numerical example (Gherasim, 2005).

Whether two trapezoidal fuzzy numbers $u, v \in \text{Trp}$, $u = (a_u, c_u, d_u, b_u)$, and $v = (a_v, c_v, d_v, b_v)$,

Elementary associated indicators

$$G(u) = \langle u \rangle = N(u) + \frac{S^R(u) - S^L(u)}{2} \in R \quad (2)$$

Variable associated indicators

Operations

$$I. \text{ Multiplication by a scalar } tu = \begin{cases} (ta, tc, td, tb) & , t \geq 0 \\ (tb, td, tc, ta) & , t < 0 \end{cases}, t \in R, \quad (3)$$

$$II. \text{ Addition } u + v = (a_u + a_v, c_u + c_v, d_u + d_v, b_u + b_v) \quad (4)$$

$$III \text{ Multiplication : } uv \stackrel{\text{def.}}{=} \frac{u \langle v \rangle + \langle u \rangle v}{2} \quad (5)$$

$$IV. \text{ Subtraction : } u - v \stackrel{\text{def.}}{=} u + (-v) = u + (-1) \cdot v, \quad (6)$$

$$V. \text{ Reverse : } v^{-1} \stackrel{\text{def.}}{=} \frac{v}{\langle v \rangle^2} \quad (7)$$

$$VI \text{ The division : } \frac{u}{v} \stackrel{\text{def.}}{=} u \cdot v^{-1} = \frac{uv}{\langle v \rangle^2} = \frac{u \langle v \rangle + \langle u \rangle v}{2 \langle v \rangle^2} \quad (8)$$

4. The using of trapeze nuanced assessments within the SERVQUAL model

The procedure for the quality measurement and assessment by using nuanced assessments within the method SERVQUAL consists of the following main steps.

Stage 1. Identification of the requirements for service quality

Depending on the particularities of the service, five dimensions of quality defined in the SERVQUAL model are identified for the performed analysis. It is also now that the optimal principles pursued within the quality analysis are set.

Stage 2. Identification of the nuanced features of quality - now identify the attributes / features that are being assessed effectively within the questionnaires for each dimension / category of quality of the service category previously defined are identified. The objective of this stage is to obtain the matrix of the dimensions and features of the analyzed service quality.

Stage 3. Data collection based upon survey

In order to collect the data, two questionnaires are applied, by using the survey technique to query the customer expectations and perceptions.

We will thus have two categories of results concerning the quality:

- "The customer expectations" assessed by the first questionnaire
- "The customer perceptions" analyzed by the second questionnaire

In its most simple form in terms of costs and dedicated time, the questionnaires are sent to subjects in electronic form or on paper, with instructions for completion and use of the questionnaires, as well as the conceptual developments on the significance of quality features which are the subject of the research. On the completion of the first survey, the person being questioned must appreciate whatever the quality of that particular service based on his/her own experience as a user of the service means to him/her. The aim is to identify and appreciate the degree to which the service should meet the specified quality attributes. The responses imply the granting of qualifiers by 5.7 or 9 degrees of intensity, depending on the chosen degree of sensitivity.

Given the limitations, we recommend the use of the Delphi technique for a better identification of the real expectations and to avoid the obtaining of a spectrum of standpoints more or less focused on the dimensions of quality pursued.

After the synthesizing of the answers two quality assessment matrices will be obtained on the two directions - expectations and perceptions.

Table 1. The quality matrix of expectations for the k category

S_{subject}	S₁	S₂.....	S_n
F₁	[A] ₁₁	[A] ₁₂	[A] _{1n}
F₂	[A] ₂₁	[A] ₂₂	[A] _{2n}
·	·	·	·
F_m	[A] _{m1}	[A] _{m2}	[A] _{mn}

Table 2. The quality matrix of perceptions for the k category

S_{subject}	S₁	S₂.....	S_n
F₁	[P] ₁₁	[P] ₁₂	[P] _{1n}
F₂	[P] ₂₁	[P] ₂₂	[P] _{2n}
·	·	·	·
F_m	[P] _{m1}	[P] _{m2}	[P] _{mn}

Also the importance coefficients for each feature and rated topic can be defined.

Table 3. Matrix of the importance /share coefficients

S_{subject}	S₁	S₂.....	S_n
F₁	α_{11}	α_{12}	α_{1n}
F₂	α_{21}	α_{22}	α_{2n}
·	·	·	·
F_m	α_{m1}	α_{m2}	α_{mn}

Stage 5. Determination of the quality indicators

a) Determining of the quality of service for each dimension

The indicator is calculated as the standard deviation between the "perception" (perceptions) and "expectations" (expectations) for each dimension of service quality.

$$Q_k = (\sum [P]_{ij} - [A]_{ij})/n \quad (9)$$

Where:

Q_k the quality of service for the category k, $k=1..5$

[P]_{ij} - the trapezoidal nuanced qualitative perceptions for the subject j questioned according to the appropriate quality features of i

[A]_{ij} - the trapezoidal nuanced qualitative expectations for the subject j questioned appropriately for the quality features of i

n- Number of the subjects surveyed.

b) The calculation of the overall quality (un-weighted) of the service

The indicator is calculated as the average value of the service quality.

If the importance indicators of quality groups were defined then *a weighted average for obtaining of the overall quality Q will be applied.*

The indicator is calculated taking into account the weights given by the assessor to each dimension of the service quality.

Stage 4. The presentation and interpretation of results

The results of the evaluation process covered by a synthetic evaluation report.

Usually, it contains all the documents prepared during the previous stages, as well as a series of summary tables and graphs based on the data from the said documents and that are used for the interpretation of the results.

The interpretation of the final outcome of the assessment – the "quality" indicator expressed as the difference between perceptions and expectations – will be achieved based upon the following scheme:

- the positive values indicate a higher quality level than expected;
- the negative values indicate a poor quality level;

the zero value or significantly towards zero indicates a satisfactory level of quality.

Nuanced trapezoidal reports can be defined to allow the identification of various degrees of quality satisfaction as the ratio between expectations and perceptions. Their substantiation will be achieved based upon the experience of the experts correlated with long-term strategic objectives.

5. Conclusions

By combining a fuzzy number to a variable quality feature as an ordinal variable-type or interval-type to include other complementary elements of research, we believe that the definition and characterization of a more complex image with a higher degree of comparability can be achieved. The quality analysis of the services in the multitude of its complexity can be seen as an expression of the evolution of the quality of life, man and society.

Given the major debates on the concept of quality of services (from the nature of the quality as the perception of comfort or discomfort to the shape of the model of the central indicator used single or aggregate – an expression of many technical or psychosocial features), the fuzzy numbers meet the need for a complex assessment, leading to a homogenization of the knowledge and an increase of the comparability degree over time.

The challenge is to obtain a nuanced assessment based on principles specific to the quality management. Working with nuanced values obtained is very easy¹⁶ and it becomes very easy to apply using specific programs. Weighted averages can be calculated, ordinal variables can be combined with the interval-type or report-type ones, nonparametric correlation coefficients can be determined.

From these standpoints mentioned above we can hope to achieve unity in the quality management of services.

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