audit FINANCIAR

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Convergenţa cu IFRS în România – minutul şi scorul

Convergence to IFRS in Romania – Score per Minute

Camera Auditorilor Financiari din România

- Determinanţii calităţii raportării financiare
- Relevanţa raportării non-financiare în determinarea valorii de piaţă a capitalului
- Influenţa sistemelor informatice integrate asupra performanţei şi sustenabilităţii
- Procesul bugetar în contextul pandemiei
- Raportarea tranzacţiilor semnificative cu părţile afiliate

Credit Scoring – abordare generală în contextul IFRS 9

- The Determinants of the Financial Reporting Quality
- The Value Relevance of Non-Financial Reporting in Determining the Market Value of Equity
- The Influence of Integrated Systems on Performance and Sustainability
- Reconsidering Budgeting after the Outbreak
- Reporting Significant Transactions with Affiliated Parties

Credit Scoring – General Approach in the IFRS 9 Context

ENCORSA este un partener de transformare digitală și simplificare a proceselor operaționale ale unei companii prin implementarea de tehnologii de automatizare precum low-code development, roboți RPA și asistenți virtuali de tip chatboți dotați cu inteligență artificială.

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+40 766.372.356 sales@encorsa.com

Sumar / Content

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Telefon: +4031.433.59.22;
Fax: +4031.433.59.40;
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Editorial Director:
Corneliu CÂRLAN, Ph.D.
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Chamber of Financial Auditors of Romania
Phone: +4031.433.59.22;
Fax: +4031.433.59.40;
E-mail: auditfinanciar@cafr.ro;
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The Determinants of the Financial Reporting Quality: Empirical Evidence for Romania

Claudia Cătălina CIOCAN, Ph. D.,
"Alexandru Ioan Cuza" University of Iasi, Romania, Faculty of Economics and Business Administration, e-mail: ciocan_claudia_catalina@yahoo.com

Lecturer Mihai CARP, Ph. D.,
"Alexandru Ioan Cuza" University of Iasi, Romania, Faculty of Economics and Business Administration, e-mail: mihai.carp@feaa.uaic.ro

Univ. Prof. Iuliana GEORGESCU, Ph. D.,
"Alexandru Ioan Cuza" University of Iasi, Romania, Faculty of Economics and Business Administration, e-mail: iuliag@uaic.ro

Abstract

The issue of the financial reporting quality has aroused the interest of several researchers whose views converge on the idea that it can be influenced both by factors related to the internal environment of the company, the corporate governance system, the activity of auditors and not only, and also by macroeconomic factors, such as the legal and political system of a country or community or certain accounting/ tax policies. The objective of the research is to highlight, starting from a model validated by Iatridis (2011) for companies in the United Kingdom, the way in which microeconomic factors influence the financial reporting quality of Romanian companies listed on the Bucharest Stock Exchange. The analysis is carried out for the 2013-2019 period. The results indicate that the companies that produce high quality financial reports are large and generally have a high operating cash flow rate, relatively low provisions and disclose more information. Also, these companies are audited predominantly by auditors who are not part of the BIG 4 group.

Key words: *financial reporting quality; qualitative characteristics; determinants of financial reporting quality; conservatism;*

JEL Classification: *G30; M41*

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Introduction

The accounting literature is abundant with papers aiming to measure the quality of financial and accounting information, the quality of results and overall financial reporting (i.e., accounting quality), while also focusing on the many factors impacting it. The relevance and intensity of the influence of these factors differ, however, from one economic space to another, the identification of their action being a necessary step, which can contribute to the efficiency of communication on the capital market.

The paper investigates the dimension of identifying and evaluating the influence of different factors on the quality of financial information reported in the Romanian economic space, completing the existing literature. By reporting to the information specific to Romanian companies listed on the Bucharest Stock Exchange, analyzed over a time horizon of 7 financial years (2013-2019), the contribution of some factors (indicators) on the quality of financial reporting was analyzed. The factors considered were either *built on the basis of accounting data* or *characteristic of the organization of the company* or *specific to the business environment of which it is part.*

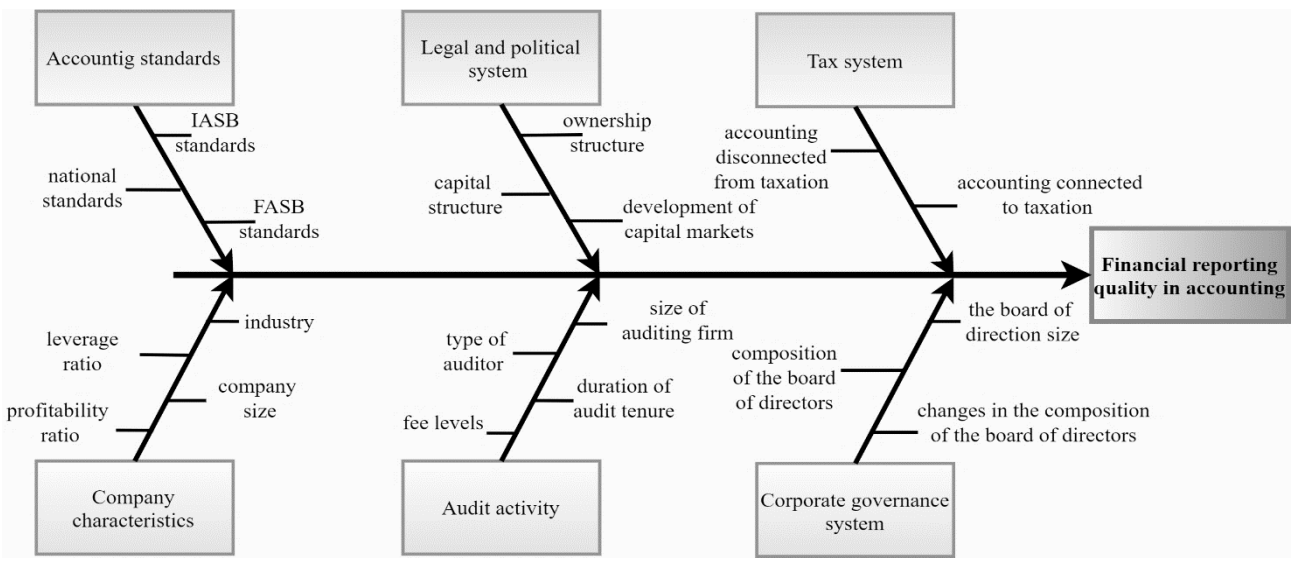
The results indicate that companies that have a high level of financial reporting quality are higher and, implicitly, more visible on the market, have a higher operating cash flow rate, have relatively low values of provisions, present more information, and are audited by an auditor outside the Big 4 group.

The content of the article is structured in three sections: the first part is a review of the literature, from the perspective of factors that may influence the quality of financial information, the second part reveals the methodological approach and the third part presents the results and discussions. The paper ends with the presentation of the main conclusions drawn from the analysis.

1. Factors with a significant influence on the quality of financial information

The quality in accounting can be seen both from a microeconomic perspective, as it is influenced by factors that relate to the conduct of business in the company, the corporate governance system, and the auditors' activity, and from a macroeconomic perspective, seeing as there are many factors outside the company that most often concern the legal and political system of a country or community (such as with the European Community) or certain accounting/ tax policies valid therein. The main factors, internal and external, with an influence on the quality of financial information, results and financial reporting as a whole are captured in ***Figure no. 1***.

Figure no. 1. The determinants of quality in accounting



Source: Authors' processing after Soderstrom and Sun, 2007, p. 688; Dechow, Ge and Schrand, 2010

Of the aforementioned factors, the most frequently analyzed is the one referring to the use of *accounting standards*, particularly the International Financial Reporting Standards issued by IASB. The accounting literature in the last decade comprises a variety of studies that focus on different aspects of IFRS implementation in numerous countries, including Romania. Although it may be seen as the most important external factor, Soderstrom and Sun (2007, p. 688) state that, in reality, the conversion to IFRS and implicitly the use of a unique set of accounting standards may not necessarily help increase the level of financial reporting quality for every firm and country due to certain additional factors that relate to the legal, political and tax systems in the respective country, as well as factors that relate to the actual financial reporting. Givoly et al (2014, p. 6) also posit that in reality, the quality of information provided to users is not just a product of international accounting standards. This is impacted by the incentives of those who draft the financial statements, of managers, who in their turn are dependent on political, social and legal forces and their interaction. Soderstrom and Sun (2007, p. 690) illustrate one first influence of the *legal system* from the perspective of its regulating role that enables the development or enforcement of the regulatory framework. This role is particularly important when considering financial reporting quality following the adoption of International Financial Reporting Standards or, as applicable, after getting national accounting standards in line with European Directives, as is the case for many states, including Romania. The authors also point out that the influence of the legal system can be acutely experienced when considering the two types of legal systems, namely the one governed by common law (as is the case in Anglo-Saxon countries) where the manner for determining accounting standards derive from the requirements of investors instead of the government, and accounting standards are largely determined by private organizations (FASB, IASB), and the one governed by Roman law, which allows governments to control how laws are established and interpreted.

The fact that in Anglo-Saxon countries accounting standards are developed in accordance with the investors' requirements by specialized bodies can be seen as one of the reasons why the accounting literature deems these superior in terms of quality and transparency (as is the case of IFRS described in the literature a high-quality accounting standards (Dimitropoulos *et al.*, 2013; Palea, 2013; Ball, 2016).

Regarding the influence exerted by the *tax system*, it should be noted that in countries where accounting is connected to taxation (as is the case of Romania, described in the literature as partially connected to taxation - Cuzdriorean, 2011), where fiscal administration bodies and banks are still the primary recipients of accounting information, managers are concerned with achieving certain tax goals to the detriment of drawing capital from the market, thus choosing to apply accounting methods that result in diminished profits. Accounting methods that are conducive to increasing profits are preferred by highly leveraged companies, by those promoting a dividend granting policy, as well as by companies where managers' remuneration is conditional upon the size of earnings or where managers have share ownership (Tulvinschi, 2017, p. 112). We can conclude that during periods when the taxation burden is deemed too heavy, there is an ever-growing tendency to reduce it and, implicitly, to manipulate earnings, which has a direct impact on financial reporting quality (Lin, Lu and Zhang, 2012; Kapoutsou, Tzovas and Chalevas, 2015; Sousa, Gonçalves Góis and Viseu, 2019).

The category of internal factors includes determinants of the financial reporting quality regarding *company characteristics* (aspects regarding the leverage ratio, profitability ratio, industry etc.), *audit activity* (auditor's nature, type of auditor, size of auditing firm, duration of audit tenure, or fee levels) and the *corporate governance system* (where we distinguish factors such as the composition of the board of directors, size of the board, changes occurring within the board, etc.).

The company characteristics entail factors such as: industry, company size, capital structure, investment level, leverage ratio, profitability/cost-effectiveness ratio (Cohen, 2003; Dechow, Ge and Schrand, 2010; Iatridis, 2011; Fathi, 2013).

As for the *industry* in which the company operates, Inchausti (1997, p. 56) presents some assumptions on its role with respect to the quantity and quality of information provided to users. Aside from mandatory information, there is a possibility for firms to offer additional data specific of the industry they operate in. Moreover, the author posits that companies in the same industry tend to provide users with information that is very similar in nature, thus aiming to respect a uniform information

submission policy. In close connection, Fathi (2013, p. 321) posits, without referencing information quality, that a company pertaining to a certain industry could be seen as an explanatory factor for the presentation of financial information. The example provided by the author refers to companies in the manufacturing industry, which are required to provide information regarding competition, product differentiation, increasing demand, demand volatility, and risks.

As for *company size*, the results obtained by Iatridis (2011, pp. 91-92) indicate that the companies presenting high quality financial reports are generally large and have market visibility. The author posits that improving the quality of financial reports appears to be positively correlated with company size, liquidity and stock exchange listing, which would mean that large and visible companies are inclined to provide high quality financial information. Concurrently, according to the author, the trend of small and recently listed companies would be to consolidate their financial reporting quality in order to show that future financial performances will improve, and thus to attract new investors. Dechow et al (2010, p. 86) state that company size can be seen as a significant indicator of the type of visibility that influences estimated political costs. Inchausti (1997, p. 53) states that large companies are expected to present a much larger volume of information, because the assumption is that the need for financing is much higher for large companies than for small ones. Consequently, there will be several potential conflicts between owners, lenders and managers, and the provision of information can be used in order to reduce agency costs and informational asymmetry between the company and current and potential investors. Given that the amount of information and its quality do not have the same meaning, the presentation of information, in particular the provision of more information to users, can be viewed with reluctance by users. The study conducted by Rahman & Hasan (2019, p. 15) presents a significant relation between company size and the quality of financial information. The authors believe that large companies are inclined to present more quality information, because unlike small companies, they are more investor-centered.

The *structure of the capital* and, in close connection, *the leverage ratio* are also factors of an internal nature that influence the financial reporting quality. The use of debt in the capital structure varies from one country to another, from one industry to another and at the same time from one company to another, depending on the financing needs of a company, as well as the desire and ability of shareholders to provide funds to a company (Ahmad and Alrabba, 2017, p. 498). In the accounting literature, capital structure is frequently correlated with the issue of informational asymmetry, as well as with the agency theory. To this end, Soderstrom & Sun (2007, 693) assert that shareholders and lenders use different methods to reduce informational asymmetry. When investors resort to stock exchanges for placing capital, they rely on the financial reports of a company and expend resources to obtain this information. Sun (2006, p. 2) posits that capital market investors reduce informational asymmetry by requesting extensive public information, while banks reduce it via private communication with managers, such as regular meetings with loan officers. Consequently, financial reporting is expected to be more useful for companies that depend on capital financing. Lin & Lee (2016, p. 145,157) state that the theory of traditional capital structure suggests that determining an optimal capital structure is achieved by balancing the costs and benefits associated with different degrees of financial leverage. Lin & Lee (2016, p. 157) posit that companies having high levels of financial reporting quality tend to adopt the equity financing method, an idea also supported by Soderstrom & Sun (2007, p. 693) who have identified a lower level of returns quality in countries where company financing is made predominantly via banks.

One of the factors directly impacting accounting quality, with an emphasis on the quality of results, is the *profitability* of the entity. A profitable company could provide users with more information in order to consolidate the credibility of reported results and to enhance its reputation. In other words, companies tend to communicate information more often when the result is positive, and low financial performances become grounds for earnings management (Fathi, 2013). Managers that fail to maintain steady profits or contribute to increasing the profits could resort to earnings management and misrepresenting the financial performance of the company in order to ensure their continued tenure (Summers and Sweeney, 1998, p. 136). The agency theory suggests that managers of highly profitable firms will use detailed information to obtain personal benefits. Consequently, they will disclose such information in order to preserve their

position and contracts. The signaling theory[1] assumes that owners will be interested in offering "good news" to the market in order to avoid their stock being underestimated. According to the political process theory[2] high profit companies will be more interested to disclose more information in order to justify their profit rates (Inchausti, 1997, p. 54). The results obtained by Sun & Rath (2009, p. 1119) suggest that company size and return on assets (ROA) play a major part in determining the direction of earnings manipulation. Using the case of Australian companies, the authors state that small companies with low levels of return on assets have much higher chances of resorting to earnings manipulation techniques. Iatridis (2011) states that it is to be expected for company profitability and high financial reporting quality to be correlated, as this can be seen as a rational choice on behalf of the management.

The public interest role of audit means that a community of people and institutions rely on the quality of an auditor's or audit company's activity. A high quality audit will contribute to the orderly functioning of markets by improving the integrity and efficiency of financial statements (European Parliament and European Union Council, 2014, l. 1). As we can also see in the EU Regulation no. 537/2014, auditors are assigned a very important role in the social sphere, as they ensure the objectivity, transparency and reliability of the financial reports provided to the public. The most frequently encountered quality determinants focusing on the audit activity entail factors such as: *the type of auditor*, *duration of tenure* and, in the same vein, *auditor rotation* and *fees charged by auditors*. The accounting literature places these factors first and foremost in the category of audit quality determinants, starting in this sense on the assumption that a quality audit is implicitly conducive to high-quality financial reporting.

The auditor's membership in the Big N[3] group is seen in the literature as a sign of the quality of the audit activity. To this end, DeAngelo (1981, pp. 189–190) and Sirois et al. (2016, p. 113) argue that the size of the audit firm is a proxy for quality (auditor independence). For a large auditor, each client is important because failing to act to meet the requirements of a particular client would jeopardize his or her reputation. On the contrary, an audit firm with a single client can conclude that it has more to gain by meeting that client's requirements and reporting in an erroneous manner than if it is thorough and risks being fired. Francis (2004, p. 352) argues that the audit performed by members of Big 4 does not mean an implicit superiority in terms of quality, but that the audits of Big 4 companies as a group will be, on average, of better quality than those of other (smaller) accounting firms.

The results obtained by Lopes (2018) suggest that there is a relation between the quality of audit and earnings management. According to the author, the level of earnings management is significantly lower in companies reaching out to Big 4 audit companies, compared to companies using a non-Big 4 audit company. A study on the perceived quality of audit in terms of the preparers of the financial statements, the users of audit reports and the auditors conducted by Gray & Ratzinger (2010, p. 344) reveals that stakeholders believe that large and multinational companies should use the services of a Big 4 auditor, due to the latter's expertise (in this case the assumption is that all Big 4 companies interpret standards in the same manner, significantly diminishing the probability of errors occurring for this reason). Other types of companies can resort to non-Big 4 auditors, as study results suggest that smaller audit companies will provide the same quality audit as the 4 major companies.

[1] The theory describes the behavior when two parties (persons or organisations) have access to different information. Typically, one party (the sender) has to choose if and how to communicate the respective information, while the other party (the recipient) has to choose how to construe the signal (Connelly *et al.*, 2011).

[2] Also known as the "theory of political opportunities", the political process theory provides an explanation for the conditions, thought process and actions that make social movement successful in reaching its goals. According to this theory, the political opportunities for change first have to be present before a movement can achieve its goals (Crossman, 2019).

[3] We are using the generic Big N name as the literature highlights that before 1989 the group was known as the Big 8, from 1989 to 1997 it was known as the Big 6, then it became the Big 5 between 1998 and 2001; then, after the 2002 crash of the Arthur Andersen company, the final name that remained was the Big 4 (Wootton, Tonge and Wolk, 1994; Bamber and Iyer, 2002; Ferguson and Stokes, 2002; Krishnan, 2003; Francis, 2004, p. 346; Francis, Michas and Yu, 2013; Eshleman and Guo, 2014)

We can thus conclude that hiring a Big 4 member for completing the audit mission is most often seen as a plus in the accounting literature in terms of audit quality and implicitly overall quality. However, we cannot state that quality audit ca be correlated exclusively with company auditing by Big 4 auditors, as there are papers such as those by Chang, Cheng and Reichelt, 2010; Lawrence, Minutti-Meza and Zhang, 2011; Alves, 2013; Chen, Elemes and Lobo, 2018, which present conflicting results suggesting that not only Big 4 members provide quality services, thus casting doubt over this Big 4 supremacy "myth". Chen et al (2018, p. 1) state that because the clients' demand can be determined more by their tax goals rather than their financial reporting quality goals, and seeing as their structure is less optimized for providing audit services at low costs, the four major auditors may be less incentivized than non-Big 4 auditors to improve the quality of financial reporting in private companies.

Chu et al (2018, p. 528) introduce the issue of *duration of an auditor's tenure***.** In their opinion, as the company auditor has an essential part in certifying the reported book values, one obvious question is if the auditor's tenure – which helps the auditor acquire specific knowledge of the company and to conduct efficient audit examinations – has a positive or negative effect on financial reporting quality. The duration of the audit tenure is a delicate matter, a double-edged sword. On the one hand we can state that an extended duration of an auditor's tenure helps the latter acquire solid knowledge about the audited entity, being able to more easily discover errors, discrepancies and instances of attempted fraud. On the other hand, increasing the dependency on that client as a result of wishing not to lose the contract, particularly when contracts with large, famous and financially potent companies are under discussion, could lead to compromising the quality of the audit service.

Using two proxies for financial reporting quality and a sample of Big 6 clients that are similar in terms of size and industry, Johnson et al (2002, p. 637) ascertain that a relatively short tenure of around two to four years is associated with low quality financial reports. Moreover, the authors did not find proof regarding the association between low quality in financial reports and audit tenures exercised over extended periods of time of 9 years or more.

In order to analyze the influence of corporate governance on the financial reporting quality, we considered it relevant to start from one of the most well-known and used definitions of the term (Napier and Shah, 2015), respectively the one presented in the Cadbury report in 1992, according to which the corporate governance system is: *„the system via which companies are led and controlled".* Boards of directors are in charge of governing their companies, and the role assigned to shareholders in the governance is to appoint the directors and auditors and to make sure there is an adequate governance structure. The responsibilities of the board of directors include the stability of strategic goals, monitoring their enforcement, supervising the management of business and reporting results to the shareholders (Alzoubi, 2012, p. 249). According to the agency theory*, the characteristics of the board of directors* (characteristics such as size, composition, independence and number of tenure years, etc.) may affect the quantity and quality of financial information provided by the company (Fathi, 2013, p. 321). Also, in close connection with the role assigned to the board of directors, the accounting literature pays attention to the characteristics of *auditing committees* which, pursuant to Directive 2006/43/EC, should mandatorily exist in public interest institutions.

As for the *size of the board of directors*, which is one of the most frequently analyzed factor alongside board composition and independence, there are conflicting results on the influence exercised by this factor. On the one hand, the literature presents a negative relation (the larger the board, the lower the financial reporting quality drops); on the other hand, there is also a positive influence (the belief being that a larger board is comprised of members with different specializations, concerned with providing such knowledge and skills to the company in order to please the shareholders). For instance, Xie, Davidson III and DaDalt, 2003; Bradbury, Mak and Tan, 2006; Fathi, 2013; Htay, Mohd Said and Salman, 2013; Zona, Zattoni and Minichilli, 2013; Chakroun and Hussainey, 2014; Akeju and Babatunde, 2017; Al-Shaer, Salama and Toms, 2017 have identified a positive relation between board size and financial reporting quality. These results imply that better quality of annual reports could be achieved by increasing the size of the board (Htay, Mohd Said and Salman, 2013, p. 242). Xie et al (2003, p. 300) posit that a larger board could be better for preventing earnings management compared to a smaller board, because larger boards may include several independent directors with solid corporate and financial expertise. The authors prove that

there is a significant negative connection between large board of directors and the level of discretionary accruals and suggest that a larger number of experienced directors helps prevent earnings management.

Alternatively, authors such as Kao and Chen, 2004; Abdul Rahman and Haneem Mohamed Ali, 2006; Byard, Li and Weintrop, 2006; Cheng, 2008 presented evidence certifying that there is a significant negative relation between board size and financial reporting quality, suggesting that in the case of small boards there is a higher possibility of obtaining quality financial reports. One explanation in this regard was provided by Kao & Chen (2004, p. 98) and Fathi (2013, p. 321), who state that the large size of boards of directors contribute in increasing communication and coordination deficiencies, and also reduces the directors' capacity to supervise the management.

The influences to be considered, aside from those regarding the characteristics of the board of directors (composition, structure, independence of members) focus on the *changes* occurring in the composition thereof (changing one or several members) and in the executive management (by changing the CEO, the CFO, etc.). Seeing as the literature presents examples where the change occurring in the management of a company may lead to earnings management in such company (particularly via provisions under the so-called "big-bath" provisioning scheme), it is important that we mention the consequences of the changes occurring in the management of a company in terms of company performance, as well as on the reporting quality thereof.

Pourcieu (1993, pp. 321-322) states that each change to the management team is unique and occurs as a result of a variety of circumstances. It is also a known fact that new managers try to accuse those previously in charge of poor performances, allowing the new management team to take credit for improved performances. Jones (2011, p. 33) asserts that when the management of a company changes, the new management tends to blame former managers for all the poor results. The so-called "big bath" technique is adopted, via which poor results will be made to appear even poorer, allowing the new managers to get started from a low baseline and enhance future results.

Denis & Denis (1995, pp. 1029-1030) have demonstrated that when the board of directors, aiming for shareholder wealth maximization, decides to remove underperforming managers and appointing suitable substitutes, this change will bring about significant improvements in the performance of a company. However, this solution proves useless in two cases. Firstly, managers can voluntarily resign from underperforming companies, perhaps to avoid lawsuits filed by shareholders. Secondly, the boards of directors in corporations may replace the managers of underperforming companies, even though the managers are not responsible for the poor performance. Thus, neither of these scenarios is necessarily about a management change geared towards improving performances. To this effect, Gois (2009, p. 7) states that the accounting literature centered on changing the CEO is primarily used to understand this change as an internal control mechanism and that it is typically associated with a low level of company performance. Francis et al (2008, p. 112) have ascertained that companies with a low level of results' quality are more susceptible to hiring new executive officers with better reputations compared to previous directors. Nevertheless, Geiger & North (2006, p. 781) state that the CFO has a substantial control over the financial results a company reports, and following their study they ascertained that discretionary accruals dropped significantly after appointing a new CFO, without such a change also entailing the appointment of a new CEO. Huson & Malatesta (2004, pp. 241-243) find that the performance of a company is at a low level before changing the management, thus indicating that boards of directors "reward" managers' poor performance by replacing them.

The *audit committee* is a subcommittee of the board of directors, providing an easier mean of official communication between the board of directors, the internal monitoring system and the external auditor. In fact, the audit committee fulfills management supervisory roles in terms of audit, financial reporting, internal control and risk management within organizations, ergo it is expected to protect the shareholders' interest (Alves, 2013, p. 147). The board of directors delegates the responsibility to the audit committee to enhance the relevance and reliability of presented financial information, and these can be seen as a monitoring mechanism that leads to increasing the quality of information flow between shareholders and managers (Fathi, 2013, p. 323). Tavierne (2019) states that organizing such a committee for a company is a mean of proving transparency, ethical financial behavior and proper business management. The results obtained

in the accounting literature regarding the influence exercised by the existence of such a committee, the size, compositions and quality thereof, as well as other elements such as members' independence on the quality of financial reporting lead to different opinions. The results obtained by Rainsbury et al (2009) indicate that there is no significant association between the quality of an audit committee and the financial reporting quality, and Bajra & Cadez (2018, p. 161) argue, on the one hand, that only the official existence of an audit committee is negatively associated with the quality of financial reporting. On the other hand, the authors analyzed the impact of the audit committee's competencies on monitoring the effectiveness and quality of financial reporting in a sample of listed companies in the main European Union stock exchanges, finding that these competencies are positively associated with the financial reporting quality. Similarly, Alves (2013, p. 158) concludes, based on the study undertaken for Portuguese companies, that the existence of an audit committee and the external audit do not independently limit earnings management, but only these two taken together lead to a reduction in earnings management, which implies a high level of financial reporting quality. Felo et al (2003, p. 1) have analyzed the relation between two characteristics of the audit committee (*composition* – estimated function of members' expertise and independence – and *size of the audit committee*) and the financial reporting quality; their conclusion was that there is a positive connection between the percentage of audit committee members with accounting or financial management expertise, the size of the audit committee and financial reporting quality, and that concurrently the independence of the committee does not influence the financial reporting quality. The results obtained by Pomeroy & Thornton (2008, p. 1) following their meta-analysis, contrary to the results obtained by Felo et al (2003), identify the independence of the audit committee as the most frequently selected metric for audit committee quality, which contributes in fact in enhancing the quality of financial reporting. Kusnadi et al (2016, p. 197) confirm that having a „mix of knowledge" in terms of accounting, taxation and management in audit committees is likely to lead to an increase in financial reporting quality.

Another category of factors that influence the quality in accounting is related to the socio-cultural environment. Hofstede defines culture as "the collective programming of the mind distinguishing the members of one group of people from others". The author states that this determines the identity of a group of people the same way that personality determines an individual's identity, and the word itself is reserved for nations, while the term "subculture" is used for an organization, profession or family (Hofstede, 1980, p. 24). As stated by the author, the national culture of any country can be described using four dimensions: *power distance*, *individualism*, *avoidance of uncertainty* and *masculinity*. Starting from the dimensions proposed by Hofstede, Gray (1988) postulates the existence of an *accounting subculture* and presents, in turn, the following four cultural dimensions: *professionalism versus statutory control; uniformity versus flexibility*; *conservatism versus optimism;* and *discretion versus transparency*.

The first dimension, *professionalism versus statutory control,* was proposed in a context where accountants have the possibility to adopt independent attitudes and exercise their individual professional judgements to a greater or lesser extent across the world. Strongly correlated to this is also the matter of the extent to which the accounting profession should be subject to public regulation or to regulation by professional associations. The second dimension, *uniformity versus flexibility*, was proposed because attitudes towards uniformity, coherence or comparability have always been seen as universal principles in this domain (Tanaka, 2014) and are to this date incorporated as qualitative characteristics of accounting information worldwide, which is why this dimension can still be deemed significant. The *discretion versus transparency* dimension stems from management and accounting alike, on account of the influence of leadership on the quantity of information made available to users. It would also appear that discretion is tightly connected to conservatism, to the effect that both values entail a caution approach to financial reporting, with discretion being connected to reporting and conservatism to measurement (Gray, 1988, p. 11). The last dimension, *conservatism versus optimism,* can be deemed a significant dimension of the book value, as conservatism is thought of as the oldest and probably the most wide-spread principle of accounting evaluation. Gray (1988, p. 10) sees conservatism in measurement as a fundamental attitude of accountants across the world. Moreover, it fluctuates for each country, ranging from a highly conservative approach in Continental-European countries to a much less conservative attitude specific of Anglo-Saxon countries.

Following the analysis of the literature, a mixture of influences exerted by different factors can be identified, without there being universally valid results, which provides support for further analysis of the determinants of the financial reporting quality.

Thus, starting from the informational landmarks identified in the literature, we aimed to test the following hypotheses:

H1: *A series of factors, such as return on assets (ROA), leverage ratio (TLSSFU), cash flow rate (OCF), size of the company (LNA), equity need (ECN), debt capital need (DCN), earnings variation (ΔE), the provisions/ total debt ratio (Prov/ TL), the provisions/ assets ratio (Prov/ A) and, respectively, conservatism (Fconserv), significantly influence the financial reporting quality*.

H2: *A number of factors, such as the amount of information presented (PC), the change in the management team (MC), the number of shares (SH), the type of auditor (AU), the industry (I) and the auditor's years of tenure (AUyears), significantly influences the financial reporting quality*.

2. Research methodology

The study aims to analyze the level of financial reporting quality for Romanian companies from the perspective of its determinants. The analysis includes a total of 58 companies listed on the Bucharest Stock Exchange (BSE) on the Standard and Premium tier. From a total of 83 listed companies registered in 2020 we excluded some companies as follows:

12 financial institutions, financial investment institutions, mutual funds and other similar financial entities;

13 companies for which it was not possible to collect data for the analysed period.

The data for the analyzed variables were manually collected from the individual financial statements of companies, reported in accordance with IFRS. The time frame considered for regressions pertained to the 2013-2019 period. We opted for this time interval, as 2012 is the first year when companies listed on the Bucharest Stock Exchange prepared their financial reports in line with IFRS and, at the time of data collection, we identified a series of adjustments that would significantly impact the assessment of financial reporting quality using the proposed index. Our primary source of data collection was the *www.bvb.ro* website, and in some cases (either on account of data unavailability on *www.bvb.ro*, or to ensure the confirmation of certain data) we accessed the websites of the analyzed companies. For each year, we considered all 58 companies, thus totaling 406 observations.

To test the working hypotheses, the study classifies Romanian companies in the sample based on the quality of annual reports in *companies with a high level of financial reporting quality* and *companies with a low level*. The separation of financial reports in this study into the two categories was based on a quality assessment tool that would evaluate the financial reporting quality using the fundamental and enhancing qualitative characteristics proposed by van Beest, Braam and Boelens (2009). The classification proposed by Iatridis (2011) is based on the examination of financial statements of companies using a check list proposed by the Investor Relations Society (IRS) which considers items that are similar to those used by van Beest, Braam and Boelens. The instrument proposed by the authors and used as such in this research is an index comprising 21 items, grouped into five sections: two for relevance and faithful representation – fundamental qualitative characteristics and three for understandability, comparability and timeliness – enhancing qualitative characteristics and was validated in the case of Romanian companies by Ciocan & Georgescu (2019). No separate items were created for the fourth enhancing qualitative characteristic proposed by the IASB Conceptual Framework, i.e. verifiability, as Van Beest, Braam and Boelens (2009) included it in the measurement tool as a sub-position of faithful representation. Each item is evaluated using a five values scale that allows us to examine the extent to which the financial reports meet each of the qualitative characteristics. Based on the assigned values, we calculated a score that comprises both **fundamental** and **enhancing** qualitative characteristics, the first weighing 67%, its components being considered by the Conceptual Framework as the most important in relation to the quality of financial reporting. Financial reporting quality, as a dependent (explanatory) variable, takes the form of a dummy variable used for logistic regression and which:

- takes the value 1 for high quality annual reports – for cases where the calculated score, comprising both fundamental and enhancing qualitative

characteristics, has values comprised in the [3,5] interval.

- takes the value 0 for low quality annual reports – for cases where the calculated score has values comprised in the [1,3] value, the value 3 being deemed in the two cases as the intermediate point on the scale of values used to assess quality.

Considering the proposed dependent variable, the study implements a series of logit models, via which the explanatory variables are strictly accounting ones (the equations (1), (2) and (3)), followed by logit models via which the explanatory variables are a mixture of general attributes specific of the company [the equations (4) and (5)]. The study targets the 2013-2019 period, and the proposed equations start from the models proposed by Iatridis (2011) – equations (1), (4) – to which we add a series of new variables that target the use of provisions, in their capacity of instruments for risks assessment and the opinion of external auditors regarding conservatism compliance.

The proposed equations are as follows:

$$AQ_{i;t} = \beta_0 + \beta_1 ROA_{i;t} + \beta_2 MVBV_{i;t} + \beta_3 TLSSFU_{i;t} + \beta_4 OCF_{i;t} + \beta_5 LNA_{i;t} + \beta_6 ECN_{i;t} + \beta_7 DCN_{i;t} + \beta_8 \Delta E_{i;t} + \varepsilon_{i;t} \quad (1)$$

Where:

AQi;t (*accounting quality)*	is a dummy variable that takes the value 1 for high quality annual reports and the value 0 for low quality annual reports
ROAi;t (*return on assets*)	is the return on assets ratio calculated as the net income before extraordinary items scaled by total assets
MVBVi,t (*market value to book value*)	is the market value scaled by book value of the share.
$TLSSFU_{i;t}$ (*total liability scaled by shareholder funds*)	represents total liabilities scaled by shareholders' funds,
$OCF_{i;t}$ (*operational cash flow rate*)	is operating cash flows scaled by total assets,
LNA_i, (*logaritm of total assets for company size*)	is the log of total assets,
$ECN_{i;t}$ (*equity capital needs*)	is a dummy variable indicating company equity capital needs. Takes the value 1 for companies needing equity and the value 0 otherwise. To determine this need we consider **the working capital** (calculated as equity – net non-current assets) which, if negative, indicates the need for equity.
$DCN_{i;t}$ (*debt capital needs*)	is a dummy variable indicating company debt capital needs. Takes the value 1 for companies needing debt capital and the value 0 otherwise. To determine this need we consider **the debt working capital** (calculated as debt capital – net non-current assets) which, if negative, indicates the need for non-equity capital.
$\Delta E_{i;t}$ (earnings)	is the change in net income before extraordinary items
$\beta_{0,1,2,3}$	regression coefficients
$\varepsilon_{i;t}$	random variable, error
i	company
t	year

$$AQ_{i;t} = \beta_0 + \beta_1 ROA_{i;t} + \beta_2 TLSFU_{i;t} + \beta_3 OCF_{i;t} + \beta_4 LNA_{i;t} + \beta_5 ECN_{i;t} + \beta_6 DCN_{i;t} + \beta_7 \Delta E_{i;t} + \varepsilon_{i;t} \quad (2)$$

As a number of share price information could not be collected, equation 2 excluded the variable MVBV (market value scaled by book value). The two equations (1) and (2) were tested and included in **Table no. 2**, being considered as a starting point for the construction of equation (3), presented below, ***equation underlying the testing of hypotheses.***

$$AQ_{i;t} = \beta_0 + \beta_1 ROA_{i;t} + \beta_2 TLSFU_{i;t} + \beta_3 OCF_{i;t} + \beta_4 LNA_{i;t} + \beta_5 ECN_{i;t} + \beta_6 DCN_{i;t} + \beta_7 \Delta E_{;t} + \beta_8 Pro/TL_{i;t} + \beta_9 Prov/A_{i;t} + \beta_{10} Fconserv_{i;t} + \varepsilon_{i;t} \quad (3)$$

Where:

Prov/TL$_{i;t}$ (*provisions scaled by total liability*)	represents provisions scaled by total debt
Prov/A$_{i;t}$ (*provisions scaled by total asset*s)	represents provisions scaled by assets
Fconserv$_{i;t}$ (*follow conservatism*)	is a dummy variable indicating the auditors' opinion regarding the compliance with conservatism, which takes the value 1 when there is compliance (the audit opinion is unqualified and there are not presented reasons for they're not able to present an unqualified opinion, or cases where the presented reasons do not imply violation of conservatism) and takes the value 0 otherwise.

All other variables in eq. (3) are defined as in eq. (1). According to the model proposed by Huțanu (căs. Toma), 2016 in her doctoral thesis, we considered that there is compliance with conservatism in the case of companies that obtained an *unqualified opinion* in their audit reports and in the case of other types of opinions whose presented reasons do not concern aspects related to violation of conservatism (i.e., concerns regarding recognizing/ supplementing provisions or adjustments etc.). In order to construct equation (5) necessary for testing the H2 hypothesis, we consider the following equation involving factors related to the company and the business environment in general:

$$AQ_{i;t} = \beta_0 + \beta_1 TV_{i;t} + \beta_2 PC_{i;t} + \beta_3 MC_{i;t} + \beta_4 D_{i;t} + \beta_5 SH_{i;t} + \beta_6 AU_{i;t} + \beta_7 I_{i;t} + \varepsilon_{i;t} \quad (4)$$

Where:

AQi;t (*accounting quality)*	is a dummy variable that takes the value 1 for high quality annual reports and the value 0 for low quality annual reports
TV$_{i;t}$ (*trading volume*)	is the volume of traded shares reported to total shares
PC$_{i;t}$ (*page count*)	is a logarithm of the number of pages of the annual report
MC$_{i;t}$ (*management change*)	is a dummy variable indicating changes to the company management. Takes the value 1 when there were changes in the management structure during the analyzed year and the value 0 otherwise,
D$_{i;t}$ (*days with no-zero volume*)	is the number of days with a volume of transactions other than zero in the analyzed period reported to the total number of trading days
SH$_{i;t}$ (*outstanding shares*)	is a logarithm of the total number of shares
AUi;t (*auditing company)*	is a dummy variable indicating the auditor and takes the value 1 when a company is audited by a Big-4 auditor and the value 0 otherwise
I$_i$ (*industry*)	is a dummy variable for the industry, encoded according to NACE rev. 2
$\beta_{0,1,2,3}$	regression coefficients
$\varepsilon_{i;t}$	random variable, error
i	company
t	year

$$AQ_{i;t} = \beta_0 + \beta_1 PC_{i;t} + \beta_2 MC_{i;t} + \beta_3 SH_{i;t} + \beta_4 AU_{i;t} + \beta_5 I_{i;t} + \beta_6 AUyears_{i;t} + \varepsilon_{i;t} \quad (5)$$

Where:

AUyears$_{i;t}$ (*audit years*)	represents the auditor's years of tenure

Due to the small number of observations, the variables TV (volume of traded shares reported to total shares) and D (number of days with a volume of transactions other than zero in the analyzed period reported to the total number of trading days) were excluded from analysis, equation 5 being proposed. Equation (4) proposed by Iatridis (2011) is the basis for the construction of equation 5.

3. Results and discussions

Table no. 1 presents the descriptive statistics for the analyzed company sample as follows: *panel A* comprises the mean and standard deviation for the analyzed indicators in high-quality financial reports, and *panel B* presents the same information for low quality financial reports

The descriptive statistic highlights the fact that Romanian companies providing users with ***high-quality financial reports*** are of large sizes (LNA) and have a large number of issued shares (SH), they present higher variations in earnings (ΔE) and need financing via equity capital and/or debt capital (ECN and DCN). Also, they have higher rates of returns on assets (ROA) and rates of operational cash-flow (OCF) which indicates that these companies prepare and submit to the public such reports in order to illustrate the management's capacity to efficiently manage the company assets and to draw in new investors. This fact consolidates the assumption that these companies are more inclined to provide reports of a superior quality. Regarding the compliance with conservatism principle, we note that high values for provisions (scaled by total assets – Prov/A) are registered in companies providing low quality financial reports, compliance with conservatism being a characteristic found in both types of companies, prevailingly in those preparing high quality financial reports.

Regarding variables related to the business environment and company in general, descriptive statistics show that companies with a high level of financial reporting quality include a higher number of pages (PC) in their annual reports and show changes in the management team (MC). At the same time, it can be noticed that the probability that these companies will be audited by a Big 4 auditor is higher than in the case of companies with a lower level of quality and that the tenure of the auditors is shorter.

The extent to which these differences can be considered statistically significant is analyzed through the logit models proposed in equations (3) and (5).

Table no. 1. Descriptive statistics

Variables	Panel A High level of financial reporting quality		Panel B Low level of financial reporting quality	
	Mean	Std. Deviation	Mean	Std. Deviation
ROA	0.0430	0.1811	0.0061	0.0998
TLSSFU	0.8253	8.2919	-0.9297	5.7646
OCF	0.0571	0.0932	-0.0021	0.1731
ECN	0.4518	0.4985	0.3524	0.4800
DCN	0.2691	0.4442	0.2190	0.4156
ΔE	13.0602	167.6545	6.9138	71.2141
PC	2.0991	0.1387	1.9649	0.1098
SH	8.1728	0.9836	7.7005	0.7671
Fconserv	0.8771	0.3289	0.8190	0.3868
MC	0.4884	0.5007	0.3619	0.4829
LNA	19.4417	1.5859	18.1221	0.9984
Prov/TL	0.1759	1.5875	0.1231	0.2032
Prov/A	0.0265	0.0831	0.0884	0.2176
AU	0.3654	0.4824	0.0667	0.2506
AUyears	4.8173	3.7162	5.0571	2.9444
I	3.0000	1.9044	2.9333	1.5459

Source: Own processing in SPSS 23.00

Tables no. 2 and no. 3 present two models for the probability that companies with a high level of financial reporting quality will be significantly different from those with a low level, from the perspective of influencing factors. The first model includes all the variables, both those proposed by Iatridis (2011) and the newly introduced ones, likely to influence the financial reporting quality. When a model includes irrelevant variables, the coefficient estimates are inefficient (Maddala and Lahiri, 1992, p. 181) and therefore the

original model was reduced to include only significant variables. The second model includes only variables that have been identified to be significant in the estimation process.

Table no. 2. High quality annual reports and factors strictly related to accounting

Variables	B (sig)	Exp (B)	Variables	B (sig)	Exp (B)
Factors strictly related to accounting					
Model 1			**Model 2**		
Equation 1					
ROA	4.267* (0.055)	71.330			
MVBV	-.015 (.337)	.985			
TLSSFU	.064 (.370)	1.066			
OCF	3.555 (.153)	35.002			
LNA	.908*** (.000)	2.480			
ECN	-.077 (.874)	.926			
DCN	-.637 (.283)	.529			
ΔE	-.003 (0.28)	.997			
Constant	-15.779	.000			
No. of observations	**270**				
Nagelkerke R Square	**0.367**				
Cox & Snell R Square	**0.249**				
Hosmer & Lemeshow test	**0.599**				
Equation 2					
ROA	.855 (.316)	2.352			
TLSSFU	.055 * (.102)	1.057			
OCF	3.496** (0.021)	32.992			
LNA	.761*** (.000)	2.141			
ECN	-.122 (.758)	.885			
DCN	-.231 (.597)	.794			
ΔE	-.001 (.342)	.999			
Constant	-13.071	.000			
No. of observations	**402**				
Nagelkerke R Square	**.278**				
Cox & Snell R Square	**.189**				
Hosmer & Lemeshow test	**.179**				
Equation 3			**Equation of significant factors of model 1**		
ROA	.806 (.356)	2.238			
TLSSFU	.046 (.145)	1.047			
OCF	4.200* (0.11)	66.658	OCF	3.931*** (.009)	50.974
LNA	.885*** (.000)	2.424	LnTA	.918*** (.000)	2.505
ECN	-.055* (.894)	.946			
DCN	-.491 (.302)	.612			
ΔE	-.001 (.485)	.999			
Pro/TL	.151 (.276)	1.163			
Prov/A	-6.989*** (.000)	.001	Prov/A	-5.986*** (.000)	.003
Fconserv	-.026 (.953)	.974			
Constant	-14.959	.000	Constant	-16.007	.000
No. of observations	**402**		**No. of observations**	**406**	
Nagelkerke R Square	**.369**		**Nagelkerke R Square**	**.345**	
Cox & Snell R Square	**.250**		**Cox & Snell R Square**	**.235**	
Hosmer & Lemeshow test	**.160**		**Hosmer & Lemeshow test**	**.000**	

*** *p<0,01, ** p <0.05, * p <0.1.*

Source: own processing in SPSS 23.00

Note. *Equation (1) is the model proposed by Iatridis (2011). Equation (2) refers to the same model proposed by the author from which the MVBV indicator was excluded because data could not be collected for the whole sample. Equation (3) is the model adapted by introducing variables concerning the use of provisions (Prov/ TL, Prov/ A) and the opinion of auditors on compliance with conservatism (Fconserv). The equation of significant factors of model 1 is the reduced version of the adapted model and includes only the significant variables identified following the testing of equation (3).*

In order to interpret the results of the logistic regression regarding the influence of the factors strictly related to accounting, we will take into account the results obtained for eq. (2) and (3) of **Table no. 2**, which is the first proposed model. The testing of eq. (1) indicated, within the limits of the available observations, that the influence of increasing company value (MVBV) on the degree of quality of financial reporting was not statistically significant. Both model 1 and model 2 have explanatory power (Nagelkerke R Square: 0.369 and 0.345; Cox & Snell R Square: 0.250 and 0.235). The Hosmer-Lemshow test indicates a compatibility of the two models, and the value for the second model (0.000) is significantly better compared to the first extended model (0.160).

Of the first series of tested equations [eq. (1), (2), (3)], *which entail variables strictly related to accounting,* there are three major factors in the first tested model with an acceptable significance level: two proposed and validated by Iatridis (2011) and a newly introduced one centered on conservatism compliance.

The first factor that was validated in the case of Romanian companies listed on the Bucharest Stock Exchange was *the company size* (LNA). The coefficient sign is positive, as it also resulted from Iatridis' study (2011, p. 91), meaning that companies with a high level of financial reporting quality are distinguished from those with a lower level of quality by size, the former being larger and more visible on the stock market. Company size also influences the management's decisions and actions, and it also dictates how the company is managed, monitored by financial analysts, investors and stock market authorities. In the case of companies listed on the Bucharest Stock Exchange, we can see a different management system in large companies, where the company management most often also includes a Board of Supervisors in addition to the Board of Directors, the latter being subordinate to the former.

The second factor, validated in the case of both Romanian and British companies, is the rate of operating cash flow, which indicates that companies presenting a high level of financial reporting quality prepare and submit to the public such reports in order to illustrate the management's capacity to efficiently manage the cash flow.

Table no. 3. High quality annual reports and factors related to business and company in general

Variables	B (sig)	Exp (B)	Variables	B (sig)	Exp (B)
Factors related to the business and company in general					
Model 1			**Model 2**		
Equation 5			**Equation of significant factors of model 1**		
PC	7.347 (.000)	1551.030	PC	8.425 (.000)	4557.925
MC	-.196 (.485)	.822			
AU	-1.596 (.001)	.203	AU	-1.632 (.000)	.196
AUyears	-.021 (.550)	.979			
NACE encoding					
Extractive industry	-1.351 (1.000)	.259			
Manufacturing industry	-19.950 (.999)	.000			
Production and supply of electricity and heat, gas, hot water and air conditioning	-2.124 (1.000)	.120			
Constructions	-20.091 (.999)	.000			
Wholesale and retail trade	-21.208 (.999)	.000			
Transport and storage	-.662 (1.000)	.516			
Hotels and restaurants	-19.645 (.999)	.000			
SH	.114 (.527)	1.121			
Constant	6680	796.606	Constant	-14.700	.000
No. of observation	**405**		**No. of observation**	**405**	
Nagelkerke R Square	**.398**		**Nagelkerke R Square**	**.332**	
Cox & Snell R Square	**.271**		**Cox & Snell R Square**	**.227**	
Hosmer & Lemeshow test	**.679**		**Hosmer & Lemeshow test**	**.462**	

**** p<0,01, ** p <0.05, * p <0.1.*

Source: Own processing in SPSS 23.00

Note. *Equation (5) is the model adapted, after Iatridis (2011), by excluding variables from the original model (for which there was insufficient data) and introducing the variable for the duration of the auditor's tenure (AUyears). The equation of significant factors of model 1 is the reduced version of the adapted model and includes only the significant variables identified following the testing of equation (5).*

As far as the indicators we proposed are concerned, we can notice that ,of the two rates deemed relevant for the analysis of provisions (Dicu and Mardiros, 2015, p. 44), the one that influences the financial reporting quality is the provisions scaled by total assets ratio (Prov/A). In the analyzed case it registers a negative value, thus indicating that companies with a high level of financial reporting quality presented relatively low values of provisions, compared to companies producing low quality financial reports. In other words, financial reporting quality decreases as the value of provisions scaled by total assets increases.

Of the second series of tested equations [eq. (4), (5)] – **Table no. 3**, *entailing variables related to the business environment and the company in general,* we can note that companies having a higher level of financial reporting quality produce more quantitatively significant information than companies with a low level of quality, a hypothesis that is not verified in Iatridis (2011). Also, in this case, both models have explanatory power (Nagelkerke R Square: 0.398 and 0.332; Cox & Snell R Square: 0.271 and 0.227). The Hosmer-Lemshow test indicates compatibility of the two models, and the value for the second model (.462) is significantly better compared to the first extended model (.679).

If in the case analyzed by Iatridis (2011) the audit activity performed by a Big 4 member proved to be associated with companies having a high level of financial reporting, the results obtained for Romanian companies run contrary, i.e., that auditing of annual reports by a Big 4 member is associated with companies producing low quality annual reports, the AU (auditor) indicator registering a negative value.

4. Conclusions

The study aimed to identify the extent to which the considered factors influence the level of financial reporting quality, for Romanian companies listed on the Bucharest Stock Exchange. The results indicate that a high level of quality of financial reporting is obtained under the action of factors (indicators) *built on accounting data*, *characteristic of the organization of the company* or *specific to the business environment* of which it is part.

Following the classification of the companies that form the analyzed sample, depending on the qualitative level of annual reports, specific influences exerted by the three categories of factors can be noticed. Firms with a high level of financial reporting quality are distinguished from those with a low level by size (size is measured by the assets held by the entity under analysis), the former being larger, visible on the stock market, monitored by financial analysts, investors and stock market authorities. A high level of operational cash flow rate suggests that companies with a high degree of quality seek to capture through reporting the ability of management to effectively manage treasury. Given the uncertain role of the use of provisions in obtaining unfair benefits (by exaggerating estimates and recognizing oversized provisions), it was observed that firms with a high level of financial reporting had relatively low values in provisions, compared to companies that present low quality financial reports.

In terms of differences in business and company in general, the results indicate that firms with a high financial reporting quality level provide significantly more quantitative information than firms with a low level of financial reporting quality and that, unlike the accounting literature which often indicates otherwise, a Big 4 member's audit of annual reports is associated with firms that submit low-quality annual reports.

This research has a series of limitations. Firstly, seeing as the study focuses on a sample of companies from a single country, i.e., Romania, it was not possible to approach the external factors described. Secondly, for a series of internal factors and variables presented in the study proposed by Iatridis (2011) we were unable to collect data corresponding to the 2013-2015 period for a large number of companies, thus leading to numerous missing records and their omission from the final analysis. The elimination of these limits represents future research directions.

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The Value Relevance of Non-Financial Reporting in Determining the Market Value of Equity

Assist. Prof. Elena NECHITA, Ph.D.,
Bucharest University of Economic Studies,
e-mail: elena.nechita@cig.ase.ro

Abstract

The value relevance of non-financial reporting is a topic of interest in the academic literature, the results of empirical research being often contradictory. In this context, the research objective is analysing the extent to which the disclosure of non-financial information related to sustainable development in the contents of sustainability reports published by companies listed on the regulated market of the Bucharest Stock Exchange (BSE) is influencing their market value. To conduct the analysis, the present study involves the application of multiple linear regression models developed based on the Ohlson (1995) model for a sample of 34 companies listed on BSE between 2015-2019, forming a number of 166 firm-year observations. The research methodology is based on the association between the firm market value and its equity book value, as well as its net income and other relevant information. Therefore, the value relevance is investigated through their impact on the market value. The findings emphasise an increase in relevance in terms of the influence exerted on the market value of capital as a result of reporting on sustainability issues. Moreover, the study highlights an increase in the impact of equity book value and net income on firms' market value in the period after the adoption of Directive 2014/95/EUD (2017-2019), compared to the previous period (2015-2016). This research complements the literature in the field of sustainability reporting and value relevance, providing empirical evidence on the importance of publishing non-financial information in relation to their market value impact.

Key words: *sustainability; Sustainable Development Goals (SDG); value relevance; market value; listed companies; empirical research*

JEL Classification: *M40, M41, Q56*

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Introduction

Requirements for reporting non-financial information are spreading worldwide, being included in the legislative provisions of an increasing number of states (de Klerk and de Villiers, 2012). In this regard, in the European Union (EU), starting from January 1, 2017 publicly-traded companies that exceed an average of 500 employees have the obligation to report non-financial information (EU, 2014).

This research aims to analyse the extent to which the publication of non-financial reports on sustainable development by companies listed on the Bucharest Stock Exchange (BSE) on the regulated market influences investors' perception in terms of the value relevance of book values and non-financial aspects, by reflecting their impact on the market value for the period 2015-2019. The investigation is based on a development of the Ohlson (1995) model previously used in the literature dealing with the value relevance of accounting values by analysing the impact on firms' market value (Hassel *et al.*, 2005; Baboukardos and Rimmel, 2016; Baboukardos, 2018; Tlili *et al.*, 2019; Grassmann, 2021; Landau *et al.*, 2020).

To conduct the analysis, the study applies multiple linear regression models based on the assumption that after including variables related to non-financial information, the models' goodness of fit (reflected by the coefficient of determination, R^2) is higher for companies that publish sustainability reports. Another research hypothesis estimates that the coefficients obtained for the independent variables included in the regression models will be significantly different from 0, thus emphasizing the association between the book values and the market capitalization of the companies. It is also assumed that the value relevance of the information disclosed from the perspective of the influence on the market value is higher in the period following the adoption of Directive 2014/95/EU (2017-2019) compared to the previous period (2015-2016).

The results of the research validate most of the hypotheses, highlighting that the reporting of non-financial information on sustainable development by BSE listed companies on the regulated market in the period 2015-2019 has led to an increase in the value relevance in terms of the influence on firms' market value. Furthermore, the findings show an increase in the influence of independent financial variables (equity book value and net income) used in the regression model on the market value in the period after the adoption of Directive 2014/95/EUD (2017-2019), compared to the period preceding the directive (2015-2016).

This research complements the literature in the field of sustainability reporting and value relevance, providing empirical evidence on the importance of publishing non-financial information in relation to their market value impact.

The remainder of the paper is structured as follows, starting with the presentation of the current context regarding sustainable development, then the research methodology that provides details on the sample, the variables used and the construction of the regression model applied. This is followed by the third section revealing and discussing the results and the conclusions of the study, respectively.

1. The current context on sustainability reporting and sustainable development goals

1.1. The legislative context regarding the reporting of non-financial information

For the presentation of non-financial information and, in particular, for reporting on sustainability aspects, as well as on the Sustainable Development Goals (SDGs) adopted by the United Nations in 2015 (UN, 2015), companies have the following reporting frameworks to choose from (Dima *et al.*, 2015; Albu *et al.*, 2013; ACCA, 2017):

- Global Reporting Initiative – GRI;
- The five-step approach <IR> framework of the International Integrated Reporting Council (IIRC);
- United Nations Global Compact – UNGC;
- The standards issued by the Sustainability Accounting Standards Board – SASB;
- SDG Compass, developed by GRI, UNGC and the World Business Council for Sustainable Development (WBCSD);
- GRI / UNGC Business Reporting on the SDG guide, designed as a supporting instrument to the SDG Compass;
- UNCTAD ISAR Core Indicators;

– Climate Disclosure Standards Board (CDSB) framework.

The variety of conceptual and reporting frameworks makes it difficult to ensure the comparability of non-financial information reported by companies, as well as of the tools used to comprehend and communicate their impact and contribution to the achievement of the SDGs.

At the European Union level, the options with respect to reporting non-financial information are specified in Directive 2014/95/EU (EU, 2014). Thus, the Directive provides that "in order to enhance the consistency and comparability of non-financial information disclosed throughout the Union" (art. 6, p. 2), large companies which are publicly traded entities exceeding on the balance sheet date the average number of 500 employees during the financial year "should prepare a non-financial statement containing information relating to at least environmental matters, social and employee-related matters, respect for human rights, anti-corruption and bribery matters" (art. 6, p. 2). For disclosing these aspects, companies "may rely on national frameworks, Union-based frameworks such as the Eco-Management and Audit Scheme (EMAS), or international frameworks such as the United Nations (UN) Global Compact, the Guiding Principles on Business and Human Rights implementing the UN 'Protect, Respect and Remedy' Framework, the Organisation for Economic Co-operation and Development (OECD) Guidelines for Multinational Enterprises, the International Organisation for Standardisation's ISO 26000, the International Labour Organisation's Tripartite Declaration of principles concerning multinational enterprises and social policy, the Global Reporting Initiative, or other recognised international frameworks." (art. 9, p. 2). The Directive is transposed into national law by Orders no. 1938/2016 and no. 2844/2016, coming into effect from January 1, 2017 (O.M.P.F. 1.938/2016, art. III, p. 9).

1.2. Reporting on sustainability aspects by publicly traded companies

Non-financial reporting is attracting increasing attention among researchers, practitioners, and regulators internationally. In some cases, capital market regulators require listed companies to provide information on sustainable development through the publication of sustainability reports, which relate to reporting on environmental, social, and governance issues (ESG), as well as occupational safety, either in a separate (independent) report or in a separate section of the annual report (Baboukardos and Rimmel, 2016).

Capital market regulators play a key role in encouraging good corporate governance and transparency by requiring listed companies to comply with sustainability reporting regulations. In this direction, the Bucharest Stock Exchange launches in September 2020 the first initiative focused on reporting ESG indicators for the Romanian capital market (BSE, 2020). The purpose of this approach is to provide quality ESG information on listed companies through Sustainalytics ESG risk ratings. Thus, local issuers will benefit from an initial assessment, with the objectives of promoting responsible investment and highlighting the importance of ESG standards among local participants. The initiative also aims to encourage local companies to align their standards with ESG best practices, which have seen spectacular growth globally in recent years.

1.3. Analysis of the relationship between non-financial reporting and the market value of listed companies

The academic literature identifies two research currents regarding the analysis of the relationship between non-financial reporting and the market value of listed companies, namely researchers who support the cost-concerned school approach, according to which the publication of non-financial information is mainly a costly aspect, rather than an advantage, respectively researchers who support the value-creation school perspective, according to which non-financial reporting brings more value relevance. In this context, empirical studies lead to mixed and sometimes even contradictory results (Grassmann, 2021; Landau *et al*., 2020).

Value relevance can be defined as the ability of book values and non-financial information to influence the market value of companies (Grassmann, 2021; Hassel *et al.*, 2005).

Results of previous research highlight the existence of a positive relationship between sustainability reporting and the market value of a company, as well as the fact that the disclosure of non-financial information increases the quality of results, as an effect of increasing information transparency (Swarnapali, 2020; Grassmann, 2021; Tlili *et al*., 2019). Moreover, companies involved in sustainability efforts have a significantly higher level of profitability indicators among the industrial sector in which they operate (DiSegni *et al.*, 2015).

In addition, Baboukardos and Rimmel (2016) provide mixed results in terms of the influence of sustainability performance indicators, highlighting both a greater value relevance of the net income for companies characterised by a higher level of sustainability performance indicators and the existence of a negative association between the equity book value and the market value for these companies.

On the other hand, Landau *et al.* (2020) and Hassel *et al.* (2005) support the cost-based approach, reflecting evidence on the fact that the performance of environmental indicators and the presentation of non-financial information have a negative influence on the firm market value.

This research aims to investigate whether the publication of non-financial information on sustainable development by BSE listed companies on the regulated market in the period 2015-2019 leads to an increase of the value relevance for investors in terms of the influence exerted on the market value or not.

2. Research methodology

Following the example of previous research (Ohlson, 1995; Hassel *et al.*, 2005; Baboukardos and Rimmel, 2016; Tlili *et al.*, 2019; Landau *et al.*, 2020; Grassmann, 2021), the study aims to determine the extent to which disclosing non-financial information on sustainable development by companies listed on the Bucharest Stock Exchange leads to an increase in value relevance for investors in terms of impact on the market value. Hereinafter, the research methodology sets out the selection criteria of the analysed sample and the procedures applied for data collection, continuing with the definition of variables and the construction of the econometric models underlying the study.

2.1. Sample selection criteria and data collection

Sustainable development is a constituent of the public policy, academia, and civil society in Romania, the main approach considered in this regard being highlighted by the National Strategy for Sustainable Development over the horizon 2013-2020-2030 (Ministry of Environment, 2008).

Given the measures taken at the national level towards achieving sustainability, the research aims to analyse whether the market value is influenced by reporting non-financial information related to sustainable development for companies listed on the Bucharest Stock Exchange or not. The data related to accounting indicators presented in the corporates' financial statements used in the study were collected from the S&P Capital IQ database (Compustat, 2021). Thus, at the date the study was conducted (January-February 2021), out of the total number of 80 companies having their shares traded on BSE on the regulated market in the Premium and Standard tiers, 46 companies were excluded from the sample, as a result of applying the selection criteria presented in **Table no. 1**.

Table no. 1. Details on applying the sample selection criteria

Description	Number of companies	Number of firm-year observations
Initial sample	80	400
Excluding financial institutions	-12	-60
Excluding firms undergoing liquidation	-2	-10
Excluding firms with suspended activity	-4	-20
Excluding firms with unavailable data	-26	-130
Excluding observations with negative equity	-2	-10
Excluding observations showing outliers	0	-4
Final sample	**34**	**166**

Source: Author's processing, 2021

Similar to previous research, financial companies (banks and non-bank financial institutions) were excluded from the sample, as they might be subject to specific regulations and differ in terms of their structure of assets and liabilities (Grassmann, 2021; Tlili *et al.*, 2019). Companies undergoing the process

of liquidation were also excluded from the analysis, as well as the firms having their shares suspended from trading, and those for which there was no information available in the period 2015-2019. According to the study conducted by Baboukardos and Rimmel (2016), the observations that presented negative values of equity were eliminated from the sample. Moreover, following the application of statistical tests meant to verify that the necessary conditions for the use of econometric models are fulfilled, 4 observations were identified and truncated, as they consisted of outliers that presented a level of studentized residuals higher than 3 in absolute value (Hassel *et al.*, 2005).

The companies included in the resulting sample are disclosed in the table presented in the **Appendix**, and **Table no. 2** highlights the classification of companies by industry based on the Global Industry Classification Standard (GICS), a taxonomy developed in 1999 by to the MSCI and S&P Dow Jones Indices (MSCI, 2021) and applied in similar studies (Hassel *et al.*, 2005).

Table no. 2. Industry classification of BSE listed companies forming the analysed sample

Primary industry sector	No. of companies	Percentage of observations
Consumer staples	1	3.01%
Consumer discretionary	6	18.07%
Energy	7	21.08%
Industrials	5	14.46%
Real estate	1	3.01%
Materials	7	21.08%
Health care	3	7.23%
Information technology	1	3.01%
Utilities	3	9.05%
Total	**34**	**100%**

Source: Author's processing, 2021

Regarding the collection of information related to the reporting of non-financial aspects used in the applied research models, the data were extracted from the GRI Sustainability Disclosure Database (GRI, 2021), similar to previous research (Grassmann, 2021; Landau *et al.*, 2020). Taking into account the fact that the database centralises the information provided voluntarily by the companies, the collected data were subjected to additional inspection by accessing the non-financial reports published on the firms' web pages. Similar to the methodology used by Landau *et al.* (2020), in case the sustainability reports or other non-financial reports were available on the company's website, but they were not found in the GRI database, the data were hand-collected from the reports published by the company.

To determine the extent to which companies refer to the Sustainable Development Goals (SDGs) in the analysed reports, information was collected based on the textual content analysis of the reports (Hummel, 2019; Li, 2010), by conducting search queries for keywords such as "sustainability", "sustainable development", "goals", "2030 Agenda".

With respect to the time frame, the period included in the analysis is 2015-2019, as a consequence of the following aspects:

- the SDGs have been adopted by the UN in 2015;
- the first reporting year in accordance with the provisions of the 2014/95/EU Directive related to the disclosure of non-financial information is 2017;
- the most recent annual reports published by the BSE listed companies are available for the financial year 2019.

Following the selection, the resulting final sample includes a number of 166 firm-year observations corresponding to the 34 companies included in the study for the period 2015-2019.

2.2. Presentation of the econometric models and definition of the variables

To shed light on the research question proposed by the paper, an extended version of the Ohlson (1995) model is applied, which is based on the assumption that the

market value is determined by the opening equity book value, the net income, and other relevant non-financial information (Grassmann, 2021; de Klerk and de Villiers, 2012; Baboukardos, 2018; Ohlson, 1995). According to the study conducted by Hassel *et al.* (2005), following an adaptation of the model used by Ohlson (1995), the value relevance of environment performance indicators from the market value standpoint is empirically investigated through the variable based on other non-financial information, v_t, as shown in the regression model in equation (1):

$$MV_t + DI_t = \beta_0 + \beta_1 BV_{t-1} + \beta_2 NI_t + \beta_3 v_t + \varepsilon_t, \quad (1)$$

where MV is the firm's market value, DI is the value of dividends, thus MV + DI is the cum-dividend adjusted market value for financial year t, while BV is the equity book value for financial year t-1 and NI is the variable based on the net income for financial year t.

According to more recent research, the model presented in equation (1) is adapted to the context of non-financial reporting, in particular integrated reporting (Grassmann, 2021; Landau *et al.*, 2020; Tlili *et al.*, 2019; Baboukardos şi Rimmel, 2016). Similar to these studies, the proposed multiple regression model is given by equation (2):

$$\frac{MV_{i,t} + DI_{i,t}}{BV_{i,t-1}} = \beta_0 \frac{1}{BV_{i,t-1}} + \beta_1 + \beta_2 \frac{NI_{i,t}}{BV_{i,t-1}} + \beta_3 GRIREP_{i,t} + \beta_4 SREP_{i,t} + \beta_5 SDG_{i,t} + \beta_6 LOSS_{i,t} + \beta_7 EUD_{i,t} + \sum_{j=1}^{8} \beta_{8j} IND_{i,t} + \sum_{y=1}^{4} \beta_{9y} FY_{i,t} + \varepsilon_{i,t}, \quad (2)$$

For the comparative analysis on the value relevance of published information in terms of their impact on the market value before and after the adoption of the EU Directive related to the mandatory disclosure of non-financial information, the multiple regression model applied is provided by equation (3):

$$\frac{MV_{i,t} + DI_{i,t}}{BV_{i,t-1}} = \beta_0 \frac{1}{BV_{i,t-1}} + \beta_1 + \beta_2 \frac{NI_{i,t}}{BV_{i,t-1}} + \beta_3 GRIREP_{i,t} + \beta_4 SREP_{i,t} + \beta_5 SDG_{i,t} + \beta_6 LOSS_{i,t} + \sum_{j=1}^{8} \beta_{7j} IND_{i,t} + \sum_{y=1}^{4} \beta_{8y} FY_{i,t} + \varepsilon_{i,t}, \quad (3)$$

The variables used in equations (2) and (3) are defined in **Table no. 3**.

Table no. 3. Defining the variables used in the multiple regression models

Variable	Description
$MV_{i,t}$	Market value of firm i in financial year t
$DI_{i,t}$	Dividends distributed by firm i in financial year t, computed as value of dividend per share multiplied by the total number of shares
$BV_{i,t-1}$	Equity book value of firm i in financial year t-1
$NI_{i,t}$	Net income of firm i in financial year t
$GRIREP_{i,t}$	Dichotomous variable that equals 1 if company i published a sustainability report in accordance with GRI standards for financial year t, and 0 otherwise

Variable	Description
$SREP_{i,t}$	Dichotomous variable that equals 1 if company i published a sustainability report or other type of non-financial report for financial year t, and 0 otherwise
$SDG_{i,t}$	Dichotomous variable that equals 1 if company i mentioned the SDGs in the sustainability report published for financial year t, and 0 otherwise
$LOSS_{i,t}$	Dichotomous variable that equals 1 if company i obtained a negative net income (loss) for financial year t, and 0 otherwise
$EUD_{i,t}$	Dichotomous variable that equals 1 for the period following the adoption of the EU Directive on the disclosure of non-financial information (2017-2019), and 0 for the period preceding this Directive (2015-2016)
$IND_{i,t}$	Dummy binary variable based on 8 of the 9 industries under GICS classification; the variable equals 1 if firm i operates in industry j for financial year t, and 0 otherwise (where j takes values from 1 to 8, one for each of the 8 primary industry sectors)
$FY_{i,t}$	Dummy binary variable based on 4 of the 5 analysed financial years; the variable equals 1 for firm i in financial year y, and 0 otherwise (where y takes values from 1 to 4, one for each of the 4 financial years)

Source: Author's processing, 2021

Thus, the cum-dividend adjusted market value, $MV_{i,t} + DI_{i,t}$, is the dependent variable of the multiple linear regression model, where the market capitalization is measured 4 months after the end of the financial year and considering a time gap of 10 days after the publication deadline, to include the impact of the information on the market. The timing with respect to collecting the market value data varies from one study to another, from 10 days after the first quarter following the end of the financial year (Hassel *et al.*, 2005), to 3 months after the end of the financial year (Grassmann, 2021; de Klerk and de Villiers, 2012), up to 6 months after the financial year end (Landau *et al.*, 2020; Baboukardos and Rimmel, 2016). These approaches differ depending on the date on which the companies' reports are published and become available to investors and stakeholders. The choice for this research is based on the provisions of Law no. 297/2004 related to the capital market, as well as on the Bucharest Stock Exchange Code (2019 updated edition), according to which "the company admitted to trading on a regulated market shall make available to the public, within maximum 4 months from the end of the financial year, the annual financial statements, together with the annual report, approved by the general meeting of shareholders" (Parliament of Romania, 2004 - Law no. 297, art. 227, par. 4, pp. 53-54).

The equity book value (BV) and net income (NI) are the independent variables based on financial indicators included in the regression model, estimating a positive relationship between these two variables and the market capitalization (MV). To mitigate the effect that the firm size might have on the results of the analysis, according to previous research (Hassel *et al.*, 2005; de Klerk and de Villiers, 2012; Grassmann, 2021), monetary variables were scaled by the opening equity book value ($BV_{i, t-1}$). All financial variables (MV, DI, BV şi NI) were collected from the Compustat database (S&P Capital IQ).

Variables GRIREP, SREP and SDG complete the list of independent variables, this time the ones capturing non-financial aspects. According to similar studies, the data underlying the construction of the 3 binary variables was collected from the GRI Sustainability Disclosure Database (which centralizes information voluntarily transmitted by companies) and complemented or double-checked through the textual analysis of the non-financial reports' contents published by companies on their own websites (Landau *et al.*, 2020; Grassmann, 2021; Baboukardos şi Rimmel, 2016). GRIREP indicates the extent to which companies publish non-financial reporting prepared in accordance with GRI standards (Kuzey and Uyar, 2017; de Klerk and de Villiers, 2012), while SREP reflects whether companies publish separate (independent) non-financial reports, regardless of applied framework (Landau *et al.*, 2020; Swarnapali, 2020; Baboukardos, 2018; Kuzey and Uyar, 2017). The SDG variable highlights whether firms refer in the content of their non-financial reports to the sustainable development goals adopted by the UN in 2015.

The control variables included in the regression model are LOSS, EUD, IND and FY.

LOSS is the dichotomous variable that captures the influence of reporting a negative net income on the market capitalization (Baboukardos, 2018; Baboukardos and Rimmel, 2016).

The binary variable EUD analyses the extent to which the adoption of Directive 2014/95/EU, applicable from 1 January 2017, influences the relationship between the market value and the book values included in the model (Baboukardos and Rimmel, 2016; Tlili *et al.*, 2019).

Being consistent with most research papers applying a similar methodology, dummy control variables have been included in the regression model to eliminate possible effects of industry (IND) and differences between financial years (FY) (Hassel *et al.*, 2005; Baboukardos and Rimmel, 2016; Baboukardos, 2018; Tlili *et al.*, 2019; Grassmann, 2021; Swarnapali, 2020).

Although used in regression models applied by similar studies (Baboukardos and Rimmel, 2016; Baboukardos, 2018; Tlili *et al.*, 2019; Swarnapali, 2020), no variables to control for the firms' size were included, as the monetary variables that might have been influenced by the size were scaled by the equity book value of the previous financial year (Hassel *et al.*, 2005; Grassmann, 2021).

Based on research investigating value relevance, "an accounting amount is defined as value relevant if it has a predicted association with equity market values" (Barth *et al.*, 2001, cited by Baboukardos and Rimmel, 2016, p. 442). Consequently, it will be considered that the equity book value (BV) and the net income (NI) are value relevant for investors in terms of the market value (MV) if after applying the regression models the resulting coefficients for these variables will be significantly different from 0. In addition, it is estimated that the two independent variables (BV and NI) will show higher values of their associated coefficients in the post-EUD period (2017-2019), compared to the pre-EUD period (2015-2016).

Furthermore, another worth mentioning aspect refers to the fact that throughout the entire examined period companies listed on the Bucharest Stock Exchange prepared their financial statements in accordance with the same accounting standards, namely the International Financial Reporting Standards. Hence, similar to the study conducted by Baboukardos and Rimmel (2016), it is expected the results obtained not to be influenced by changes in accounting regulations.

In order to compile the multiple regression models, as well as to apply all statistical procedures necessary for data processing, IBM SPSS Statistics 27 was used as a software resource.

3. Findings and discussions on the value relevance of sustainability reporting in terms of the influence exerted on the firms' market value

The results obtained following the application of the multiple regression models presented in the methodology section by equations (2) and (3) are highlighted below, in the form of descriptive statistics, multicollinearity analysis and the analysis of the determination coefficient, as well as the resulting coefficients for each variable.

The regression models were applied both on the entire sample for the full analysed period (2015-2019) – equation (2), and for the period prior to the application of the EU Directive on mandatory reporting of non-financial information (pre-EUD, 2015-2016), compared to the subsequent period (post-EUD, 2017-2019) - equation (3).

3.1. Descriptive statistics and multicollinearity analysis

Table no. 4 highlights the mean, median, standard deviation, and minimum and maximum values of the independent, dependent, and control variables for the entire sample under examination, after removing the outliers.

Table no. 4. Descriptive statistics

Variable	Mean	Median	Standard deviation	Minimum	Maximum
$(MV_{i,t} + DI_{i,t}) / BV_{i,t-1}$	0.9287	0.7777	0.6934	0.1475	5.4458
$1 / BV_{i,t-1}$	0.0344	0.0210	0.0426	0.0001	0.2415
$NI_{i,t} / BV_{i,t-1}$	0.0939	0.0799	0.1101	-0.1828	0.7156
$GRIREP_{i,t}$	0.2108	0.0000	0.4091	0.00	1.00
$SREP_{i,t}$	0.2711	0.0000	0.4459	0.00	1.00
$SDG_{i,t}$	0.0723	0.0000	0.2597	0.00	1.00
$LOSS_{i,t}$	0.1145	0.0000	0.3193	0.00	1.00
$EUD_{i,t}$	0.5964	1.0000	0.4921	0.00	1.00
N	166	166	166	166	166

Source: Author's processing, 2021

The descriptive statistics reflect a mean value of the dependent variable, $(MV_{i,t} + DI_{i,t}) / BV_{i,t-1}$, of approximately 0.93, indicating a cum-dividend market value with 7.13% lower on average than the equity book value. On the other hand, the maximum level reached by the dependent variable highlights a market value about 5.45 times higher than the book value. At the same time, the sampled companies are characterised by an average return on equity ratio, $NI_{i,t} / BV_{i,t-1}$, of 9.39% and a median of 7.99%, while slightly over 10% of firms recorded a loss (mean value of the variable $LOSS_{i,t}$ being 0.1145). With respect to the non-financial variables, only a quarter of the companies published stand-alone non-financial reports (variable $SREP_{i,t}$ registering a mean value of 0.2711), while non-financial reports prepared in accordance with the GRI standards are found only for 21.08% of the analysed firms during the period 2015-2019 (variable $GRIREP_{i,t}$).

To determine the associations between variables, as well as to conduct the multicollinearity analysis, **Table no. 5** discloses the Pearson coefficients correlation matrix for the variables included in the regression model.

Table no. 5. Pearson coefficients correlation matrix

Variable	$(MV_{i,t} + DI_{i,t}) / BV_{i,t-1}$	$1 / BV_{i,t-1}$	$NI_{i,t} / BV_{i,t-1}$	$GRIREP_{i,t}$	$SREP_{i,t}$	$SDG_{i,t}$	$LOSS_{i,t}$
$(MV_{i,t} + DI_{i,t}) / BV_{i,t-1}$	1.000						
$1 / BV_{i,t-1}$	-0.066	1.000					
$NI_{i,t} / BV_{i,t-1}$	0.827***	0.092	1.000				
$GRIREP_{i,t}$	0.043	-0.302***	-0.089	1.000			
$SREP_{i,t}$	0.025	-0.352***	-0.077	0.848***	1.000		
$SDG_{i,t}$	-0.038	-0.160**	-0.086	0.540***	0.458***	1.000	
$LOSS_{i,t}$	-0.213***	0.029	-0.449***	0.092	0.079	0.119*	1.000
$EUD_{i,t}$	0.006	-0.078	0.044	0.215***	0.308***	0.135**	-0.013
***. Correlation is significant at the 0.01 (1%) level.							
**. Correlation is significant at the 0.05 (5%) level.							
*. Correlation is significant at the 0.1 (10%) level.							

Source: Author's processing, 2021

In addition, **Table no. 6** presents the correlation matrix based on the Spearman's rho coefficients related to the variables included in the regression model.

Table no. 6. Spearman's rho coefficients correlation matrix

Variable	$(MV_{i,t} + DI_{i,t}) / BV_{i,t-1}$	$1 / BV_{i,t-1}$	$NI_{i,t} / BV_{i,t-1}$	$GRIREP_{i,t}$	$SREP_{i,t}$	$SDG_{i,t}$	$LOSS_{i,t}$
$(MV_{i,t} + DI_{i,t}) / BV_{i,t-1}$	1.000						
$1 / BV_{i,t-1}$	-0.066	1.000					
$NI_{i,t} / BV_{i,t-1}$	0.796***	0.013	1.000				
$GRIREP_{i,t}$	0.123	-0.418***	-0.048	1.000			
$SREP_{i,t}$	-0.008	-0.467***	-0.116	0.848***	1.000		
$SDG_{i,t}$	0.018	-0.241***	-0.065	0.540***	0.458***	1.000	
$LOSS_{i,t}$	-0.252***	0.070	-0.551***	0.092	0.079	0.119*	1.000
$EUD_{i,t}$	-0.008	-0.055	0.001	0.215***	0.308***	0.135**	-0.013
***. Correlation is significant at the 0.01 (1%) level.							
**. Correlation is significant at the 0.05 (5%) level.							
*. Correlation is significant at the 0.1 (10%) level.							

Source: Author's processing, 2021

Based on the coefficients in the two tables, there is no evidence on the existence of multicollinearity issues, as the correlation coefficients among independent variables are below the conventional threshold of 0.7 (Grassmann, 2021; Landau *et al.*, 2020), except for $GRIREP_{i,t}$ and $SREP_{i,t}$ coefficients. Although both Pearson and Spearman's rho coefficients are 0.848, statistically significant at the 1% level, the additional analysis of the tolerance and variance inflation factor (VIF) shows that the variables are not affected by multicollinearity. Details in this regard can be found in section 3.3.

Furthermore, the correlation coefficients signal a positive above average association, significant at the 1% level, between the dependent variable, $(MV_{i,t} + DI_{i,t}) / BV_{i,t-1}$, and the return of equity ratio, $NI_{i,t} / BV_{i,t-1}$ (Pearson coefficient of 0.827, and Spearman's rho coefficient of 0.796), consistent with the results obtained by Grassmann (2021). Additionally, there is a negative association between reporting a negative net income for the financial year, variable $LOSS_{i,t}$, and the cum-dividend market capitalization, $(MV_{i,t} + DI_{i,t}) / BV_{i,t-1}$, significant at the 1% level, similar to the study conducted by Baboukardos and Rimmel (2016).

3.2. Results of the multiple regression models

3.2.1. Regression results for the entire analysed period (2015-2019)

Table no. 7 highlights the results of applying the multiple regression model given by equation (2) for the entire analysed period (2015-2019), in terms of the coefficients of determination and the coefficients related to the variables.

The research is based on the assumption that the publication of non-financial information on sustainable development leads to an increase of the value relevance for investors from the perspective of the market value of companies listed on the BSE during the period 2015-2019. In line with Hassel *et al.* (2005), the regression model was applied in 3 steps, each of their findings being disclosed in columns A-C of **Table no. 7**, as follows:

(A) – regression of the dependent variable $(MV_{i,t} + DI_{i,t}) / BV_{i,t-1}$ on the financial variables $1 / BV_{i,t-1}$ and $NI_{i,t} / BV_{i,t-1}$, without including the non-financial variables related to sustainability and the control variables;

(B) – regression of the dependent variable $(MV_{i,t} + DI_{i,t}) / BV_{i,t-1}$ on the financial variables $1 / BV_{i,t-1}$ and $NI_{i,t} / BV_{i,t-1}$, as well as the control variables $LOSS_{i,t}$, $EUD_{i,t}$, $IND_{i,t}$ and $FY_{i,t}$, without including the non-financial variables related to sustainability;

(C) – regression of the dependent variable $(MV_{i,t} + DI_{i,t}) / BV_{i,t-1}$ on the financial variables $1 / BV_{i,t-1}$ and $NI_{i,t} / BV_{i,t-1}$, the control variables $LOSS_{i,t}$, $EUD_{i,t}$, $IND_{i,t}$ and $FY_{i,t}$, as well as the non-financial variables related to sustainability $GRIREP_{i,t}$, $SREP_{i,t}$ and $SDG_{i,t}$.

Table no. 7. Results of the multiple regression model - equation (2) - period 2015-2019

Indicators	Model (2) without non-financial and control variables (A)		Model (2) without non-financial variables, but including control variables (B)		Model (2) with both non-financial and control variables (C)	
Model goodness of fit – dependent variable $(MV_{i,t} + DI_{i,t}) / BV_{i,t-1}$						
R^2	0.705		0.792		0.799	
Adjusted R^2	0.701		0.771		0.774	
F-stat	194.438***		38.129***		32.445***	
Coefficients	*B*	*t-stat*	*B*	*t-stat*	*B*	*t-stat*
Constant	0.512	11.538***	0.326	3.459***	0.330	3.511***
$1 / BV_{i,t-1}$	-2.325	-3.340***	-2.457	-3.359***	-2.312	-3.143***
$NI_{i,t} / BV_{i,t-1}$	5.294	19.659***	5.747	19.410***	5.765	19.482***
$LOSS_{i,t}$			0.515	5.432***	0.506	5.325***
$EUD_{i,t}$			-0.024	-0.293	-0.022	-0.266
$GRIREP_{i,t}$					0.244	1.753*
$SREP_{i,t}$					-0.090	-0.702
$SDG_{i,t}$					-0.204	-1.588
Dummy $IND_{i,t}$ (industry control)	No		Yes		Yes	
Dummy $FY_{i,t}$ (control for years)	No		Yes		Yes	
No. of firms	34		34		34	
No. firm-year observations	166		166		166	
***. Statistically significant at the 0.01 (1%) level.						
**. Statistically significant at the 0.05 (5%) level.						
*. Statistically significant at the 0.1 (10%) level.						

Source: Author's processing, 2021

Following the application of the multiple regression model, the coefficient of determination R^2 increases from 70.5% to 79.2% after the inclusion of the control variables. Moreover, R^2 records a further increase to 79.9% by including non-financial variables related to the presentation of sustainability information. Thus, the results highlight an increase in value relevance with respect to the impact on the firms' market value after the publication of sustainability reports by companies listed on the BSE during the period under examination. Also, the F-test statistics emphasise that the model goodness of fit is significant at the 1% level.

Regarding the variables coefficients, their values are significantly different from 0, at 1% level, for the intercept and the financial variables in all 3 stages, as well as for the variable $LOSS_{i,t}$. Therefore, as expected, there is a positive relationship between the cum-dividend market value and the equity book value (a negative coefficient significantly different from 0 for the reversed value of equity, $1 / BV_{i,t-1}$), along with a positive relationship between the dependent variable $(MV_{i,t} + DI_{i,t}) / BV_{i,t-1}$ and the net income scaled by the opening book value of equity (a positive coefficient significantly different from 0 for $NI_{i,t} / BV_{i,t-1}$). These findings are consistent with previous studies using a similar methodology (Hassel *et al.*, 2005; Landau *et al.*, 2020; Grassmann, 2021; Baboukardos and Rimmel, 2016).

Furthermore, GRIREP is the only variable based on non-financial data that exerts a positive influence on the investigated phenomenon, statistically significant at the 10% level, with a coefficient of 0.244. This result emphasises that preparing and publishing stand-alone sustainability reports in accordance with the GRI standards by companies listed on the BSE during 2015-2019 determines a positive impact on the market value. The findings are in line with those obtained by Kuzey and Uyar (2017), as well as de Klerk and de Villiers (2012).

3.2.2. Regression results for the comparative analysis pre-post adoption of EU Directive on reporting of non-financial information

Table no. 8 reflects the results of applying the multiple regression model given by equation (3), in terms of the coefficients of determination and coefficients related to variables, for the comparative analysis pre-post adoption of Directive 2014/95/EU on the reporting of non-financial information.

Table no. 8. Results of the multiple regression model – equation (3) – comparative analysis pre-EUD (2015-2016) / post-EUD (2017-2019)

Indicators	Pre-EUD (2015-2016)		Post-EUD (2017-2019)	
Model goodness of fit – dependent variable ($MV_{i,t}$ + $DI_{i,t}$) / $BV_{i,t-1}$				
R^2	0.796		0.816	
Adjusted R^2	0.740		0.780	
F-stat	14.449***		22.753***	
Coefficients	*B*	*t-stat*	*B*	*t-stat*
Constant	0.240	1.970**	0.371	3.065***
1 / $BV_{i,t-1}$	-2.338	-2.399**	-2.450	-2.059**
$NI_{i,t}$ / $BV_{i,t-1}$	5.738	11.425***	5.943	15.231***
$LOSS_{i,t}$	0.547	3.482***	0.474	3.624***
$GRIREP_{i,t}$	-	-	0.257	1.555
$SREP_{i,t}$	0.206	1.153	-0.127	-0.830
$SDG_{i,t}$	-0.353	-1.324	-0.193	-1.161
Dummy IND (industry control)	Yes		Yes	
Dummy FY (control for years)	Yes		Yes	
No. of firms	34		34	
No. of firm-year observations	67		99	
***. Statistically significant at the 0.01 (1%) level.				
**. Statistically significant at the 0.05 (5%) level.				
*. Statistically significant at the 0.1 (10%) level.				

Source: Author's processing, 2021

In line with expectations, the obtained R^2 for the period 2017-2019 is 81.6%, greater than the coefficient of determination of 79.6% corresponding to the period 2015-2016, reflecting a higher value relevance with respect to the impact on the market value of companies listed on the BSE in the post-EUD period (2017-2019), compared to the pre-EUD time frame (2015-2016), with the probability of error at the 1% level.

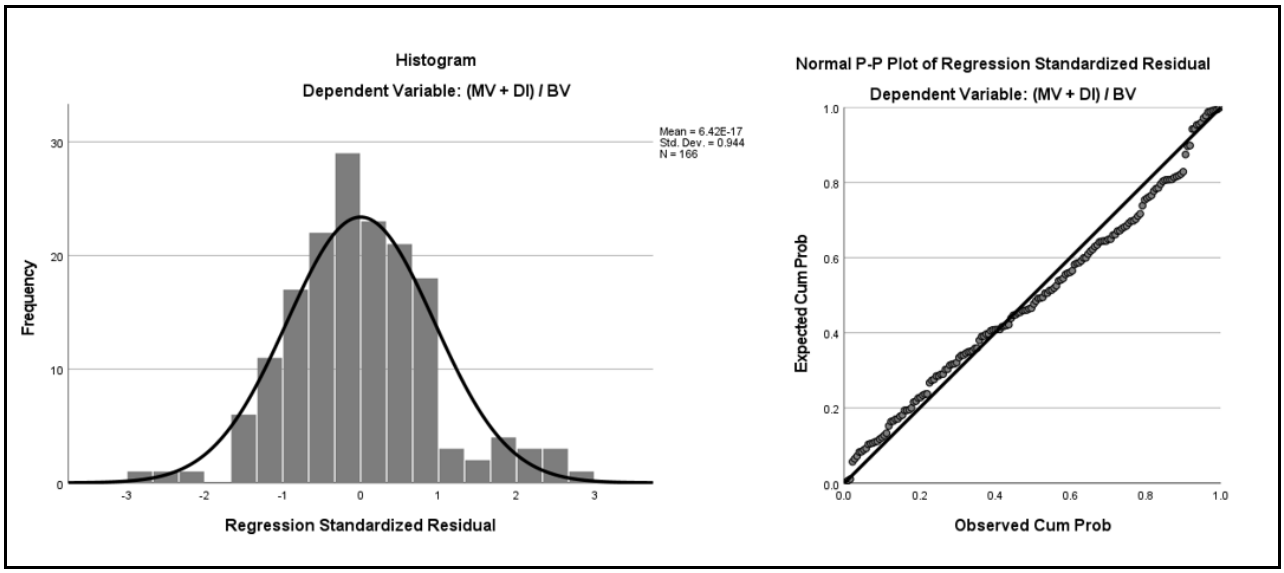
This result is also confirmed by the values of the coefficients corresponding to the intercept and the variables based on financial data. Thus, both the equity book value and the net income exert a greater influence on the market value during 2017-2019, in comparison to 2015-2016. The findings are statistically significant at the 5% level for variable 1 / $BV_{i,t-1}$ and at the 1% level for variable $NI_{i,t}$ / $BV_{i,t-1}$ and are similar to those highlighted by Baboukardos and Rimmel (2016), and Tlili *et al.* (2019) respectively.

3.3. Additional checks applied for testing the statistical validity of the models

To verify the statistical validity of the regression models used in the research, several procedures were applied to assess whether the criteria related to the normal distribution of residual values, multicollinearity, and dealing with outliers are met.

Figure no. 1 reflects the histogram and the P-P plot of the standardized residual values. Following the visual inspection of the two graphs, the normal distribution of the standardized residuals is observed.

Figure no. 1. Histrogram and P-P plot of standardised residuals obtained for the regression model on equation (2)



Source: Author's processing, 2021

In order to detect a possible multicollinearity issue between the independent variables included in the multiple regression model presented in equation (2), in addition to the analysis of Pearson and Spearman's rho coefficients, the statistical indicators of tolerance and variance inflation factors (VIF) were generated, as disclosed in **Table no. 9**.

Table no. 9. Tolerance and variance inflation factor (VIF) for the regression model on equation (2)

Variable	Tolerance	VIF
$1 / BV_{i,t-1}$	0.670	1.493
$NI_{i,t} / BV_{i,t-1}$	0.620	1.613
$GRIREP_{i,t}$	0.203	4.933
$SREP_{i,t}$	0.202	4.944
$SDG_{i,t}$	0.589	1.698
$LOSS_{i,t}$	0.715	1.399
$EUD_{i,t}$	0.385	2.594

Source: Author's processing, 2021

Given that all indicators are within accepted limits (tolerance greater than 0.1 and VIF lower than 10), it can be concluded that the data are not affected by multicollinearity (Hassel *et al*., 2005; Baboukardos and Rimmel, 2016).

Following the application of all procedures, the test results showed that all assumptions were verified and all statistical criteria were met to allow the use of the multiple linear regression models.

The main statistically significant research findings obtained after the application of the regression models on the sample of 34 BSE listed companies on the regulated market, consisting of 166 firm-year observations, are summarised in **Table no. 10**.

Table no. 10. Summary of research results

Analysed statistical indicator	Hypothesis	Findings	Validated
Equation (2) model			
R^2 of the regression without non-financial variables – step (B)	R^2 step (B) < R^2 step (C)	0.792 (F-stat 38.129***)	Yes
R^2 of the regression with non-financial variables – step (C)		0.799 (F-stat 32.445***)	
1 / $BV_{i,t-1}$ coefficient – step (B)	β_0 step (B) < β_0 step (C)	-2.457***	Yes
1 / $BV_{i,t-1}$ coefficient – step (C)		-2.312***	
$NI_{i,t}$ / $BV_{i,t-1}$ coefficient – step (B)	β_2 step (B) < β_2 step (C)	5.747***	Yes
$NI_{i,t}$ / $BV_{i,t-1}$ coefficient – step (C)		5.765***	
GRIREP $_{i,t}$ coefficient – step (C)	β_3 step (C) ≠ 0	0.244*	Yes
Equation (3) model – pre-post EUD analysis			
R^2 pre-EUD	R^2 pre-EUD < R^2 post-EUD	0.796 (F-stat 14.449***)	Yes
R^2 post-EUD		0.816 (F-stat 22.753***)	
1 / $BV_{i,t-1}$ coefficient – pre-EUD	β_0 pre-EUD < β_0 post-EUD	-2.338**	No
1 / $BV_{i,t-1}$ coefficient – post-EUD		-2.450**	
$NI_{i,t}$ / $BV_{i,t-1}$ coefficient – pre-EUD	β_2 pre-EUD < β_2 post-EUD	5.738***	Yes
$NI_{i,t}$ / $BV_{i,t-1}$ coefficient – post-EUD		5.943***	
***. Statistically significant at the 0.01 (1%) level.			
**. Statistically significant at the 0.05 (5%) level.			
*. Statistically significant at the 0.1 (10%) level.			

Source: Author's processing, 2021

Conclusion

The research investigates the value relevance of accounting values and non-financial information related to sustainability in terms of their impact on the market value of companies listed on the Bucharest Stock Exchange on the regulated market during 2015-2019. Starting from the Ohlson (1995) model, the analysis was conducted by applying multiple regression models based on the relationship between the equity market value as a dependent variable and the independent variables represented by the equity book value, net income and non-financial information related to sustainable development (Hassel *et al*., 2005; Baboukardos and Rimmel, 2016; Grassmann, 2021).

According to the results that are summarised in **Table no. 10**, it can be concluded that the reporting of non-financial information on sustainable development by companies listed on the BSE in the period 2015-2019 has led to an increase in value relevance with respect to the influence exerted on the firms' market value. In addition, the findings show an increase in the influence of the independent variables based on financial data (equity book value and net income) used in the regression model on the market value in the period after the adoption of Directive 2014/95/EU (2017-2019), compared to the period preceding the EU Directive (2015-2016).

The main limitation of the research refers to the small number of companies selected for analysis, and observations that formed the sample respectively, this being specific to studies conducted at a single country level, especially in the case of emerging economies. Given the reduced sample size and the relatively short time frame under examination, the research results should be interpreted with caution (Hassel *et al*., 2005; Landau *et al*., 2020). As future research directions, including other companies with similar characteristics from different countries, as well as developing of the regression models by adding variables based on ESG indices measured at the international level (MSCI ESG Index, S&P Dow Jones ESG Index etc.) are to be considered.

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Appendix. List of companies included in the final sample		
No.	**Company name (Compustat code)**	**Industry code***
1	Alro S.A. (BVB:ALR)	7
2	Altur S.A. (BVB:ALT)	1
3	Alumil Rom Industry S.A. (BVB:ALU)	7
4	Antibiotice S.A. (BVB:ATB)	4
5	Biofarm S.A. (BVB:BIO)	4
6	Casa de Bucovina - Club de Munte S.A. (BVB:BCM)	1
7	CNTEE Transelectrica SA (BVB:TEL)	9
8	Compa S.A. (BVB:CMP)	1
9	Electromagnetica S.A. (BVB:ELMA)	6
10	IAR S.A. (BVB:IARV)	5
11	Impact Developer & Contractor S.A. (BVB:IMP)	8
12	Oil Terminal S.A. (BVB:OIL)	3
13	OMV Petrom S.A. (BVB:SNP)	3
14	Rompetrol Rafinare S.A. (BVB:RRC)	3
15	Rompetrol Well Services SA (BVB:PTR)	3
16	S.C. Aerostar S.A. (BVB:ARS)	5
17	S.C. Electroarges S.A. (BVB:ELGS)	1
18	S.C. Prebet Aiud S.A. (BVB:PREB)	7
19	S.C. Romcarbon S.A. (BVB:ROCE)	7
20	S.C. Ropharma S.A. (BVB:RPH)	2
21	S.C. Santierul Naval Orsova S.A. (BVB:SNO)	5
22	S.C. Turism Felix S.A. (BVB:TUFE)	1
23	S.N. Nuclearelectrica S.A. (BVB:SNN)	9
24	S.N.T.G.N. Transgaz S.A. (BVB:TGN)	3
25	S.C. Cemacon SA (BVB:CEON)	7
26	SNGN Romgaz SA (BVB:SNG)	3
27	SOCEP S.A. (BVB:SOCP)	5
28	Societatea Conpet S.A. (BVB:COTE)	3
29	Societatea Energetica Electrica S.A. (BVB:EL)	9
30	Teraplast S.A. (BVB:TRP)	7
31	Turbomecanica SA (BVB:TBM)	5
32	Turism, Hoteluri, Restaurante Marea Neagra S.A. (BVB:EFO)	1
33	Vrancart S.A. (BVB:VNC)	7
34	Zentiva S.A. (BVB:SCD)	4

**where: Consumer discretionary = 1, Consumer staples = 2, Energy = 3, Health care = 4, Industrials = 5, Information technology = 6, Materials = 7, Real estate = 8, Utilities = 9*

Source: Author's processing, 2021

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The Influence of Integrated Systems on Company Performance and Sustainability

Laura-Eugenia-Lavinia BARNA, Ph. D.,
Bucharest University of Economic Studies,
e-mail: lauralavinia17@gmail.com

Univ. Prof. Bogdan-Ştefan IONESCU, Ph. D.,
Bucharest University of Economic Studies,
e-mail: bogdan.ionescu@cig.ase.ro

Dumitru-Florin MOISE,
CFO – Timac-Agro Romania,
e-mail: moisedumitruflorin@yahoo.com

Abstract

In this paper, the authors investigated the evolution of ERP-type integrated information systems and analysed the presentation of their main concepts and features, limited to the performance and sustainable development of the enterprise.

Integrated ERP systems play an important role in managing and conducting the day-to-day business of an organization (irrespective of being small, medium or large companies). The research method used to justify the impact of ERP systems on the performance and sustainability of the organization was the archive analysis (review of the literature), doubled by a quantitative empirical research based on a questionnaire. The analysed information was collected from over 20 papers by Romanian and foreign authors, published in various scientific journals, specialized books and conference proceedings, as well as based on the answers received based on a questionnaire intended to prove that the integrated ERP systems contribute to improving the sustainable development and performance of the organization, by reducing costs and protecting the environment, increasing the quality of decision-making, productivity and data volume management. Following the study, the authors concluded that the evaluation of the processing of the volume of data generated by ERP systems, as well as the consistency, quality and clarity of information are representative factors on the impact of ERP systems on the sustainable development of organizations, in order to ensure the performance of the organization in the short, medium and long term.

Key words: *accounting; ERP systems; evolution; performance; sustainability; audit mission;*

JEL Classification: *C88, M15, M40, M41, P42*

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Introduction

The economic environment has evolved over time and has become very dynamic and the information has become paramount in substantiating and making decisions. The business environment presents many risks, some of which are inevitable, while others can be controlled by the organization. For an organization to be successful and survive in a dynamic economic environment, managers must find optimal solutions and make radical innovations in an uncertain environment to maintain and grow their business. Thus, the organization must invest in IT systems that add value to business processes.

The main objective of this paper is to highlight the importance and main features of integrated ERP systems, as well as the evolution of these systems in an attempt to optimize the processes specific to the company's functions.

According to Ionescu et al. (2009, p. 335), the evolution of the economic environment has led to the appearance of "substantial changes in the way the financial and accounting activity is designed" in an organization. Today, it is no longer necessary to demonstrate that information has an important role "in economic and social development" so that information must be "collected, stored, processed and transmitted to managers to become useful" and to substantiate the decisions taken by managers (Pascari, 2015).

According to Synapsa (2020), IT systems that integrate the functions of the enterprise (ERP systems) have been created to meet the needs of managing the activity of organizations. The main purpose of these information systems is the automatic processing of the accounting information underlying the decision-making process. Senior Software (2020) states that ERP systems contain "areas specific to various areas such as: sales, procurement, production, finance, accounting and others." All processed information is stored in a common database, so that users of financial accounting information have easy access to information. The role of these information systems is to bring together "a multitude of processes and businesses" (Oracle Romania, 2020).

In Transart's vision (2021), ERP (Enterprise Resource Planning) systems are defined as "a single platform, useful for monitoring, control and integrated management of all activities, processes and operations carried out by a company." The main role of ERP systems is to significantly improve the flow of information between departments, leading to process automation and streamlining activities within the organization. With these systems, data can be more easily shared between departments, eliminating duplication of daily tasks, all information being stored in a "common, complex and up-to-date database" (Transart, 2021).

In the following sections, we will present the main concepts and features related to integrated ERP systems, based on which we developed a research methodology that focuses on quantitative analysis based on the questionnaire, followed by the presentation of results that identify the main ERP systems used and analysis of the main value-adding functionalities for company's functions. Finally, the paper summarizes the main conclusions regarding the use of integrated ERP systems in terms of improving the decision-making process to ensure the performance and sustainability desired by managers.

Literature review

In this section, we will present the main concepts and features of ERP systems. In the article we used a research method focused on archival analysis (literature review) to present the issues listed above, but also the questionnaire where we identified the main ERP systems used and the main impact on the organization in terms of using these systems.

The main questions of the research were related to the definition of integrated systems in the literature, the analysis of their components, as well as their influence on performance.

The increased business pace determined the need to have quick access to key data of the organization. Jituri, Fleck and Ahmad (2018) concluded that to perform the tasks on time and make the right decisions of good management, a high-performance computer system must be used, which should meet the main requirements of the activity carried out by the organization.

Organizations now need to integrate data into a common database. The role of ERP systems is to bring together the work and flow of information within an organization and to "eliminate duplication of tasks", all being stored in a "correct, complete and updated database" (Transart, 2021). Elragal and Haddara (2012, p. 22) consider that the database stores and shares essential data for

different departments, but also business functions. All data and information collected and processed from different activities, departments can be accessed by users of ERP systems in that organization, providing a "unitary and integrated perspective" (Transart, 2021).

Through integration, management and external stakeholders obtain the information needed for planning, control and decision-making.

With the evolution of accounting information systems and information technology, the needs of the organization have increased and are now achieved by using integrated systems called Enterprise Resource Planning (ERP) systems. Elragal and Haddara (2012, p. 22) observed that ERP systems are the most used "information technology solutions in organizations".

According to Mihai (2018), the concept of ERP systems consists of the following elements:

- **E**nterprise – "economic unit or activity";
- **R**esource – provides information about the "material, financial, human and informational potential" that the organization has; and
- **P**lanning – "establishing policies and procedures for better management of the organization".

These ERP systems combine several subsystems such as: accounting, production, human resources, sales, marketing focusing on the business processes of an organization. ERP systems contain interfaces to financial functions necessary to carry out the activities of the organization. The main reasons why the organization uses ERP systems are:

1. The evolution of the external environment of the organization;
2. Problems identified by management in the decision-making process; or
3. System problems (architecture, functionality), such as situations in which some tasks were performed manually.

Gronwald (2017, p. 59) defines ERP systems as those systems that manage all business processes in an organization. Desai and Srivastava (2013, quoted by Gronwald, 2017) stated that "organizations can implement best practices in the system, and the ERP system" is perceived as a business tool, not as an IT tool. Magal and Word (2012, p. 25) consider that ERP systems focus on intracompany processes (consider all operations performed within an organization) and consider the integration of all functional and multifunctional business processes. Bradford (2015, p. 1) considers ERP systems to be business systems that "integrate and streamline data" across the organization into a "complete system that supports the needs of the entire enterprise". The purpose of these ERP systems is to improve all operations and key activities of an organization in areas such as: accounting, procurement, production and sales.

ERP systems are focused on business processes, the information processed and provided by the system being clear, complete and logical.

ERP systems offer various advantages and benefits for the organization. The role of ERP systems is to help the organization "share and transfer data and information" (Elmonem, Nasr and Geith, 2016) within the organization (between departments) and outside the organization, but also to provide support for process optimization and automation business. The exchange of data and information between departments leads to faster fulfilment of the various objectives of the organization. Sørheller et al. (2018) consider that ERP systems have the role of "reducing working time for a specific task". According to Elmonem, Nasr and Geith (2016, p. 1), the results of implementing ERP systems could be in the form of higher quality, shorter marketing time, much more efficient communication between departments, much more correct decisions and much higher productivity.

Any module / component is used for a specific business area or department. The advantage of ERP systems is that they offer the possibility to implement one or more modules, which correspond to the requirements of the entire organization or department. According to the B-org website (2021), the most used modules are: accounting, payroll, sales and inventory management. The same analysis states that an ERP system should contain the following modules: inventory management, procurement management, sales and distribution management, customer and supplier portfolio management, production management and planning, inventory management, accounting and salary.

In **Table no. 1**, we made a comparison regarding the modules contained in two integrated ERP systems (SAP R / 3 and Dynamics AX 2012 R / 3).

Table no. 1. SAP R/3 module and Dynamics AX 2012 R/3 module

No.	Module	SAP R/3	Dynamics AX 2012 R/3
I	**FI -Financial**		
1	General Ledger	**x**	**x**
2	Accounts Receivable	**x**	**x**
3	Accounts Payable	**x**	**x**
4	Asset Management	**x**	**x**
5	Treasury	**x**	**x**
6	Investment management	**x**	
7	Controlling	**x**	
8	Budgeting		**x**
9	Travel and expense		**x**
10	Compliance and internal controls		**x**
II	**LO – Logistics**		
1	Material Management	**x**	
2	Inventory management		**x**
3	Procurement and sourcing		**x**
4	Sales and Distribution	**x**	**x**
5	Master planning		**x**
6	Production Planning	**x**	**x**
7	Plant Maintenance	**x**	
8	Warehouse management		**x**
9	Transportation management		**x**
10	Service Management	**x**	**x**
11	Quality management or Production control	**x**	**x**
12	Project System	**x**	
13	Retail and retail essentials		**x**
14	Trade allowance management		**x**
15	Call center		**x**
16	Data import export framework		**x**
III	**HR –Human Resources**		
1	Personnel Management	**x**	**x**
2	Payroll	**x**	**x**
3	Personnel Time Management	**x**	
4	Personnel Development	**x**	
5	Organizational Management	**x**	**x**
6	System administration		**x**

Source: Own creation, based on information from Mihai (2018) and Microsoft (2014)

According to **Table no. 1**, we noticed that the two ERP systems have 11 common modules (these modules may differ from one ERP system to another), the rest of the modules (16 modules) being specific to each ERP system. Based on the identified modules, we deduced the main functions of integrated systems.

The functions of integrated systems, as presented by B-org (2020), have the role of:

- reducing duplication of data and tasks;
- help to comply business processes with tax legislation;
- automate the business processes of the organization;
- generate data from the database in real time (example: checking balance, account statements, purchase journals, sales journals, accounting notes, etc.);
- automatically configure the interval between the document date and the due date of the invoice;
- "records the financial history of each client";
- report and analyse data from the entire organization;

- data protected due to "access rights established for each department and person";
- achieve a management of human resources, sales, stock;
- provide data transparency;
- automatic taking over of quantity and prices from other documents (Ciel, 2021); and
- data import.

ERP systems have a technical architecture that helps users interact more easily with the system. Magal and Word (2012, p. 24) state that ERP systems have "a 3-tier client-server architecture or a service-oriented architecture".

Currently, ERP systems can also be used in the Cloud, with licenses being purchased or rented on a software-as-a-service (SaaS) subscription (Softone, 2020).

ERP systems operating in the Cloud have the advantage of a low cost of ownership, because they use "an internet browser and do not require investment in infrastructure" and are implemented very quickly. Cloud ERP offer users the opportunity to access the ERP system via the Internet (Acumatica, 2008).

The concept of Cloud computing has expanded greatly as a result of digitalization and the "rapid evolution of the mobile market" (Tudoran and Ionescu, 2014, p. 295), but also the penetration of integrated systems that increasingly use cloud technology. Digitalization aims to reduce the inefficient consumption of resources within an organization, hence the emergence of the concept of sustainability.

In the following, we have chosen to present the concept of sustainability related to the business environment, which is an essential economic component for managers and entrepreneurs, because this component has the role of sustainable business development. As long as an organization has a sustainable behaviour towards the environment in which it operates, it will obtain various advantages (e.g. funding from this program) (Dona, 2020).

Danciu (2013) argues that sustainability "becomes a model of development only if countries, economic sectors, companies and citizens are aware, learn and use its principles." Sustainability can also be seen as an essential strategy for the future. If an organization wants to develop sustainably, it must consider the 3 dimensions of sustainability: environmental sustainability, social sustainability and economic sustainability. Environmental sustainability is the organization's ability to use and allocate resources as long time as possible and to control waste. Social sustainability involves the way in which social interactions within the organization are observed and maintained. Economic sustainability can be understood as "the organization's ability to make a profit, in order to survive and benefit from local, national and global economic systems" (Danciu, 2013). Any organization must ensure that "the principles for understanding, developing and achieving all the proposed objectives are respected" (Ikerd, 2013 quoted by Danciu, 2013). The principles used to ensure the sustainability of the organization are represented by holism (close relationships between sustainable components) and diversity (a variety of different elements, strategies and solutions addressed by the organization).

If we refer to the definition of the concept of sustainability of a business plan, we can say that it represents a development of a long-term strategy. Ensuring the sustainability of an organization means protecting it from various problems and economic crises of the organization. In the process of sustainability, modern technologies and investments are essential for a sustainable development of the organization.

Organizations need integrated solutions for "collecting, integrating, automating, and monitoring information to ensure sustainability" (Brooks et al., 2012 cited by Chofreh et al., 2014), such as sustainable ERP systems (S-ERP). The role of such systems is to integrate all information and processes of an organization (accessing, collecting and storing information, interpreting and using information). Integrated ERP systems offer several advantages for the sustainable development of the organization, which we will present in **Table no.2**.

Table no. 2. The sustainability of the organization is ensured using ERP systems

No.	Activity	Effect on the sustainability of the organization
1	Customization of the ERP system according to the specifics of the organization	Costs are reduced with the implementation of a new system that meets the requirements of the organization.
2	The flow of information is much clearer because the information is stored in a common database, easily accessible by any user within the organization.	Increasing long-term operational efficiency, rapid accessibility to information
3	Quick query of the database to obtain information needed by a specific department	The electronic use of information reduces the consumption of printed / photocopied paper.
4	Faster information processing with detailed interfaces	Reducing costs, working time on various transactions and thus electricity consumption (Lofty, 2015; Nicolaou, 2004 quoted by Nicolaou and Bhattacharya, 2006)
5	Recognition of previously processed data (example: for a previously processed fiscal receipt, its details can be subsequently recognized by querying the database, these data being useful for processing a bank statement)	
6	Processing a large volume of information	Provides scalability and flexibility
7	Generating clear, precise, relevant information using ERP systems	Managers make much more correct decisions regarding the organization and set reliable, quantifiable goals for the future.
8	Correctly reports based on information generated by the ERP system (Chofreh, 2018)	
9	Efficient inventory management using the ERP system	Avoiding waste of resources (Frazee, 2012)

Source: Own creation

Watson et al. (2010, cited by Bradford, Earp and Williams, 2012), believe that ERP systems can provide a "multifunctional view of the entire organization" by providing support for good sustainable practices.

To verify the concordance of the ERP-type integrated systems with the managers' requirements and the needs of the organization, an audit of the ERP systems must be planned periodically, but also on the accounting information and supporting documents. During the audit engagement, auditors will verify the correctness and compliance of the data processed and generated, their efficiency, effectiveness and confidentiality. Auditors must collect information about the ERP systems used and the IT controls implemented to observe the issues presented above. Considering the guidelines included in "Information systems audit guide" [from Rom. *Ghidul de audit al sistemelor informatice* (2012, p. 10)], the stages of an information systems audit mission are: "audit planning, conducting the audit, reporting and reviewing the audit".

In the process of auditing the organization, most supporting documents are in electronic format. Thus, the auditor must "change his audit method" (Gheorghe, 2006), using the following techniques: verifying the correctness of the accounting processing performed by the ERP system, testing the security measures of the ERP systems used by the organization, identifying and assessing the risks could be subject to the organization, evaluation of internal control, verification of the integrity of files generated by the ERP system, analysis of information through complex database queries, verification of the credibility of information provided by the ERP system, verification of financial statements and reports based on information generated by the ERP system" (Gheorghe, 2006).

To verify the aspects presented above, an auditor must first evaluate and know the ERP system, then apply various detailed tests "to collect the necessary evidence" (Bîcîin, 2016) to justify his opinion and prepare the report. audit.

Research methodology and analysis of results

Our research aims to analyse the influence of integrated information systems on the performance and sustainability of the organization. As presented in the previous section, organizations carry out the same activities on a monthly basis: data processing and collection, storage of supporting documents useful in audit missions, as well as for the preparation of balance sheets, preparation of tax returns and preparation of monthly reports.

The research methodology we addressed in this paper is quantitative based on the statistical analysis of the data collected based on the questionnaire using Microsoft Excel, as well as the collection of information presented in the literature review. The information used for documentation and stated in the previous section was taken from various databases such as: ScienceDirect, Proquest, Emerald and other specialized sites which contain scientific journals, as well as various specialized books. We also designed a questionnaire as an empirical quantitative method, where we identified the main ERP systems used and the main impact on the organization in terms of the use of these systems (the main effects of ERP systems on the performance and sustainability of the organization). The questionnaire contains 23 questions and was published on the isondaje.ro platform (being distributed online to respondents), between November 13, 2020 - December 20, 2020, to which 112 respondents answered, these being in a percentage of 20.5% students enrolled in the Academy of Economic Studies (bachelor's degree (70.5%), master's degree (25.9%) or doctorate (3.6%)), 72.3% employees (in economics, IT, banks, finance and education), 5.4% entrepreneurs and 1.8% retirees, residing in urban areas (78.6%) or in rural areas (21.4%).

The questionnaire distributed to respondents contains two sections: a section containing questions on the profile of respondents and a section specific to the research conducted on ERP systems.

Table no. 3 presents the distribution of respondents by age, gender and area of residence.

Table no. 3. Distribution of respondents by age, gender and place of residence

Age (years)	Women		Men		Total (respondents)
	Urban area	Rural area	Urban area	Rural area	
20 - 30	63	14	10	6	93
31 - 40	7	-	-	1	8
41 - 50	2	1	-	1	4
51 - 60	5	-	-	1	6
61 - 70	-	-	1	-	1
>71	-	-	-	-	-
Total	**77**	**15**	**11**	**9**	**112**

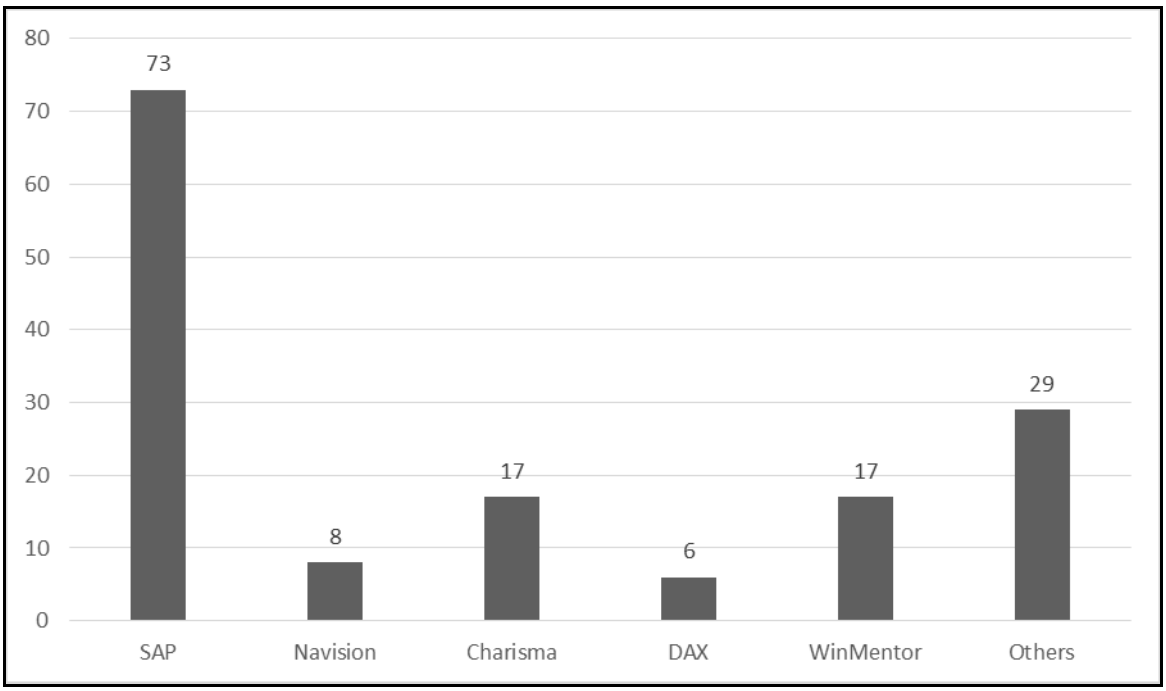
Source: Authors' research

As can be seen in **Table no. 3**, most respondents were between 20 and 30 years old (83.04%, i.e., 93 respondents), followed by those aged between 31 and 40 years (7.14%, i.e. 8 respondents) and then those aged between 51 and 60 years (5.36%, i.e. 6 respondents), most respondents being female (82.14%, i.e. 92 respondents), because according to a study by ANS (2020) the number of students enrolled in bachelor's, master's and doctoral programs are predominantly female.

In the second part of the questionnaire, we analysed *the impact of ERP systems on the performance and sustainability of the organization*.

Following the questionnaire, it was found that 70.5% of respondents used ERP systems. Figure 1 shows the most relevant ERP systems. According to ***Figure no. 1***, respondents chose SAP system (48.7%, i.e., 73 respondents), followed by Charisma (11.3%, i.e., 17 respondents) and WinMentor (11.3%, i.e., 17 respondents).

Figure no. 1. ERP systems used by respondents



Source: Authors' research

Mentioned as "Other" were systems such as: Saga, Sun System, People Soft, B-org, Oracle, Axapta, Ciel, etc.

In the questionnaire we also included a question about the experience of respondents with the ERP systems. The results obtained for this question are presented in **Table no. 4**.

Table no. 4. Respondents' experience in using ERP systems

Respondents' experience	Number of respondents
< 6 months	54
6 months – 1 year	26
1 – 5 years	26
5 – 10 years	3
>10 years	3
Total	**112**

Source: Authors' research

If we refer to the influence of ERP systems on the performance of the organization, the respondents stated in a percentage of 60.7% that these systems have the role of improving the performance of the organization. Other respondents believe that ERP systems increase labor productivity (27.7%), reduce costs (5.4%) and improve the company's image (3.6%).

41.1% of the respondents also believe the usage of an ERP system bring automation to daily tasks by 75%, while other 39.3% believe that daily tasks are actually automated only in proportion of 50%, while c. 8% of respondents feel that their daily tasks are 100% automated by using an ERP system. Regarding the *degree of data processing generated by ERP systems*,

respondents gave a grade of 3 meaning average on a scale of 1 to 5, where 1 is "Very little" and 5 is "Very much".

When asked *about the organization in which the respondents work if it has entrepreneurial initiatives*, 67.9% of the respondents agreed. Moreover, 97.3% of respondents believe that an organization should conduct training programs on employee involvement on the sustainability side (sustainable development) of the organization. Thus, on a scale of 1 to 5 (1 representing very few and 5 representing very many), respondents gave a grade of 3 meaning neither very many nor very few. If we refer to the training related to the professional development of the employees, the respondents stated that they benefit from many training programs.

Regarding the *idea of modernizing ERP systems* to ensure environmental protection and resource conservation, respondents gave a grade of 4 meaning "largely" on a scale of 1 to 5, where 1 represents "to a very small extent" and 5 represents "to a very large extent."

Regarding the attention paid to sustainability by the organizations, the respondents gave on a scale from 1 to 5 (1 representing to a very small extent, and 5 to a very large extent), note 4 meaning “to a large extent”.

Regarding the formulation of research-specific questions, we used the 5-value Likert scale, where respondents had to specify their agreement or disagreement with the questions in the questionnaire. Using these Likert scales, averages and standard deviations can be calculated to compare different categories of subjects. The questions contain factors that we have identified in the literature regarding the impact of ERP systems on the sustainability of organizations. These factors are presented in **Table no. 5**.

Table no. 5. Representative factors regarding the impact of ERP systems on the sustainability of organizations

Factors	Code
Decreased electricity consumption	SC1
Reducing the number of printed documents	SC2
Consistency, quality and clarity of information	SCAL
Increasing labor productivity	SW
Evaluation of the data volume processing generated by ERP	SVOL

Source: Own creation

In order to derive more insights into the data collected based on the questionnaire, we performed ***correlation tests and regression analyses***. The purpose of the regression analyses performed was to identify the relationship between the variables chosen for the analysis and the degree of intensity of the relationship, as well as to establish the shape and meaning of this relationship. Through multiple regression analysis we evaluated the extent to which the dependent variable (Use of an ERP system contributes to the sustainable development of the company - US), can be determined using independent variables (Decrease in electricity consumption - SC1, Reducing the number of printed documents - SC2, Consistency, quality and clarity of information - SCAL, Increasing labour productivity - SW, Evaluation of data processing generated by ERP - SVOL).

We formulated some research hypotheses that we presented in **Table no. 6**.

Table no. 6. Research hypotheses formulated

	Research hypotheses	Relationship
H_1	ERP systems help improve the sustainability and performance of the organization	US and SC1, SC2, SCAL, SW, SVOL
H_2	There is a significant relationship between the use of an ERP system that contributes to the sustainable development of the company and the decrease in electricity consumption.	US and SC1

Research hypotheses		Relationship
H_3	There is a significant relationship between the use of an ERP system that contributes to the sustainable development of the company and the reduction of the number of printed documents.	US and SC2
H_4	There is a significant relationship between using an ERP system that contributes to the sustainable development of the company and increasing the quality and clarity of decisions.	US and SCAL
H_5	There is a significant relationship between the use of an ERP system that contributes to the sustainable development of the company and the increase of labour productivity.	US and SW
H_6	There is a significant relationship between the use of an ERP system that contributes to the sustainable development of the company and the evaluation of the volume of data generated by the ERP.	US and SVOL

Source: Own creation

In **Table no. 7**, we presented for the multiple regression model, the value of the regression coefficient (R), the coefficient of determination (R^2) and the standard error. Irrelevant values in the model increase the standard error.

Table no. 7. Regression model

Multiple R	0.9597
R Square (R^2)	0.9211
Adjusted R Square	0.9088
Standard Error	1.0410
Observations	112

Source: Authors' research

Following results presented in **Table no. 7**, the value of the regression coefficient (R) is 0.9597 (a value close to 1) which shows that between the US dependent variable (Using an ERP system contributes to the sustainable development of the company) and the 5 independent variables (Decreasing electricity consumption - SC1, Reducing the amount of printed documents - SC2, Consistency, quality and clarity of information - SCAL, Increasing labour productivity - SW, Evaluation of data processing generated by ERP - SVOL) there is a very strong relationship, in the sense that ERP systems influence within the organization the decrease of electricity consumption, the reduction of the quantity of printed documents, ensures the consistency, quality and clarity of information, the increase of labour productivity and the process of evaluating the processing of the volume of data generated by ERP. This is also confirmed by the coefficient of determination (R^2) which shows that 92.11% (a value close to 100%) of the variation of the US dependent variable is explained by the independent variables (SC1, SC2, SCAL, SW, SVOL). To verify that the multiple regression model is valid, we performed the ANOVA analysis. The obtained results are presented in **Table no. 8**.

Table no. 8. ANOVA

	df	SS (Sum of Squares)	MS (Mean Square)	F	Significance F
Regression	5	1355.03	271.01	250.05586	5.65806E-57
Residual	107	115.965	1.0838		
Total	112	1471			

Source: Authors' research

Considering the following significant indicators from **Table no. 8** to determine the validity of the multiple regression model we found that:

F = 250.05586
Significance F = 5.65806E-57 < 0.05

Because the significance F is less than 0.05 it follows that the constructed multiple regression model is valid

In **Table no. 9**, we identified the value of the coefficients from the multiple regression model.

Table no. 9. Coefficients of independent variables

	Coefficients	Standard Error	t Stat	P-value	Lower 95%	Upper 95%	Lower 95%	Upper 95%
Intercept	**0**	**N/A**	**N/A**	**N/A**	**N/A**	**N/A**	**N/A**	**N/A**
X_1 – SC1	0.078	0.083	0.932	0.353	-0.087	0.243	-0.087	0.243
X_2 – SC2	0.041	0.141	0.289	0.773	-0.239	0.321	-0.239	0.321
X_3 - SCAL	0.308	0.159	1.934	0.046	-0.007	0.624	-0.007	0.624
X_4 - SW	0.208	0.166	1.249	0.214	-0.121	0.537	-0.121	0.537
X_5 - SVOL	0.286	0.081	3.551	0.0005	0.126	0.446	0.126	0.446

Source: Authors' research

The multiple regression model is as follows:

$$y = 0.078*X_1 + 0.041*X_2 + 0.308*X_3 + 0.208*X_4 + 0.286*X_5 + e$$

Where:

X_1 - Decreased electricity consumption – SC1,

X_2 - Reducing the number of printed documents – SC2,

X_3 - Consistency, quality and clarity of information – SCAL,

X_4 - Increasing labor productivity – SW,

X_5 - Evaluation of data processing generated by ERP – SVOL

According to the data presented in **Table no. 9**, we calculated the significance of each independent variable, these data being presented in **Table no. 10**.

Table no. 10. Significance of independent variables

Independent variables	Variable significance calculation 100% – (p-value*100)	Significant / Insignificant
X_1 – SC1	64.64% < 95%	Insignificant
X_2 – SC2	22.73% < 95%	Insignificant
X_3 – SCAL	95.40% > 95%	Significant
X_4 – SW	78.57% < 95%	Insignificant
X_5 - SVOL	99.94% > 95%	Significant

Source: Authors' research

According to the data in **Table no. 10**, the regression model would remain only two terms, because they are significant (between the independent variables SCAL and SVOL and the dependent variable US is a significant relationship), and the regression model would look like this:

$$y = 0.308*X_3 + 0.286*X_5 + e$$

Where:

X_3 - Consistency, quality and clarity of information – SCAL

X_5 - Evaluation of data processing generated by ERP – SVOL

The reason for which only two factors were identified as significant in the regression model (i.e., consistency, quality and clarity of information, as well as the evaluation of data processing generated by ERP), while the others were not selected by the respondents might be due to the large number of young respondents at the beginning of their careers.

Regarding the role of ERP systems, respondents stated that they have a major impact on production and services, then on business infrastructure and then on business processes.

To the open question "Other comments", the respondents did not have any other comments.

Conclusion

The aim of this paper is to highlight the impact of ERP systems on the performance and sustainability of small, medium or large companies, given the evolution of information systems and information technology, in which the organization must implement integrated ERP systems as efficient as possible to achieve the desired results and meet their set goals in time (example: performance goals, sustainable development goals). At the same time, ERP systems must meet the requirements of the organization and provide real-time financial information - accurate and complete accounting. As long as ERP systems provide accurate and complete financial-accounting information, managers will make the best decisions.

The results obtained from the questionnaire show that the representative factors (X_3 - consistency, quality and clarity of information - SCAL, X_5 - evaluation of data processing generated by ERP - SVOL) have a significant influence on the dependent variable (y - Use of an ERP system contributes to the sustainable development of the company - US). Based on the information and analysis performed, we can conclude that ERP systems have a key role in improving financial activity (this is confirmed by the independent variable in the regression model called "consistency, quality and clarity of information") and in the sustainable development of small, medium or large firms.

ERP systems have the role of automating accounting activities, ensuring transparent information to substantiate managers' decisions, but also to ensure the sustainable development of small, medium or large companies. Thus, we consider that ERP systems are indispensable for any organization in carrying out its activities, especially since based on the information provided by these systems important decisions are made by managers. Thus, no manager can ignore the importance of ERP systems in the organization, because information technology is constantly evolving, especially in the future it is expected that the technology "online accounting will change the accounting profession" (Ionescu, Prichici and Tudoran, 2014, p 15).

In conclusion, integrated ERP systems are very useful in any organization and can help improve their performance and sustainability.

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Reconsidering Budgeting after the COVID-19 Outbreak

Anca-Ioana BRÎNDUŞE (NIMIGEAN), Ph. D. Student,
West University in Timisoara, Romania,
e-mail: anca.brinduse93@e-uvt.ro

Univ. Prof. Ovidiu Constantin BUNGET, Ph. D.,
West University in Timisoara, Romania,
e-mail: ovidiu.bunget@e-uvt.ro

Abstract

The financial field is experiencing unprecedented changes, as the effects of the COVID-19 outbreak are unraveling. One of the main challenges the managers have to face is the elaboration and implementation of the budgets. During 2020, companies worldwide had to continuously adjust the budgets which were already approved before the pandemic. But, as everyone understood that the world is not facing just a temporary situation, executive leaders had to also reconsider their budgeting process, taking into consideration the uncertainties of the future. It was clear that the traditional way of developing a budget, based on historical information, was no longer relevant and a new process should be implemented. Therefore, the aim of this paper is to put into discussion which would be the best alternative to the traditional budgeting process. Based on the thorough analysis of the reports published by relevant organisms and firms, the authors concluded that the best alternative would be the zero-based budgeting technique. The paper presents the benefits of this method, but also a guideline regarding the implementation of this process.

Key words: *COVID-19; budgeting; accounting; Zero-Based Budgeting (ZBB);*

JEL Classification: *M40, M41*

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1. Introduction

Crisis have always produced significant changes in the fields they affect, but COVID-19 is now causing a worldwide critical situation, where its impact can affect a wide range of companies and functions. In response to the uncertainty generated by this crisis, leaders worldwide are forced to rethink and redesign the whole budgeting process. Starting from 2020, the preparation of an annual budget has been a major challenge, as the future predictions are constantly changing. After continuously adapting previous approved budgets and improvising new forecast, executives worldwide must find a solution in developing a relevant budget during the pandemic context.

The aim of this paper is to bring clarifications regarding the budgeting process in the era of COVID-19. As it is a new topic, the research was based on reports published by several consultancy firms or well-known organisms in the financial field, such as: Deloitte, PricewaterhouseCoopers, World Health Organization, Gartner, Accountancy Europe or International Monetary Fund. In the first part of the paper, the authors analyze the basic principles of the Zero-Based Budgeting technique, which appears to be a promising solution for the budgeting process worldwide. Secondly, it is analyzed how the main companies can benefit from adopting this method during and after the COVID-19 pandemic. Moreover, it was presented a guideline on how executive leaders can put into practice the activities which are specific to Zero-Based Budgeting.

The contribution of this paper resides in bringing clarifications regarding the budgeting process during this worldwide crisis. Furthermore, the content of this paper should be relevant both to the scientific literature, but also to the financial field, as it presents a structured overview of the benefits of adopting the Zero-Based Budgeting, but also a guideline regarding its implementation.

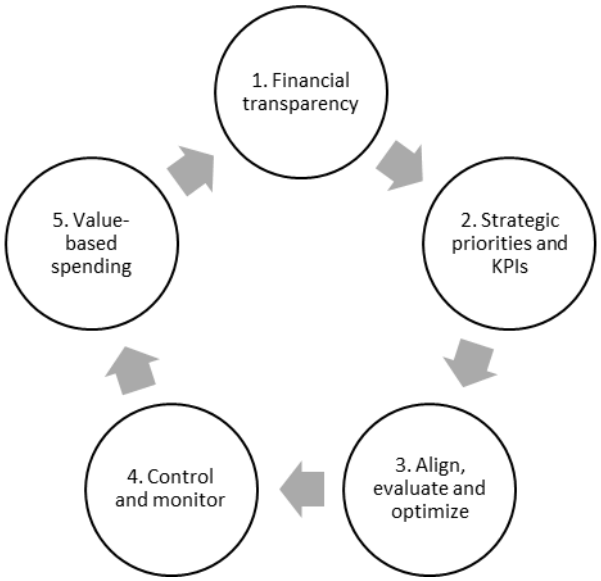
2. Is Zero-Based Budgeting the appropriate instrument to make predictions during COVID-19?

2.1. Theoretical framework regarding Zero-Based Budgeting

Nowadays, the business environment is constrained by various factors, such as sales uncertainty, social distancing or e-commerce development over the traditional selling channels (IMF, 2020; Crucean & Hategan, 2021). But, probably the most important factor that should be taken into consideration while discussing about a budget, are the constrains regarding costs. Executive leaders worldwide should have an approach which allows them to assess their spending in connection with the value it is generating within the companies (Accountancy-Europe, 2020). After conducting their business in the pandemic context for more than a year now, more and more managers are starting to notice the advantages which Zero-Based Budgeting offers (Wiles, 2020; Gartner, 2020). But, in order to be able to successfully apply this technique, one must understand what Zero Based Budgeting is and its principles. The Zero-Based Budgeting method is in total disagreement with the traditional budgeting, which takes the costs from previous periods and apply different increase or decrease rates in order to obtain values which will guide the whole company in the next year. But, in the current context, companies should choose wiser how to allocate their resources (Mondaq, 2021).

The Zero-Based Budgeting technique should be understood starting from its name. In theory, the *zero* comes from the fact that the budget will start from a completely empty canvas, not taking into consideration what were the previous expenses (Callaghan, Hawke & Mignerey, 2014). In practice, one cannot simply remove all the previous costs that were made. But the idea is not to rely on previous costs and to deliberately choose how to allocate all the resources taking into consideration the operational and strategical objectives. In order to successfully apply this method, there are a few steps which are recommended to be followed, presented in ***Figure no. 1***.

Figure no. 1. Steps in Zero-Based Budgeting implementation



Source: Adapted from Wiles (2020)

The first step, ensuring financial transparency, is necessary in order to understand the relationships between cost drivers and costs, which will emphasize the value added by each activity in a company. Also, by clearly understanding different types of cost (fixed or variable), managers can understand the impact these expenses have. This high level of financial transparency should bring to surface inefficiencies that have not been taken into consideration before.

Secondly, in the pandemic context it is of paramount importance to clearly define which are the strategic objectives of the company, in order to ensure their prioritisation while developing the budget. The higher management should clearly and openly communicate their strategical priorities across all the functions in order to maintain a tight collaboration towards a common objective (WHO, 2020). After this step, the strategic objectives should be translated into appropriate KPIs, which should be able to capture the effectiveness and efficiency of the results of these objectives.

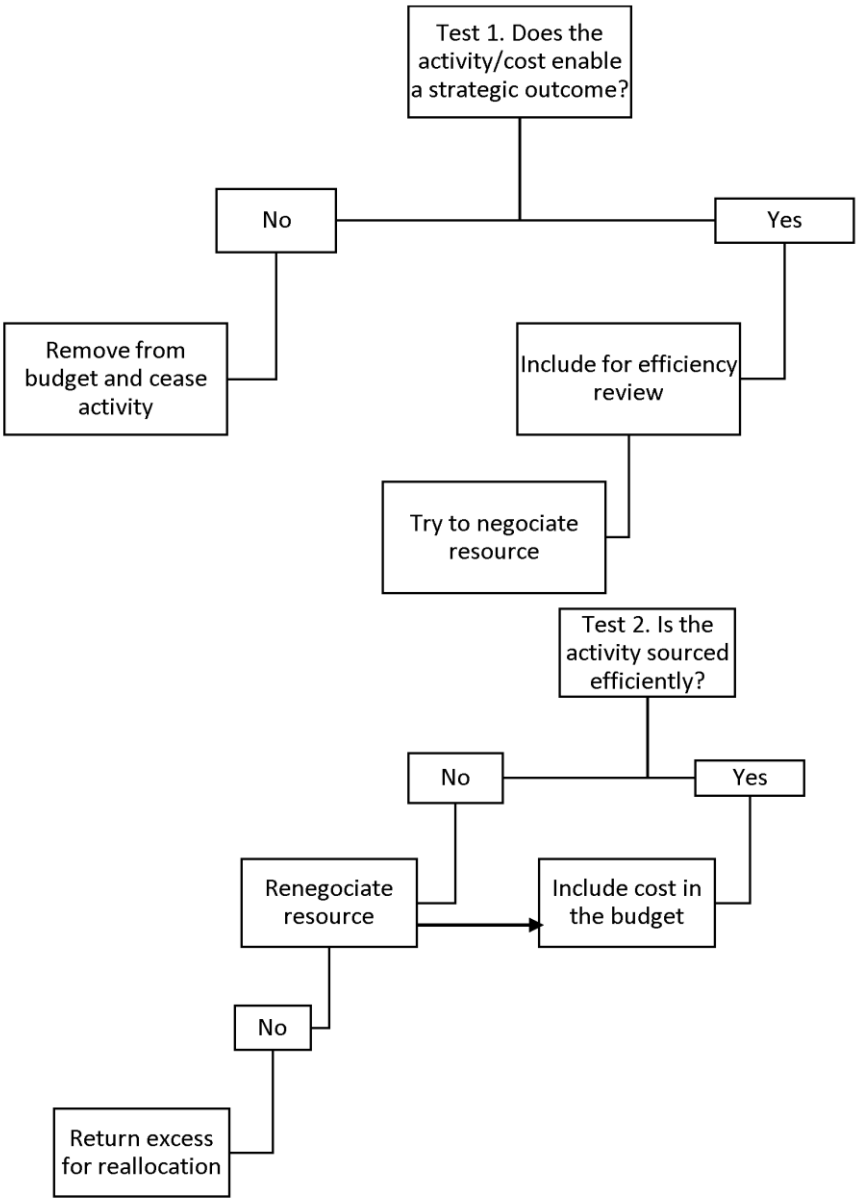
In order to have an efficient budgeting process, there should be an alignment of the objectives, with the KPIs and with the spending made in order to achieve these indicators. After a thorough evaluation of these expenses, companies can have a better understanding weather they can be shifted to another activity or if they should not be included in the budget at all. But, the cost reduction should be taken into consideration only when there are no other value-adding activities to which expenses could be shifted or if the company needs the resources in order to survive (Wiles, 2020; Callaghan, Hawke & Mignerey, 2014; Deloitte, 2018; Mondaq, 2021).

Furthermore, the budget and its implementation should be constantly monitored and reviewed in order to ensure that the company is still focused on the strategic objectives that were initially formulated. Finally, zero based budgeting should be operationalized taking into consideration the principle of value-based spending. All the expanses should be made only after ensuring that they are generating value for the company, but often this require a thorough analysis and some difficult choices in order to decide if a certain spending can be included in the budget or not.

Gartner (2020) developed a Zero-Based Budgeting Tree, a tool which should be used in order to decide which expenses should be included in the budget, shown in ***Figure no. 2***. The first test should be applied to remove all the unnecessary activities or costs. For the remaining activities or costs, the second test should be applied, remaining in the end only with the relevant costs. Using this map should ensure that:

- All activities are evaluated in a fairly manner
- The decision process is free of bias

Figure no. 2. Zero-Based Budgeting decision tree



Source: Adapted from Gartner (2020)

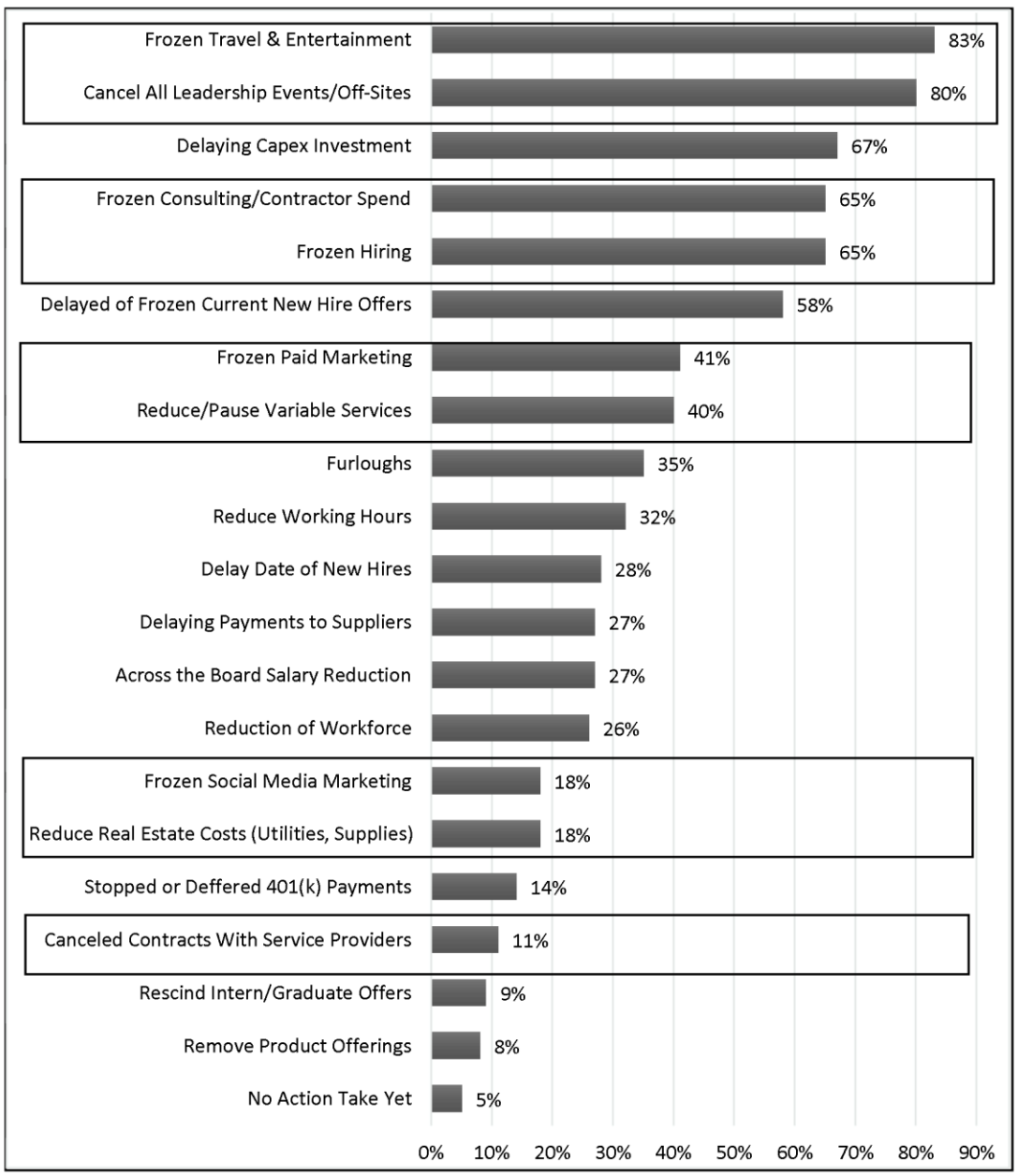
The Zero-Based Budgeting can often become a tedious and time-consuming method, but research shows (Callaghan, Hawke, & Mignerey 2014; Deloitte, 2018; Gartner, 2020; Wiles, 2020) that if it is implemented in a correctly manner, it takes only a few more days to develop it in comparison with the traditional budgets, but the results are exceeding expectations.

2.2. Guidance regarding budgeting in the context of COVID-19

Taking into consideration the uncertainty of the business environment which was caused by the COVID-19, financial managers worldwide are redesigning their budgeting process in order to survive (Mondaq, 2021;

WHO, 2020). This new approach represents an opportunity to put into practice all the lessons which can be learned from this critical period. The budget pressures from 2020 demanded serious cost reduction in order to increase short-term efficiency and the survival of the companies. According to a study (Gartner, 2020), in April 2020, 26% of the participants in the study anticipated that they would be using the Zero-Based Budgeting technique in order to overcome the pandemic situation. The main advantage these executives have seen in the Zero-Based Budgeting is that it presents a safe and structured approach to identify cost reduction policies.

Figure no. 3. Cost reduction measures taken during the COVID-19 pandemic



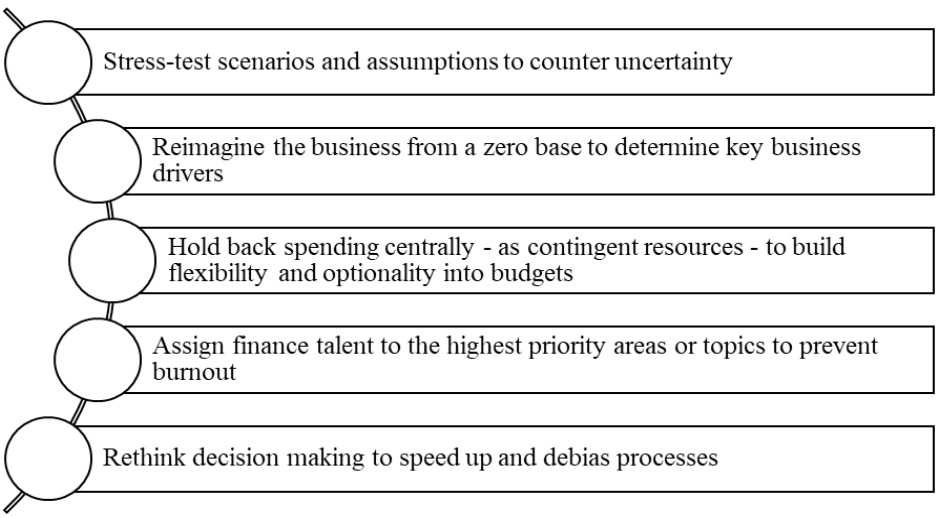
Source: Adapted from Gartner (2020)

Executives have used some of the Zero-Based Budgeting tools even before officially implementing it. (Agraval, Birshan, Grube, Maloney & Seth, 2020; Gartner, 2020). Starting with March 2020, most organizations embraced a cost-cutting exercise, based on the principles of the Zero-Based Budgeting. "However, a Zero-Based Budgeting approach to budgeting is more than just a cost-cutting exercise; it eliminates extraneous expenses that are not aligned with the strategy and instead shifts funds into activities that drive sustainable growth" (Gartner, 2020). In ***Figure no. 3***, there are presented the first actions which were took by executive leaders worldwide in order to survive the pandemic effects. The ones highlighted in a square are usually measures related to the Zero-Based Budgeting. As it can be easily observed, the top measures taken by executives in order to overcome the effects of the pandemic, are in direct connection with the Zero-Based Budgeting.

Moreover, taking into consideration the complex economic environment, a perfect budgeting process may not be achievable, but there might be a better version of it. The common budgeting process can be unnecessarily prolonged by negotiations and may not always be in direct connection with the strategy of the company. In opposition, a completely new budgeting process can address different topics which may generate added value for the company and suggest actions which are the translation of the strategical objectives of the company (Mondaq, 2021; IMF, 2020). In order to achieve the benefits of the Zero-Based Budgeting in the current pandemic context, Agraval, Birshan, Grube, Maloney, & Seth (2020) suggest that there might be five steps that CFOs can take in order to rethink and redesign their budgeting process.

The five steps are presented in ***Figure no. 4***.

Figure no. 4. Steps that CFOs can take in order to redesign the budgeting process



Source: Adapted from Agraval, Birshan, Grube, Maloney, & Seth (2020)

I. Stress-test scenarios and assumptions to counter uncertainty

This first step refers to analysing the assumptions and decisions that were previously made in order to determine their relevance in the current context. The result of this analysis should be an alignment of all departments and functions regarding the next steps. This stress-test scenario should also be taken into consideration by the senior management in order to determine whether there is a need of a bold initiative that can only be done at the higher levels.

II. Reimagine the business from a zero base to determine key business drivers

"Business leaders' mindsets were changed when they were forced to move resources from areas that were once considered untouchable and saw that those moves

resulted in a better prioritization of the projects, an improved understanding of fixed versus variable costs, and a clearer overview of risks and opportunities" (Agraval, Birshan, Grube, Maloney & Seth, 2020). As shown above, most of the business leaders have already implemented zero based budgeting measures during 2020 in order to keep alive their companies. When preparing the budgets during or after the pandemic, executives should keep the same principles, meaning that in some areas they have to start from zero and not base their resource allocation on previous dimensions.

III. Hold back spending centrally – as contingent resources – to build flexibility and optionality into budgets

In most cases, once the budgets are approved, changes are hardly an option or several approvals are needed. But, in the COVID-19 context, companies had to learn how to be more flexible and constantly adapt to the changing conditions. This flexible attitude should be maintained in the next years as well, if companies desire to overcome the negative effects of the pandemic (PwC, 2020; WHO, 2020; Mondaq, 2021). Moreover, they should also adapt their key performance indicators (KPIs), as the old ones are rarely still relevant. The choice of the appropriate KPIs is of high importance as they show how the company is coping with the new conditions, but also, they have a huge role in resource allocation, which is of paramount importance in this situation.

IV. Assign finance talent to the highest priority areas or topics to prevent burnout

The pandemic context has completely changed the dynamics of the finance team in a company. The words "fast" and "change" have become ordinary while the working remotely to support major budget shifts and taking critical decisions (PwC, 2020). The segregation of duties was no longer a priority and everyone was involved in the process, which may have been stressful or tiring for the finance team. Luckily, digital solution became a priority during the pandemic causing taking some pressure of those working in the finance area. But this means that there should be a change in the way of working, while learning to work with the new digital tools which were implemented in 2020. In order to protect their employees from burnout, managers should set priorities for the next periods, with clear objectives, expected outcomes and defined deadlines. "In all cases, it is important for CFOs to lead with empathy and it is critical to establish clear communication plans" (Agraval, Birshan, Grube, Maloney & Seth, 2020).

V. Rethink decision making to speed up and debias processes

Firstly, managers should define the new budgeting and decision-making process, so the finance team has a clear understanding of how the business will be conducted started from now on. But, in order to make these changes, managers should also reconsider their KPIs and align them with the new strategy, taking into consideration the effects of the COVID-19 on their company. Moreover, both managers and their team should be constantly transparent regarding the relevant KPIs and budgets and should have a smooth communication with everyone in the company. Also, the traditionally incentives given to the employees should also be adapted to the new conditions in order to keep the employees motivated and debias the processes.

In order to remain competitive on the market, organizations worldwide face severe pressures to cut cost while still achieving the desired level of performance (Gartner, 2020; PwC, 2020). By trying to implement some of the specific activities of the Zero-Based Budgeting, executive leaders should have a more structured overview regarding of the cost saving measure that can be taken.

3. Conclusion

During this unprecedented period of uncertainty related to the COVID-19, every sector is affected and there is a need of a general shift in the way things are done within the companies. When referring to the budgeting process, it is critical for the executive leaders to understand the importance of the correct allocation of resources during this worldwide crisis. The traditional budgeting process, which takes the costs from previous periods and apply different increase or decrease rates in order to obtain values which will guide the whole company in the next year, is no longer relevant in the COVID-19 context. As it was presented through the paper, one of the most effective method is the Zero-Based Budgeting. The budget pressures from 2020 demanded serious cost reduction in order to increase short-term efficiency and

the survival of the companies. The main advantage of the Zero-Based Budgeting is that it presents a safe and structured approach to identify cost reduction policies. „However, a Zero-Based Budgeting approach to budgeting is more than just a cost-cutting exercise; it eliminates extraneous expenses that are not aligned with the strategy and instead shifts funds into activities that drive sustainable growth" (Gartner, 2020). By following the steps presented above, companies can firstly align their objectives with the strategy and then translate these objectives into relevant KPIs. Furthermore, the KPIs will support the management in understanding which activities are generating value to the company and try to reallocate or reduce the resources of the activities which do not bring any added value in the company. By trying to implement some of the specific activities of the Zero-Based Budgeting, executive leaders should have a more structured overview regarding of the cost saving measure that can be taken, and can remain competitive on the market.

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Reporting Significant Transactions with Affiliated Parties of Listed Companies on Stock Exchange

Lioara-Veronica PASC, Ph. D. Student,
East European Center for Research in Economics and Business,
West University of Timisoara, Romania,
e-mail: lioara.pasc73@e-uvt.ro

Univ. Prof. Camelia-Daniela HAȚEGAN, Ph. D.,
East European Center for Research in Economics and Business,
West University of Timisoara, Romania,
e-mail: camelia.hategan@e-uvt.ro

Abstract

The complexity of related party transactions may lead to subjective interpretations of their reporting requirements. The objective of the paper is to examine the nature of significant transactions with related parties, how they were reported in accordance with legal requirements, and how the reported issues are correlated with the information in the annual financial statements. The study includes a synthesis of the evolution of specific regulations in Romania, as well as a centralization of the information highlighted in current reports published by entities and annual reports for 2017-2019, in order to identify issues to consider in the process reporting and publishing, in the case of companies carrying out such transactions. The sample consists of energy companies listed on the Bucharest Stock Exchange, included in the BET index, in which the state is the majority shareholder. The results of the study showed that reporting requirements have changed over time, both in terms of defining transactions and mandatory reporting ceilings. The analysis found different interpretations of companies on reporting obligations which can lead to difficulties in correlating and comparing data in the context of corporate transparency. The conclusion is that additional factors arise when reporting these types of transactions, which must be taken into account so that there is no impact on their completeness and accuracy, without affecting the auditor's opinion.

Key words: *significant transactions; related parties; auditor; reporting; transparency;*

JEL Classification: *M42, M48, M41, G38*

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Introduction

In order to increase the degree of trust in the companies that are listed on the stock exchange, the interested parties requested to obtain more corporate and high-quality information (Boesso & Kumar, 2007). Interest in corporate information has grown not only among users of financial statements, but has also spread among new users requesting clear, relevant and timely information related to both financial performance and other useful information of the activity of the companies analyzed, in particular those related to their social size and corporate risks. Improvements in risk disclosure play an important role in protecting the interests of stakeholders and, consequently, they are an important part of corporate governance reforms (Solomon et al., 2000). At the same time, in order to build trust and gain social legitimacy, firms have responded to growing pressure from stakeholders by voluntarily disclosing a greater amount of risk-related information (Abraham & Cox, 2007). The companies wish to promote themselves because like any other company they develop a new product, namely their own listed shares. Communication with investors, analysts and the media is a path that must be taken seriously by companies. The result of communication with them in response to market demand is directly reflected both in the share price and in the relationship with users (Hațegan, 2020). At both European and national level, the interest in making the financial information presented as transparent as possible leads to the need for stricter regulations on the reporting of transactions with related parties, as additional factors arise when auditing such companies, transactions that must be taken into account so that there is no impact on the correctness and accuracy of the results of the independent auditor's report (Pasc & Hațegan 2020). Such a set of measures and instruments is currently being adopted by the European Union through the Directives on: i) harmonization of transparency obligations with regard to information on issuers whose securities are admitted to trading on a regulated market, ii) the prospectus to be published in the case of a public offering of securities or for the admission of securities to trading, iii) the establishment of rules for the application of certain provisions. All these directives have been transposed into Romanian legislation.

The objective of the paper is to identify the degree of compliance regarding the reporting of significant transactions with related parties carried out according to legal requirements for 2017-2019 and the analysis of how the reported issues are correlated with the information in the annual financial statements of the sampled energy companies listed on the Bucharest Stock Exchange, included in the BET index, in which the state is the majority shareholder.

The paper is organized as follows: following the literature review and review of the legislative history, the methodology used to identify the level of information disclosed by Romanian companies listed on the stock exchange on related party transactions is presented. The results are presented and discussed in the fourth section. The final section summarizes the main conclusions of the study with a brief discussion about its implications for future research as well as the limitations of this study.

1. Literature review and regulatory framework

1.1. Literature review

Keeping managerial abuse under control to reduce losses due to conflicts of interest is, for many, the key to corporate governance; shareholders must be constantly on alert to not be deceived by greedy or unscrupulous managers (Charkham & Simpson, 1998).

From the point of view of investor theory, interest in corporate information is not limited to shareholders and other investors, but also to other interested groups of investors. Depending on the extent to which firms recognize the legitimacy of the interests of these stakeholders, they tend to voluntarily report information to achieve their intended purpose. This theory focuses on the most influential actors in an organization, namely those who can influence it, directly or indirectly. According to Boesso & Kumar (2007), the more critical a group of investors is to a company, the greater is its influence on the company's disclosure practices. Miihkinen (2012) defined risk disclosure as “all the information that firms provide in the risk analyzes they present in their annual reports”. The study of risk presentation can be considered a new field of research in financial accounting (Linsley & Shrives, 2006).

In empirical accounting research, the researchers Beerbaum (2015), Wagenhofer (2008), Cadbury (1999), Markarian et al., (2007) considered that

although companies should follow the approach of disclosing specific investment to external investors, corporate disclosures tend to assimilate and to converge on group disclosures and form clusters or packages, following the path dependency theory (Bebchuk & Roe, 1999).

Faulkender & Yang (2012) noted that the evidence shows that benchmarking manipulation became more severe after improved mandatory disclosure was required, especially in firms with substantial shareholder complaints about compensation practices, low institutional ownership and ownership by boards of directors or managers. The strongest effect is felt in companies with new directors. These findings call into question whether mere disclosure can remedy possible abuses in compensation by executives.

Abusive transactions with related parties took place in Romania due to the weaknesses of the mechanisms that govern them, very few companies disclosed detailed information. (Mihai et.al., 2017). Căpățină-Verdeş and Mironiuc (2018) investigated the relevance of the information in the financial reports regarding transactions with related parties based on transfer prices, presented by entities listed in Romania, in the period after the application of international regulations, respectively 2012 - 2016. The conclusion of the study was that the annual tax reports of listed entities that reported related party transactions should be considered relevant and reliable for users of tax data.

In another study, Ignat & Feleaga (2019) concluded that the substantiation of the competition principle as required by IAS 24 *Related party disclosures* is a subjective analysis influenced by domestic law, bringing into question the idea of the need for a rule to be applied uniformly in all countries. At this point, if a transaction with an affiliated party is considered in one jurisdiction, it may comply with the competition principle and, if analyzed in another jurisdiction, may not comply with this principle. This situation can lead to double taxation of results within a multinational group of companies.

There is a very fine line between interests; Bodu (2019) clarified the notions of contrary or conflicting interest meaning that there is a conflict between the interest of society and the one who decides for society. The contrary interest must be significant, not only marginally and in the first case, it affects the decisional objectivity and suppresses the good faith of the members of the management bodies towards the company they manage. For this reason, the legislator established both civil and criminal actions in case of decisions taken in conflict with the corporate interest. The opposite interest may arise: (i) at the representation, when a member of the management body concludes an act at the company's expense even if there is a conflict of interest; (ii) in the decision-making process, when one or more members participate in the deliberation; or (iii) in the case of obtaining personal profits from the use of goods or information to which he has access by virtue of membership in the management body.

1.2. Regulatory framework for reporting relations with related parties

In Romania, the reporting of transactions with affiliated parties was regulated by several normative acts, in **Table no. 1** being presented the chronology of the most relevant of them.

From **Table no. 1** results that art. 82 of Law 24/2017 provided for a value threshold of 50,000 euros. The legislator decided to separate from Law 297/2004 the articles dedicated to issuers of financial instruments and operations in the market with these instruments and although it repeats in proportion of 80% the provisions it repealed from the latter normative act, Law 24/2017 groups those legal institutions that form the special corporate law of the capital market (Bodu, 2019). At the time of the publication of the law, Article 82 contained clear provisions regarding the obligations of the directors of companies admitted to trading on the financial markets. Legislators have brought the regulations to a more detailed level, inserting more specific and detailed requirements that include the obligation to carry out additional checks by auditing companies in the area of application, to protect investors and shareholders and ensure that they are properly informed and during these transactions.

Table no. 1. Chronology of normative acts that regulated the reporting of significant transactions

Act/ Art.	In force	Summary	Observations/ Modifications
Law no. 297/2004 on capital markets (L297/2004)			
Art. 225	29 June 2004	Par.1 The directors of the companies traded on the stock exchange must report to the supervisory authority all legal acts whose cumulative value exceeds 50,000 euros, which were concluded with employees, administrators, shareholders holding the respective control with the persons with whom they interact	The first legislative regulation in the field
		Par.2 When concluding any legal acts, the market price and the interests of the third parties with which the act is concluded shall be observed, mentioned in paragraph 1	
		Par.3 The reports provided in paragraph 1 shall specify precise elements such as: the parties that concluded the legal act, the date of conclusion and nature of the act, the description of its object, the total value of the legal act, mutual debts, guarantees, deadlines and payment methods.	art. repealed on 29.03.2017
		Par.4 The reports must also contain any other information necessary to analyze the effects of legal acts on the financial situation of the company.	
Law no. 24/2017 on issuers of financial instruments and market operations (L24/2017)			
Art. 82	1 April 2017	Par.1… "any legal act concluded by the issuer with the directors, employees, shareholders holding control, as well as with the persons with whom they act in concert, whose cumulative value represents at least the RON equivalent of 50,000 euros"	It is transposed almost identically art. 225 of Law 297/2014 in art.82
Law 158/2020 for amending, supplementing and repealing certain acts (L158/2020), among which is also Law 24/2017			
Art. 82	28 Aug. 2020	At point 40 of the law, it is mentioned that art.82 is repealed	The info will be partially taken over in art.92[3] of Law 24/2017
Art. 92[3]	28 Aug. 2020	(1) Paragraph 1 of the old art. 82 shall be kept, namely that the entities traded on the stock exchange must report to ASF all legal documents and additions shall be made in accordance with paragraphs 3 and 13.	Responsibility is now transferred to the entire board of directors
		(3) Defines the notion of "significant transaction" as any transfer of resources, services or obligations whether or not it involves the payment of a price, the individual or cumulative value of which represents more than 5% of the issuer's net assets	It introduces and defines the notion of significant transaction
		(13) If the threshold of 5% of the value of net assets is exceeded as a result of the cumulation of transactions with the same affiliated party or only individually, the respective transactions must be made public.	The amount of 50,000 euros is replaced by significant transactions or in a percentage of 5% of the net assets of the issuing company
		(2) Paragraphs (3) and (4) of former art.82 are taken over. The reports contain precise elements such as: the parties that concluded the legal act, the date of conclusion and the nature of the act, the description of its object, the total value of the legal act, mutual debts, guarantees established, the terms and methods of payment	
		(6) Keeps the paragraph 2 of the old Article 82, namely that: at the conclusion of any legal acts the market price and the interests of the third parties with which the act is concluded; adds the obligation to present justifications for the transactions that are not made at the market	The obligation to provide justifications for transactions not carried out at market price is added
		New paragraphs are introduced which provide further clarification, namely par. 5 and 7 to 12, respectively	

Source: Authors' processing, 2021

It is necessary to emphasize the definition of new concepts introduced by Article 923, namely that the "significant transaction" means any transfer of resources, services or obligations whether it includes or not paying a

price whose individual or cumulated value is more than 5% of the issuer's net assets, according to the latest individual financial reports published by the issuer.

The reporting of companies' transactions is monitored by the Romanian Financial Supervision Authority (ASF), which has issued regulations for the application of legal requirements. Thus, the last regulation in force is Regulation no. 5/2018 regarding the issuers of financial instruments and market operations (R 5/2018) which at art. 144 states that the reports published by companies are analyzed by the financial auditor who has the obligation to issue "a report stating whether the price, in conjunction with the rights and obligations assumed by the parties, is fair compared to other existing offers on the market." Thus, Regulation no. 5/2018 regulates the procedure and standards to which the audit firms are obliged to adhere, complementing the obligation imposed by art. 82, namely that the reports published by entities regarding significant transactions be audited. According to this regulation, the financial auditor only analyzes the transactions reported during the semester by the audited entity and will draw up a limited insurance commitment. It is based on simplified sampling procedures and has a smaller scale overall. The report drawn up shall specify whether the price, in conjunction with the rights and obligations assumed by the parties, is correct in relation to the other existing offers on the market. If the transactions are not carried out at the market price, the reasons that led to this derogation and the pricing policies will be specified. The task of ensuring that the supporting documents underlying the preparation of current reports, as well as the evidence provided to the auditor, are complete, correct and justified lies solely with the entity that prepares them.

2. Research methodology

The research methodology is qualitative and consists in synthesizing the reports on significant transactions published by listed companies on the regulated market on the IRIS (Issuer Reporting Information System) platform developed by BVB, and also comparing the obtained information with their directors' annual reports and notes to the statements of annual financial audits. The research object of the study was the thematic of reporting transactions with related parties as regulated by art. 82 of Law 24/2017.

The selection process was based on three criteria, companies must: i) publish transactions according to art. 82 of Law 24/2017 which had as object sale-purchase transactions, ii) to be included in the BET index of BVB in the energy activity sector, iii) to have the Romanian state as the majority shareholder.

A first step was the scientific documentation aimed at deepening the existing information in the field of study of transactions with related parties and addressed their impact on companies. The reports were selected using the expression “Art. 82 of Law 24/2017” as a filtering criterion, published in the period 2017 - 2019. Out of the total of 21,325 published reports, following the filter applied according to the first selection criterion, 1,580 published reports related to a number of 87 companies were identified. After the application of the second criteria, 7 companies in the field of energy remained graphically presented in ***Figure no. 1***, according to the share held by the state in the share capital.

Figure no. 1. Energy companies included in the BET index

Source: Authors' processing, 2021

After the application of the third selection criterion, the reports of the 2 companies where the state is not the majority shareholder were eliminated, leaving in the sample a number of 535 reports published by 5 companies, which represents a third of the number of reports published by main market companies. The characteristics of the companies, sorted alphabetically by stock exchange symbol are highlighted in **Table no. 2**.

Table no. 2. Characteristics of the companies included in the final sample

Symbol BVB	Company	Activity area	No. reports	Ownership percentage
COTE	Conpet SA	Services - pipeline transport	4	58.7162
SNG	S.N.G.N. Romgaz S.A.	Utilities - natural gas extraction	159	70.0071
SNN	S.N. Nuclearelectrica S.A.	Utilities - electricity production	214	82.4981
TEL	C.N.T.E.E. Transelectrica	Utilities - electricity transmission	32	58.6882
TGN	S.N.T.G.N. Transgaz S.A.	Utilities - natural gas transportation	62	58.5097

Source: Authors' processing, 2021

3. RESULTS

The analysis of the information published by the companies included in the sample was performed on each company, and the results are centralized in separate tables, the amounts being expressed in lei. **Table no. 3** provides the information identified for Conpet S.A.

Table no. 3. Centralizer of significant transactions reported by Conpet SA

Current reports IRIS				Financial statements (explanatory notes) and the administrator's report		
Affiliated party	**No. and date of contract**	**Contract object**	**Contract value**	**Total trans. value**	**Annual value**	**Year**
CFR MARFA S.A.	102/ 30.03.2015	Rail transport of crude oil and rich gas from loading ramps to destinations set by Conpet	225,128,496	227,626,461	73,016,731	2019
					64,925,236	2018
					66,960,497	2017
					22,723,997	Previous period

Source: Authors' processing, 2021

From the analysis of the reports of significant transactions at CONPET S.A. it was found that there is a correlation between the amounts declared and the explanatory notes to the audited annual financial statements, as well as with the annual report of the administrator.

Table no. 4 presents the information summarized for the company ROMGAZ S.A.

Table no. 4. Centralizer of significant transactions reported by ROMGAZ SA

Contracting / affiliated party	Object of the contract	Estimated value of the legal act without VAT	Year
- Filiala de Înmagazinare Gaze Naturale Depogaz Ploieşti S.R.L.	Sale-purchase natural gas on competitive market	442,723,808	2019
		6,064,865	2018
		211,832,004	2017
S.N.T.G.N. Transgaz S.A.	Provision of monthly transport services related to the entry points in the NTS	641,233,810	2019
		273,828,829	2018
		343,993,306	2017
Electrocentrale Constanța S.A.	Sale-purchase natural gas on competitive market	259,051,351	2019
		57,472,382	2018
		117,295,616	2017
S.C. ELECTROCENTRALE GALATI S.A.	Sale-purchase natural gas on competitive market	141,776,108	2019
		79,439,868	2018
		208,399,587	2017
S.C. C.E.T. GOVORA S.A.	Sale-purchase natural gas on competitive market	63,624,363	2019
		119,556,463	2018
		-	2017
Termo Calor Confort S.A.	Sale-purchase natural gas on competitive market	30,178,915	2019
		53,370,790	2018
		33,645,712	2017
Termoficare Oradea S.A.	Sale-purchase natural gas on competitive market (01.03.2019-31.03.2019)	165,290,440	2019
		234,838,052	2018
		317,048,806	2017
SOCIETATEA COMPLEX ENERGETIC HUNEDOARA S.A.	Sale-purchase natural gas intended for PET consumption and non-household consumption	53,218,355	2019
		61,794,372	2018
		22,016,531	2017
MODERN CALOR S.A.	Sale-purchase natural gas intended for PET consumption and non-household consumption	22,494,899	2019
		2,308,429,070	2018
		-	2017
Company ELECTROCENTRALE BUCUREŞTI S.A.	Sale-purchase natural gas intended for non-household consumption	30,739,518	2019
		-	2018
		-	2017
S.C. OLTCHIM S.A.	Sale-purchase natural gas on competitive market	7,508	2019
		71,121,740	2018
		24,638,439	2017
S.C. CENTRALA ELECTRICA DE TERMOFICARE ARAD S.A.	Sale and purchase of natural gas for the production of thermal energy in cogeneration plants and thermal power plants intended for public consumption	25,554285	2019
		-	2018
		-	2017
C.N.T.E.E. TRANSELECTRICA S.A.	Sale of electricity	-	2019
		10,582,851	2018
		-	2017

Source: Authors' processing, 2021

During the analyzed period, 159 reports published on the IRIS BVB platform were extracted and centralized, but no correlation could be identified between the published reports and the explanatory notes to the

audited annual financial statements. In *Note 23 - Transactions and balances with affiliated entities* (i) within the audited financial statements, transactions with other companies controlled by the Romanian state are not considered, from the financial statements point of view, transactions with affiliated entities. The company also defined this exception in the Policies for related party transactions, in Chapter 5 of the document. Prior to the revision of IAS 24 in 2003, state-controlled entities were exempted from disclosing related parties. This derogation was removed in the 2003 revision, which entered into force in 2005 and continues to be in force today. According to IAS 24, the purpose of related party reporting is "to ensure that an entity's financial statement contains the information necessary to draw attention to the possibility that its financial positions and profit or loss may have been affected by the existence of related parties and outstanding transactions and balances, including commitments, with such parties". In our opinion, all companies, regardless of the share of state capital in the share capital, are obliged to disclose related parties and the transactions that take place with them and are also obliged to update their policies on related party transactions accordingly under current legal regulations.

Table no. 5 includes the transactions with the affiliated parties reported by the company NUCLEARELECTRICA.

Table no. 5. Centralizer of significant transactions reported by NUCLEARELECTRICA

IRIS reports			
The contracting party	**The subject of the reports**	**Estimated value of the legal act without VAT**	**Year**
National Administration of Romanian Waters	Receiving wastewater in the resource from the Nuclear Power Plant 2020	71,474,385	2019
			2018
		14,403,516	2017
National Administration of state reserves and special problems	Heavy water needed to complete the reserve	15,564,733	2019
		10,316,132	2018
		5,845	2017
National Administration of Romanian Waters (Dobrogea Seashore Water Basin Administration)	Receiving wastewater in the resource from the Nuclear Power Plant	7,012,751	2019
		65,366,040	2018
		73,203,936	2017
National Weather Administration – Dobrogea Regional Centre	Forecast / Diagnosis / Weather Warning Services	-	2019
		905,376	2018
		-	2017
Association: Pegas Impex and Public Utilities Cernavoda	Refurbishment works of the main section of the primary heating agent on Anghel Saligny Street, Cernavoda	2,232,688	2019
		-	2018
		-	2017
CNTEE Transelectrica	Wholesale energy sales	-	2019
		32,512,985	2018
		24,777,507	2017
National Uranium Company (CNU)	Processing of non-compliant nuclear materials	573,996,807	2018
	Storage of Radioactive Solid Waste	289,400	2017
	Natural uranium in powder form	147,990,700	2019
National Company for the administration of navigable canals	Right of use - Warehouse Equipment	1,673,929	2019
	Dredging works - Water transit	10,925,077	2018
	Rent Cernavoda Warehouse	326,311	2017
Research-Development Institute for Earth Physics ("INCDFP")	Seismic engineering services, Cernavoda	-	2019
		467,640	2018
		-	2017

IRIS reports			
The contracting party	**The subject of the reports**	**Estimated value of the legal act without VAT**	**Year**
ISCIR State Inspection for the Control of Boilers, Pressurized Recipients and Lifting Installations	Technical verification services	-	2019
		100,000	2018
		150,000	2017
Kinetrics Nuclear Romania	Complete design activities at Cernavoda NPP	35,991,581	2019
		-	2018
		-	2017
(RATEN ICN) – National Authority for Nuclear Technologies – The Institute for Nuclear Research Pitesti	Treatment of radioactive waters from the activity of FCN Pitesti	5,019,203	2019
	Measurements of C-14 and SR-90	14,509,978	2018
	Radioactive waste treatment services	3,135,208	2017
SDEE Energy Distribution Company Transilvania Sud.	Wholesale energy sales	12,868,560	2019
		46,374,401	2018
		-	2017
SDEE Energy Distribution Company Muntenia Nord	Wholesale energy sales	63,200,880	2019
Electrica Furnizare S.A.	Wholesale energy sales	117,951,715	2019
		185,410,063	2018
		339,812,306	2017

Source: Authors' processing, 2021

From the analysis of the 214 reports published on the IRIS BVB platform by Nuclearelectrica S.A. it was found that there are reports prepared by the company according to the provisions of Law 24/2017 and Regulation 5/2018. The reported transactions included in the current reports have been prepared by the company's management to report to ASF, the auditor in the half-yearly reports certifies the current reports, but the amounts reported cannot be correlated with those stated in the explanatory notes to the audited annual financial statements and the administrator's reports.

Table no. 6 contains the transactions with related parties reported by TRANSELECTRICA.

Table no. 6. Centralizer of significant transactions reported by TRANSELECTRICA

The contracting party	**The subject of the reports**	**Estimated value of the legal act without VAT**	**Year**
SC SMART SA	Strategic services / works in installations	43,879,780	2019
		-	2018
		50,901,078	2017
S.N. NUCLEARELECTRICA SA	Sale-purchase of electricity	-	2019
		-	2018
		55,958,782	2017
SC TELETRANS SA	Maintenance and operation services of telecommunications systems, process and information technology;	110,692	2019
		-	2018
		28,164,402	2017

The contracting party	The subject of the reports	Estimated value of the legal act without VAT	Year
SC SMART SA through Piteşti Branch	Integration of 110kV measuring cells and 220kV switches in the online monitoring system of Grădişte Station	-	2019
		-	2018
		319,988	2017
SC SMART SA through Piteşti Branch	Station Grădişte-Revitalizare isolation	-	2019
		-	2018
		497,100	2017
Hidroelectrica SA	Purchase of electricity	-	2019
		-	2018
		2,118,417	2017
Company Complexul Energetic Oltenia SA	Sale-purchase natural gas intended for PET consumption and non-household consumption	-	2019
		-	2018
		51,986,600	2017
Company for Maintenance Services of the Electric Transmission Network "SMART" SA	Strategic services/works	-	2019
		-	2018
		227,419,041	2017
SC SMART SA - Craiova Branch	RC LEA 400 kV Tantareni-Turceni G1+2, G3+4	-	2019
		1,236,899	2018
		2,498	2017
National Society for natural gas "Romgaz" SA	Purchase of electricity	-	2019
		-	2018
		8,893,152	2017
SC SMART SA – Constanța Branch	Execution of works for Modernization of teleprotection system, telecommunications in Cernavoda station	-	2019
		1,236,899	2018
		-	2017

Source: Authors' processing, 2021

At Transelectrica, 32 current published reports were extracted and centralized, all complying with audit requirements, but no correlation could be identified between the published reports and the explanatory notes to the audited annual financial statements and no correlation between current reports and those referred to by the auditor in the independent limited liability report.

Table no. 7 includes transactions with related parties reported by TRANSGAZ.

Table no. 7. Centralizer of significant transactions reported by TRANSGAZ

IRIS Reports			
The affiliated party	**The subject of the reports**	**Contract value**	**Year**
Transgaz, Ploiesti Branch		-	2019
		-	2018
	Provision of underground natural gas storage services	7,212,860	2017
E.ON Energie România SA		-	2019
		-	2018
	Natural gas -Consumption	81,338,400	2017
S.N.G.N. Romgaz S.A	Natural gas from Underground Storage Depots: Provision of monthly transport services related to the entry points in the NTS	316,011,983	2019
		236,316,781	2018
		100,381,572	2017

IRIS Reports			
The affiliated party	**The subject of the reports**	**Contract value**	**Year**
Complexul energetic Hunedoara SA	Ctr. n3. 51T/26.08.2019	565,771	2019
	Provision of annual transport services related to the exit points from the NTS	2,414,074	2018
	provision of transport services	2,672,651	2017
Electrocentrale Bucuresti S.A.	Provision of annual transport services related to exit points in the NTS	74,906,797	2019
		85,407,014	2018
		82,402,238	2017
CEC Bank S.A.		-	2019
		-	2018
	Services for recording amounts representing indemnities and compensations available to entitled persons	362,191	2017
Vestmoldtransgaz S.R.L	Support services for the creation and continuous operation of the procurement commissions of Vestmoldtransgaz S.R.L.	948,777	2019
		-	2018
		-	2017
Electrocentrale Constanta S.A.	Provision of annual transport services related to the exit points from the NTS	7,332,374	2019
		2,364,611	2018
		-	2017

Source: Authors' processing, 2021

During the analyzed period, 62 current reports published by Transgaz were extracted and centralized. The company complies with the legislative requirements and the ASF norms but no correlation could be identified between the published reports and the explanatory notes of the audited annual financial statements. In the tables presented, the transactions identified in the current published reports were centralized in value in order to identify the nature and parts of the transactions, as well as to correlate them with the information presented in the explanatory notes.

Unfortunately, it was not possible to identify the correlations between the amounts included in the current transaction reports and the amounts presented in the explanatory notes to the financial statements because the current reports mentioned the value of the contracts concluded, which can run for more than one year. and in the financial statements was strictly presented the information related to the reference financial year.

Due to the specifics of the activity of the 5 companies in the field of energy and the flow of energy from producer to consumer, there were reciprocal relationships between them, as shown in **Table no. 8**.

Table no. 8. The matrix of mutual relations between companies

Symbol	COTE	SNG	SNN	TEL	TGN
COTE	-				
SNG	No	-			
SNN	No	No	-		
TEL	No	Yes	Yes	-	
TGN	No	Yes			-

Source: Authors' processing, 2021

Table no. 8 shows that Conpet SA is the only company that did not have relations with the other four. Thus, Romgaz as a gas producer concluded contracts with Transgaz and Transelectrica. Nuclearelectrica as an energy producer has concluded contracts for its transport with Transelectrica. The comparison of the reported information found differences between mutual reporting due to different company policies or delayed reporting which leads to the amounts in the tables presented not being identical for the same period.

Following the analysis, we found that the reporting requirements do not fully achieve their purpose of bringing transparency in the disclosure of significant transactions with related parties because there is no mechanism to control and identify potential transactions not reported by companies, through negligence, error or intentionally, when publishing annual reports. There is no certainty that the half-yearly reports are accurate, complete and transparent because they are based on data provided and verified exclusively by the entity's audit and internal control department. Thus, only from the annual financial statements it would be possible to identify all the transactions with the affiliated parties presented according to the policies of each company, a situation that can create confusion and mislead the users of the information.

Conclusions

In one of the first studies of Beasley et al. (1999) there were over 10 situations reported in which related party transactions were not properly disclosed. The authors demonstrated that, although the auditors had the necessary knowledge of the disclosures of the missing affiliates based on their documentation, they did not challenge the company's disclosure and did not request an extension of the company's disclosure.

A first conclusion that we can draw from this study according to the auditors' statements is that the half-yearly report introduced as mandatory by art. 923 of Law 24/2017 amended by Law 158/2020 refers strictly to what the company disclosed, but no specific procedures were performed to verify the current reports and the sources from which the reports were extracted.

It also does not mention the procedures for verifying contracts concluded with the directors, employees or shareholders who hold the respective control with the affiliated entities which, according to the legislation, must be reported. The study revealed discrepancies in the reports published by the analyzed companies, which led to the impossibility of making correlations between current reports and annual reports. In order to increase corporate transparency, raising the accountability requires a broader shift in attitudes towards reporting based on a balance of financial and non-financial information. The latter should be as credible and reliable as the financial data. At the same time, in order to increase the trust of the users of the financial statements, it is necessary to modify not only the methodology and procedural practices but also changes the mentality of the organization. Although the legislation has supplemented the requirements for reporting of significant transactions and required companies to be audited to ensure the transparency of reporting and the accuracy of information presented, the purpose is not achieved, the audit is only used to inform the company's management and not to disclose significant transactions. We believe that these shortcomings may be due to the subjectivity with which the legislation is understood and transposed in the current procedures and last but not least it may be due to an immature market at the beginning of the road that has not yet lived its own experiences.

Naturally, companies are required to implement a by-law that sets out the responsibilities of the board and the key functions held by management and most members must have proven that they are adequately qualified for the responsibilities they have. It is also recommended to implement an internal process and policies for defining, applying, properly managing transactions with related parties and a method of verifying the knowledge of legal rules and reporting procedures by those involved and ensuring increased accountability in the process. Benchmarking is often mentioned in the international literature, as "best practices" cannot simply be taken over and implemented "surgically" in one's own organization (Boxwell, 1994), but more attention must be paid to how they are implemented, to the predominant culture, to the human resource necessary to be able to adapt a process. This is a major challenge of the benchmarking methodology, i.e., adapting the process from the top companies to their own organization (Bhutta and Huq, 1999). In the process of comparing best practices, management identifies the best firms in their industry or in another industry where there are similar processes and compares the results and processes of those studied ("targets") with their own results and processes.

The study performed on the selected companies revealed that the level of compliance of the reports is increasing during the analyzed period, but it could not be established if they are complete. The reporting method and the content of the reports differ from one company to another, this is largely due to the lack of mature legislation in the field to determine the exact way in which these reports should be made and the elements they should contain. Internationally, experts tend to suggest as a good option, the "benchmarking" method which involves, among other things, the creation of a standard to comply with all companies in the field of applicability for this type of reporting and to define the optimal version of the documentation to be presented.

The limitations of the research consist in the small number of companies included in the sample, as well as in the fact that the data were collected manually, with the risk that some information was not taken into account. In future research, the analyzed sample will be extended, as well as the nature of the transactions, by including those related to the reporting of loans between related parties. The study will also include other variables that lead to the creation of an econometric model on the factors that may influence the reporting of transactions with related parties.

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Convergence to IFRS in Romania – Score per Minute

Daniela PORDEA, Ph. D. Student,
West University of Timisoara, Romania,
e-mail: danapordea@gmail.com

Univ. Lecturer Alin-Constantin DUMITRESCU, Ph. D.,
West University of Timisoara, Romania,
e-mail: alin.dumitrescu@e-uvt.ro

Abstract

The current stage of evolution of our society includes the extension of economic, social and political phenomena beyond the physical boundaries that history has drawn and thus requires a change in approach to accounting by adapting specific practices to the new needs of the market. The impact of digitization leads to the visible dissolution of borders and the generalization of accounting practices and tools. The accounting profession is moving towards increasing standardization and national regulations in this area tend to become more international, in an attempt to optimize one of the most important qualities of financial reporting: comparability. In this context, the present study aimed to compare and analyze the divergences between the Romanian accounting regulations applied according to EU Directive 34/2013 through the Order of the Minister of Public Finance no. 1802/2014 for the approval of the Accounting Regulations regarding the individual annual financial statements and the consolidated annual financial statements (OMFP 1802/2014) and the International Financial Reporting Standards. In terms of research methodology, the authors' approach is a qualitative one with quantitative elements, starting from the analysis of the relevant literature in order to understand and deepen the general context. To investigate the main similarities and differences between the sets of accounting rules the comparative method was used, but also tools specific to quantitative methods for the mathematical calculation of convergence scores between OMFP 1802/2014 and IFRS. Although the Romanian accounting framework has been aligned in many respects with the international one, the obtained results reveal a series of divergences between the two sets of regulations, materialized in different ways of approaching economic transactions.

Key words: *accounting regulations; convergence; comparability; IFRS;*

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Introduction

The economic and social transformations characterizing the era of international globalization translate into new and complex challenges for the accounting profession. States, governments and companies around the world are going through extensive interconnection processes designed to facilitate international trade and investment in the new market conditions. In these circumstances, accounting systems are adapted to meet the needs of the business environment and to be able to provide comparable information as a basis for user decisions. Accounting is starting to become a standardized and heavily digitized process and the need to harmonize accounting rules and practices is increasingly being discussed worldwide.

In our country, the main user of financial information has always been the state, the Romanian accounting system being influenced by the French one. However, in recent decades, the evolution of world business began to influence the domestic economic environment and regulators have started to turn their attention to the similitude of domestic and international accounting standards, in order to ensure a competitive market and encourage foreign investment. From this perspective, Romania's accession to the European Union in 2007 represented a real turning point for the evolution of accounting regulations.

These considerations aroused our interest in studying, more than 14 years after the accession to the EU, the differences between the Romanian accounting regulations and the International Financial Reporting Standards, thus contributing to the development of the accounting system in our country, in the direction imposed by the global market.

The concept of international accounting convergence refers to the approximation of US accounting standards (US GAAP) to International Financial Reporting Standards (IFRS) and involves regulators in the main Anglo-Saxon states, but also the European Union.

In the European area, the term convergence has started to be used relatively recently and means the reduction of the gap between the sets of national accounting regulations and IFRS (Nobes and Parker, 2016).

Convergence or gradual modification of national accounting rules in order to bring them closer to IFRS is, in fact, a particular form of harmonization. The literature does not provide a clear delimitation between the concept of harmonization and that of convergence, the latter seeming to gradually replace the former. In any case, in light of the events of recent decades, the markets' globalization and the growing need for information, regulators around the world oriented towards convergence with International Financial Reporting Standards, which have become the benchmark for contemporary accounting systems in order to meet the current needs of the global economic environment in terms of transparency and comparability.

One of the main factors affecting the quality of financial reporting is the accounting regulation used (Sonderstrom and Sun, 2007). The increase in the quality of accounting information following the adoption of IFRS is revealed by numerous current researches. Key and Kim (2020) showed that IFRS reporting has led to a decrease in earnings management for 500 large companies in South Korea, which indicates the disclosure of higher quality information. Similar results were obtained for Indonesia, as shown by Wahyuni, Puspitasari and Puspitasari (2020) based on a methodology of structural analysis of the literature, on a sample of 168 scientific publications.

However, in Romania the number of economic entities reporting based on national regulations is significant. For this reason, ensuring the comparability of financial statements between listed and unlisted companies, as well as between unlisted companies from different countries becomes difficult and the analysis of regulatory convergence between national rules and IFRS is a necessity on the road to full harmonization.

The importance of establishing and analyzing the level of formal accounting convergence lies in the influence that legislation has on accounting practice. Therefore, our present study may be useful both scientifically, by providing new perspectives in accounting research on convergence, and at a practical level, by facilitating the understanding of specific rules and methods by professionals and regulators.

In the following we will present the research premises, the literature review, the research methodology, as well as the results we have obtained, underlining the main formal differences between the two accounting frameworks.

1. Research premises and literature review

The differences between accounting rules and practices in different states are numerous and various, being caused by factors such as the national legal system, the types of predominant companies, the quality of professional accounting bodies or the degree of conservatism in approaching the transactions (Black, 2004). But the main criterion of difference between the accounting systems that we have found in literature is related to the users of financial reports and the protection of their interests. Thus, we have identified two major categories of states: (1) those oriented towards capital markets, where the main recipients of accounting information are considered the investors and (2) countries where business financing is mainly done through bank loans. In the case of the latter, the influence of the tax system on accounting regulations is significant.

Different views of international accounting systems translate into divergences in accounting regulations between countries. Nobes and Parker (2016) have noted four topics that most often involve significant differences from one state to another: conservatism or conservatism, asset valuation methods, the treatment of provisions and the presentation of financial statements.

In accounting research, conservatism is assimilated with the tendency to underestimate assets or results and this principle is found within the regulations related to the capitalization of certain costs (such as formation or development expenses) or the recognition of revenues from long-term contracts. International accounting differences in terms of conservatism have been a significant obstacle to accounting harmonization.

The concept of conservatism in the colloquial sense is associated with the idea of protection and suggests a circumspect and cautious attitude. In the formal sense of accounting legislation, conservatism has different national meanings. Thus, in a state like Romania, with strong fiscal influence and having as the main source of funding the banking system, the accounting regulations almost excessively embraced the principle of prudence or conservatism.

Regarding the methods of asset valuation, there are various national practices that are mainly influenced by the legal and fiscal system. Thus, in countries with detailed legislation and a high influence of taxation on accounting, professional judgment plays a secondary role and the agreed method for assets valuation is the historical cost, while countries with legal systems based on jurisconservatism, mainly the Anglo-Saxon ones, have a more flexible approach, allowing a variety of evaluation methods. In Romania this statement is reinforced by the variation of the accounting treatments in the application of the fair value principle for tangible assets valuation, which, until January 1, 2016, was achieved with "sufficient regularity of 3 years" for fiscal reasons. Following the change in the building tax base as the fair value in accounting no longer served as a basis for taxation (according to Law 227/2015 - the Fiscal Code), the direct effect was the presentation by Romanian economic entities in the financial statements prepared for December 31, 2020 of "fair values" established in the years 2013-2014, which caused significant distortions in the information presented in the financial statements. Although the legislator updated the accounting regulations (OMFP 1802/2014) in the sense of explicitly indicating the accounting treatments of return from the fair value policy to the historical cost policy for the valuation of tangible fixed assets, a small number of economic entities applied this change in their accounting policies, preferring the "fair value" from the previous years (7-8 years ago) which only "fair" can no longer be called… A possible update of fair values would involve, concretely, higher costs for companies, which balance the quality of financial reporting and the effort they have to make and decide not to update the values presented under alternative treatment due to revaluation costs. The conclusion… maybe it would be too harsh to say that Romanian entrepreneurs do not care at all about the quality of accounting information. Only when the interest of the state as a user of accounting information intervenes, does his concern become real.

Conservatism in financial reporting is also reflected in the treatment of uncertainties by recognizing provisions or adjustments for impairment of assets. Their evaluation and presentation involve various ways of interpreting probabilities and have a high degree of subjectivism Different approaches of national accounting rules, arising from both prudential and fiscal reasons, have led international accounting regulators to deepen the issue of provisions / adjustments for impairment by ensuring appropriate criteria for recognizing and measuring their value.

The presentation of the financial statements is another element that differs significantly from one state to another, and the European Directives have played an important role in this regard by regulating a pre-established format of reports and a certain order of elements that require disclosure. From the financial statements users' perspective, two elements have proved themselves essential in practice: on the one hand the detailing of costs in the Profit and Loss Statement, which can be achieved either by nature or by their functions, and on the other hand the format of financial statements, which can be horizontal (account format, with separate sections) or vertical (list format). For investors, who in the Anglo-Saxon countries are considered the most important users of financial-accounting information, detailing the expenditure by their destination is more relevant in the decision-making process as it highlights elements such as cost of sales or gross margin that allow a proper analysis of business efficiency. The horizontal format of financial statements is preferred in continental economies, where the state is their main user, while in countries where capital markets play a key role in financing companies, the vertical format is generally used.

All these divergences between international accounting regulations and practices are reflected in one of the most important qualitative characteristics of financial statements: comparability. The provision of comparable financial information that would allow the evaluation of the performances of economic entities in a unitary way has also become a priority for the Romanian business environment, especially in the context of the expansion of multinational companies in our country. Thus, in addition to banks and listed entities, where the application of IFRS is a mandatory legal requirement, more and more companies with foreign shareholders use the Standards in parallel with national regulations for reporting to parent companies.

However, the number of listed Romanian entities that, by the effect of the law, prepare and present the financial statements according to the International Financial Reporting Standards is very small compared to the total number of companies on the Romanian market. Thus, according to data provided by The World Federation of Exchanges (2019), in 2018 a number of 87 entities were listed on the main market at the Bucharest Stock Exchange (85 domestic and 2 foreign companies), while the total number of active entities in our country amounted to 927,373 companies at the same date (National Trade Register Office, 2018).

Therefore, most entities in Romania prepare their financial statements according to OMFP 1802/2014. This regulation is the result of aligning our country with the European values and is a step in the process of harmonization with EU Directives, but there is also a strong influence of International Financial Reporting Standards in the development of the normative act in question. The regulatory convergence of the Romanian framework with IFRS is part of the reality of the international accounting environment in recent decades, in which the universal accounting language is embodied by the sets of International Standards, which is a benchmark for countries like Romania, where domestic markets have not yet reached their maximum level of development.

The comparative analysis of national regulations and IFRS, as well as the measurement of convergence between sets of regulations have been important challenges in contemporary accounting research, being approached by many authors: Nobes (2009), Peng and van der Laan Smith (2010), Apostolov (2015), Jindrichovska and Kubickova (2017).

A number of Romanian authors have addressed the differences between national regulations and IFRS. Thus, Istrate (2013) has studied the impact of the mandatory adoption of IFRS in Europe on a sample of 600 listed entities, conducting a comparative analysis of states in terms of conservatism. The same author (Istrate, 2014) analyzed the impact of the transition to IFRS on the financial indicators reported by Romanian entities in 2011 on a sample of 68 listed companies. The obtained results revealed that the level of IFRS compliance in our country seems to be lower than in other European states.

Ienciu et al. (2014) have drawn attention to the importance of non-financial reporting imposed by European Directives. The study reveals that Romanian entities do not fully comply with European and international regulations regarding the presentation of information on environmental, social and employees matters.

As for the models for measuring accounting harmonization and the similarities between accounting rules, the literature establishes several distinct methodologies. Thus, Van der Tas (1988) developed

three harmonization indices: (a) Herfindahl Index of Harmony, derived from the Herfindahl-Hirschman index used in economics for competitive analysis and market concentration; (b) the comparability index which reflects on the financial statements and which was subsequently developed by Archer, Delvaille and McLeay (1995) in two separate indices for measuring internal comparability within a state and external comparability, between different states and (c) the index of international harmonization. This type of instrument uses as a basis for analysis the information in the financial statements presented by entities.

Fontes, Rodrigues, and Craig (2005) comparatively approached a mathematical method based on Euclidean distance, as well as two sets of similarity coefficients (Jaccard coefficients and Spearman coefficients) for determining regulatory convergence between Portuguese accounting rules and IFRS. Strouhal, Horák and Bokšova (2017) used, in addition to Jaccard coefficients, the Lance-Williams grouping algorithm to determine the level of de jure harmonization of accounting regulations in the Czech Republic, Slovakia, Poland and Hungary (Visegrád Group) with IFRS.

Qu and Zhang (2010) identified different existing methods of measuring convergence and proposed a new method based on grouping algorithms to compare the Chinese accounting framework with IFRS by delimiting four categories of elements: completely convergent, substantially convergent, substantially different and completely different.

In the relevant Romanian literature, we have identified few studies that consider OMFP 1802/2014 in relation to the International Financial Reporting Standards, including the works of Albu and Pălărie (2016) and Ciocan (2019). Most of the similar comparative analyzes take into account the previous accounting regulations, Order 3055 of October 29, 2009 for the approval of the Accounting Regulations compliant with the European directives: Strouhal et al. (2011), Mitu, Tudor and Pali-Pista (2014), Buculescu and Velicescu (2014).

In view of the above, we aimed to compare the Romanian accounting regulations included in OMFP 1802/2014 with those contained in the International Financial Reporting Standards (IFRS) and establish their level of convergence in terms of fixed assets, inventories, provisions, revenues and expenses, presentation of financial statements.

2. Research methodology

To achieve the research objective, we have adapted the method used by Qu and Zhang (2010), by grouping the analyzed elements into 4 segments, depending on their level of convergence.

For this purpose, we have studied the Order of the Minister of Public Finance no. 1802/2014 for the approval of the Accounting Regulations regarding the individual annual financial statements and the consolidated annual financial statements (OMFP 1802/2014) and International Financial Reporting Standards. We have considered the five main categories we set out to address: (1) fixed assets, (2) inventories, (3) provisions, (4) revenues and expenses, (5) presentation of financial statements. Each category was compared in terms of the significant elements contained in the two sets of regulations, the International Financial Reporting Standards (IFRS) and the Romanian norm (OMFP 1802/2014).

Then the elements were grouped in one of the 4 segments of convergence to which we have assigned a score and which we have delimited as follows:

i. Segment 1 – complete convergence (convergence score 1) – if both accounting standards contain the same provisions for the analyzed element, the accounting treatments or application effects are identical.

ii. Segment 2 - partial convergence (convergence score 0,7) – in the following cases:

- national regulation contains fewer details on one element, but accounting treatments or enforcement effects are similar in significant respects;
- national regulation differs from IFRS, but the effect of its application is not substantially different.

iii. Segment 3 – partial divergence (convergence score 0,3) – if the national regulation contains less details on one element or includes additional provisions and the accounting treatments or the effects of the application differ significantly.

iv. Segment 4 - complete divergence (convergence score 0) – in the following cases:

- the national regulation does not contain provisions regarding an element highlighted in the Standards, which may lead to completely different accounting treatments or effects of application;

- national legislation contains different provisions on one element, which may lead to completely different accounting treatments or effects of application.

Within each segment, the analyzed elements were grouped and the level of convergence was determined for each of the five categories that were the subject of our study, using the weighted average, as follows:

$$\frac{\sum_{i=1}^{4} n_i \, x \, k_i}{\sum_{i=1}^{4} n_i} \quad (1)$$

where:

i – is the serial number of the convergence segment

n – is the number of elements corresponding to segment i

k – is the score corresponding to segment i.

We have approached the fixed assets in all their relevant aspects: property, plant and equipment, intangible assets, investment property, biological assets, the treatment of borrowing costs, assets held for sale, the main characteristics of leases and the financial assets.

The relevant definitions for each concept, the method of recognition, measurement and presentation of the elements in the financial statements, the methods and specific provisions for the depreciation of fixed assets, the impairment of assets, as well as the capitalization of borrowing costs were analyzed and compared.

In summary, we have considered a number of **58 elements** for fixed assets, as follows:

- definition of property, plant and equipment
- criteria for recognition of property, plant and equipment
- distinct categories of property, plant and equipment
- the moment of removal from an entity's statement of financial position (derecognition)
- initial measurement of property, plant and equipment
- treatment of costs with decommissioning – property, plant and equipment
- recognition of deferred payments in the case of property, plant and equipment
- treatment of asset exchanges
- subsequent expenditures (inspections)
- subsequent expenditures (replacements)
- valuation of tangible assets subsequent to initial recognition
- definition of useful life – property, plant and equipment
- estimation of useful life for property, plant and equipment
- start of depreciation – property, plant and equipment
- depreciable amount – property, plant and equipment
- useful life review - property, plant and equipment
- impairment of property, plant and equipment
- ways to calculate impairment value - property, plant and equipment
- impairment testing - property, plant and equipment
- definition of intangible assets
- criteria for recognition of intangible assets
- research and development phases
- internally generated goodwill
- capitalization of formation and research expenses
- moment of derecognition of intangible assets
- initial measurement of intangible assets
- treatment of deferred payments for intangible assets
- treatment of subsequent costs for intangible assets
- valuation of intangible assets subsequent to initial recognition
- revaluation of intangible assets
- estimation of useful life for intangible assets
- start of depreciation for intangible assets
- depreciable amount – intangible assets
- impairment of intangible assets
- ways to calculate impairment value – intangible assets
- impairment testing - intangible assets
- definition of investment property
- recognition of investment property
- initial measurement of investment property
- subsequent valuation of investment property
- definition of biological assets
- initial measurement of biological assets
- valuation of biological assets
- borrowing costs eligible for capitalization
- capitalization conditions
- determining the borrowing costs to capitalize

- suspension of capitalization
- cessation of capitalization
- definition of assets held for sale
- recognition and measurement of assets held for sale
- definition of a lease
- initial recognition of a lease
- depreciation of the asset subject to financial leases
- operating leases
- definition of financial assets
- initial measurement of financial assets
- directly attributable costs for financial assets
- valuation of financial assets subsequent to initial recognition

For the inventories we have analyzed **4 elements** (definition of inventories, treatment of discounts, initial/subsequent measurement, valuation of cost of goods sold) and for the provisions a number of **4 elements** have been approached (provision definition, types of provisions, criteria for recognition of provisions and measurement of provisions).

The **11 elements** considered in the category of revenues and expenses were:

- definition of revenues
- definition of expenses
- moment of revenue recognition
- identification of contracts with customers
- performance obligations - condition for recognition of revenues
- discounts
- the costs of fulfilling a contract
- marginal costs
- financing component
- variable consideration
- specific disclosure requirements.

Regarding the presentation of the financial statements, we have considered **13 elements** for the comparison between the two sets of regulations:

- structure of the financial statements
- objective of the financial statements
- principles of financial reporting
- financial statements components
- separate presentation of current and non-current assets / liabilities
- classification of expenses in the profit and loss statement
- other comprehensive income
- additional disclosure requirements
- transactions with owners
- discontinued operations
- cash flow statement
- changes in equity statement
- events after the reporting period.

3. Results and discussions

The results we have obtained are revealed in **Table no. 1**.

Table no. 1. The level of convergence between the Romanian accounting regulations (OMFP 1802/2014) and the international standard (IFRS)

Segment:	**1**	**2**	**3**	**4**	**TOTAL**	**Level of convergence**
Score:	**1**	**0.7**	**0.3**	**0**		
I. FIXED ASSETS						**63.10%**
Number of analyzed elements:	29	8	9	12	**58**	
II. INVENTORIES						**65.00%**
Number of analyzed elements:	2	0	2	0	**4**	
III. PROVISIONS						**75.00%**
Number of analyzed elements:	3	0	0	1	**4**	
IV. REVENUES AND EXPENSES						**54.55%**
Number of analyzed elements:	5	1	1	4	**11**	
V. PRESENTATION OF FINANCIAL STATEMENTS						**62.31%**
Number of analyzed elements:	6	3	0	4	**13**	

Source: Own projection

We have noticed a level of formal convergence of 63.10% between the national regulations and IFRS in the case of fixed assets. We could find a complete similarity in terms of defining the categories of fixed assets and the criteria for recognizing them in the financial statements (except for those held for sale and biological assets), as well as in the case of defining leases.

The rules regarding the start of depreciation are partially convergent, but the two sets of regulations differ substantially when we talk about the treatment of deferred payments (to which the Romanian norms do not refer) or the determination of depreciable amount, where International Standards define the concept of residual value, concept not found in OMFP 1802/2014. Moreover, the international norms contain distinct standards and special accounting treatments for certain categories of assets such as investment property or assets held for sale, for which, according to Romanian standards, the rules on property, plant and equipment apply.

Regarding the methods of measurement for the elements presented in the financial statements, the Romanian legislator did not focus on International Standards, where the matter is more flexible and more based on professional judgement.

Other divergent legal provisions regarding fixed assets are related to the measurement of capitalization costs as well as to the suspension of capitalization, for which there are distinct rules in IFRS, which are not found in domestic law.

The accounting treatments of leases are largely convergent, but with the coming into force of IFRS 16 – *Leases*, in January 2019, a standard issued by the IASB in January 2016 and replacing the old relevant standard (IAS 17), the international framework requires the same accounting treatment for financial and operating leases and from this point of view the Romanian norms are not similar.

The comparative situation of financial assets reveals a complete divergence from the perspective of their measurement, which according to IFRS is achieved at fair value plus directly attributable costs, while OMFP 1802/2014 retains as a general principle the valuation at acquisition cost.

For inventories we have obtained a level of convergence of 65% between the two sets of regulations. Here, the situations of partial divergence (with a score of 0.3) are those regarding the treatment of discounts, as well as the valuation of cost of goods sold, for which IFRS does not allow the LIFO method, which is still provided in our national law.

The highest level of convergence was found for the provisions - 75%. OMFP 1802/2014 was aligned with the international framework in this respect, the only difference being that in the domestic legislation the categories of provisions that can be disclosed by the entities in their financial statements are specifically defined and described. At the same time, we have noticed the introduction in the Romanian regulatory framework of the provisions for onerous contracts, that were not present in the old legislation.

The requirements of OMFP 1802/2014 regarding the definition, recognition and presentation in the financial statements of revenues and expenses converge in a percentage of 54.55% with the international reference IAS / IFRS. We can observe a total divergence in the criteria for recognizing contracts with customers (provided by the Standards, but not found in the domestic legislation). The financing component (resulting from the time lag between the payment of assets and the moment of transfer) and possible compensations for delays or cancellations also involve substantially different accounting treatments.

As for the presentation of the financial statements, we have obtained a convergence level of 62.31%. The structure of the financial statements and their objective, as stipulated in the Romanian accounting norms (OMFP 1802/2014) agree almost entirely with IFRS. Moreover, the presentation of the objective in the national framework is identical to that in IAS 1, with the exception that the concepts of financial position and financial performance are not explicitly defined by OMFP 1802/2014, for deepening these concepts it is necessary to consult the texts issued by the International Accounting Standards Board (IASB), from where they were, in fact, taken over.

If we analyze the accounting principles, which are not defined as such in the international reference, but are found as concepts used in the Standards, we notice the way in which IFRS approaches conservatism. If in the 1989 version of the Conceptual Framework for Financial Reporting conservatism was a qualitative feature of the financial statements, the 2010 version completely excludes it as it does not align with the neutrality in the

representation of transactions and affects the credibility of the disclosed information. Only in the 2018 version of the Framework is conservatism included, but only to emphasize the reporting neutrality characteristic. This view characterizes the Anglo-Saxon systems, where financial markets have an overwhelming influence on accounting approaches. Romanian regulations give undue importance to conservatism, a basic principle that has been taken from continental accounting systems generally oriented towards taxation and the banking sector. Conservatism or prudence is seen in our country as a measure of legal protection, by prohibiting the overestimation of revenues and assets and the underestimation of debts and expenses, thus providing a margin of safety for users of financial statements. However, we must not neglect the excessive prudence that leads to the creation of "hidden reserves" and which can also represent a risk of distortion in the financial statements, being often used as "earnings management" in disclosing the financial performance, in which case they may qualify in the area of tax fraud.

We have also found divergences in the content of the financial statements between OMFP 1802/2014 and IAS / IFRS, the elements presented do not fully coincide. The source of these divergences consists in the different ways of approaching the transactions and economic events by the two accounting standards.

Conclusions

Reducing the differences between the accounting practices of different countries is a major concern of global and regional regulatory bodies, and efforts in this direction are reflected in the phenomenon of international accounting harmonization. This process is a difficult one, on the one hand because of the major divergences between the states of the world from a cultural, economic and social point of view, and on the other hand because of the fiscal implications that the necessary legislative transformations would exert on national economies.

Through the study we have conducted, we aimed to identify and analyze the divergences between accounting regulations in Romania and European and international ones in the context of accounting harmonization and convergence.

The Romanian accounting research on measuring the convergence of accounting norms with IFRS mostly includes comparative studies that relate to the legislation prior to Order 1802/2014. At the same time, if we consider fixed assets, which are one of the most complex elements in the financial statements and involve the most varied approaches internationally, the previous research we have identified addresses regulatory convergence separately, by types of fixed assets. Our analysis has focused on the category of fixed assets as a whole, taking into account all relevant requirements. Moreover, we have not identified studies that would determine the level of convergence between the two sets of regulations in terms of the presentation of financial statements. For these reasons, we believe that present research makes an additional contribution to the development of the Romanian accounting system in the direction of the needs imposed by the global market.

One of the limits of our approach is the extent of the analyzed elements. Thus, we have examined a total of 90 elements to study the convergence of national regulations with IFRS regarding fixed assets, inventories, provisions, revenues and expenses and the presentation of financial statements. Considering additional elements could lead to different results.

On the other hand, our analysis is a formal one, aimed at regulation. An approach to „de facto" convergence at the level of Romanian economic entities that are not listed on the stock exchange and do not apply IFRS could consider the analysis of financial statements and the identification of a convergence profile and possible differences that may occur in practice. In this way, convergence studies would focus on what national accounting is and not just on what it should be.

Finally, the study has considered the complete set of IFRS regulations as a basis for comparison, while the national accounting reference OMFP 1802/2014 is the one used by entities which are not listed on a regulated market. That is why we consider that an approach of the International Financial Reporting Standards for SMEs would be welcome, together with the analysis of the opportunity and costs of adopting this framework in Romania, adapted to small and medium entities.

In the light of the above, we consider it appropriate to reflect further on the functional nature of accounting in relation to the symbols of modernity. The way in which accounting systems relate technologically and socially to various fields of activity, as well as their ability to respond to the needs imposed by globalization remain important issues that need to be examined and deepened in accounting research.

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Credit Scoring – General Approach in the IFRS 9 Context

Luminița-Georgiana ACHIM, Ph. D. Student,
e-mail: luminita.achim28@gmail.com

Elena MITOI, Ph. D. Student,
e-mail: elena.Mitoi@gmail.com

Valentin MOLDOVEANU, Ph. D. Student,
e-mail: moldoveanu.valentin3@gmail.com

Codruț-Ioan ȚURLEA, Ph. D. Student,
e-mail: turleacodrut@gmail.com

Faculty of Accounting and Management Information Systems, Bucharest University of Economic Studies, Romania

Abstract

With the coming into force of the standard IFRS 9 – Financial Instruments, in January 2018, financial institutions passed from an incurred loss model to a forward-looking model for the computation of impairment losses. As such, the IFRS 9 models use point-in-time, estimates of Probability of Default and Loss Given Default and provide a more faithful representation of the credit risk at a given as they are based on past experiences as well as the most recent and forecasted economic conditions. However, given the short-term fluctuations in the macroeconomic conditions, the final outcome of the Expected credit loss models is highly volatile due to their sensitivity to the business cycle. With regard to Probability of Default estimation under IFRS 9, the most commonly methods are: Markov Chains, Survival Analysis and single-factor models (Vasicek and Z-Shift). The development of the score-cards is still the same as in the case of the Internal Ratings Based Probability of Default models, encouraging institutions to use the already available credit rating systems and perform adjustment to the calibration. This paper outlines a non-exhaustive list of quantitative validation tests would satisfy the requirements of the IFRS 9 standard.

***Key words**: IFRS 9; credit scoring; statistic tests; financial institutions;*

***JEL Classification**: M41, M21*

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1. Introduction

Before the introduction of the IFRS 9 – *Financial Instruments* standard, only sophisticated and complex institutions would have been familiar to rating systems as they would have been used for Internal Ratings Based (IRB) or economic capital models. Hence, before the introduction of IFRS 9, many small and medium sized institutions have simplistic rating methods in place. The existence of an adequate rating system has been discussed by Hamerle et al (2003) who consider that for example a rating system composed of two grades would be considered inappropriate for the computation of the capital requirements. Hence despite IFRS 9 not prescribing the number of grades expected to be included in a rating system it is encouraged to use a similar approach to Basel III, whereas the Bank for International Settlements (BIS) guidelines consider appropriate a minimum of seven performing grades (for retail and non-retail exposures) and at least one default grade. More exactly, credit scoring refers to the set of techniques used by institutions to assess an obligor's creditworthiness by using predictive models to facilitate the credit assessment process the obligor is accepted based on the institution's risk appetite as well as the maximum value that could be lent.

Credit scoring models are used to predict the probability of obligors' default. To measure the quality of the scoring models quantitative tests can be use such as: Gini index, AUROC, Somers' D, KS statistics, Information statistics (Information Value, Weight of Evidence), Binomial test, Chi-square test, Population Stability Index, Herfindahl-Hirschman Index (HHI). Such techniques can be used throughout the selection process, as well as for validation and monitoring purposes to assess the quality of the mode after its deployment.

The paper will present a non-exhaustive list of statistic tests used in credit scoring validation including a short description and advantages and disadvantages. Institutions can apply a large variety of methods when validating their rating models, however it is essential that at least one method is applied for each validation layer discrimination, calibration, stability and concentration.

2. Literature review

Credit scoring is considered one of the most essential methods used by banks, following the rapid expansion of the credit industry worldwide. It is heavily used by financial institutions to provide credit to good applicants and to differentiate good credit from bad credit. The decision that involves granting or refusing to grant credit to a client can also be supported by court techniques, which, according to Sarlija et al. (2004), are based on previous or current knowledge and experiences of credit analysts, the latter evaluate clients in terms of credit repayment capacity, guarantees. Although these judgment techniques can also be applied, financial institutions use, rather, credit rating models, out of the need to quantify credit risk. Gup and Kolari (2005) define credit scoring as a use of statistical models in order to establish the probability that a potential borrower will no longer be granted a loan. According to the same authors, rating models are used to evaluate business loans, real estate and consumption. Thomas et al (2002) consider credit scoring as a set of decision models that help creditors in granting consumer loans: who will receive credit, what operational strategies can increase the profitability of lenders to creditors. Crook (1996) presents a number of benefits of credit scoring. One of the most important advantages is that, in order to make a decision, a smaller volume of information is needed, because credit scoring models have been estimated to include only variables that are correlated with repayment performance. At the same time, through credit scoring attempts are made to correct any prejudices that may result from taking into account the reimbursement history only for the approved applications.

3. Research methodology

The research methodology aims a deductive approach which highlights the theoretical perspective regarding the concept of IFRS 9 and a non-exhaustive list of statistic tests used in credit scoring validation. As research method can have mentioned the documents analyze which consists in going through the specialized literature in order to identify the relevant works to the examined subject. Were accessed books and articles from the field, European regulations and International Accounting Standards (International Financial Reporting Standard 9 - *Financial Instruments*) and, also, web pages of the Basel Committee on Banking Supervision and European Banking Authority.

4. Statistic tests used in credit scoring validation

4.1. Kolmogorov-Smirnov (KS)

Among the most commonly used test for the assessment of the discriminatory power of a model is the Kolmogorov-Smirnov statistic by quantifying the distance between two distributions good and bad observations as per the definitions established by the institution. The KS values can range between 0 and 1, where 1 implies that the model is able to accurately distinguish between the good and bad populations. Hence, the higher the KS the better the model.

For each individual obligor, where a score S is available, the following is applicable:

Equation 1

$$D_K = \begin{cases} 1, client\ is\ good \\ 0, \quad otherwise \end{cases}$$

Using the aforementioned formula, the empirical cumulative distribution functions (CDF) of scores of good, bad or all can be computed:

Equation 2

$$F_{GOOD}(a) = \frac{1}{n}\sum_{i=1}^{n} I(s_i \le a | D_K = 1), \qquad a \in [L,H]$$

$$F_{BAD}(a) = \frac{1}{m}\sum_{i=1}^{m} I(s_i \le a | D_K = 0), \quad a \in [L,H]$$

$$F_{ALL}(a) = \frac{1}{n+m}\sum_{i=1}^{n+m} I(s_i \le a), \qquad a \in [L,H]$$

Where:

s_i – Score of the i^{th} obligor;

n – Number of good obligors;

m – Number of bad obligors;

I – indicator function where I (true) = 1 and I (false) = 0;

L – The minimum value of given score;

H – The maximum value of given score.

Based on Equation 2, the KS is defined as follows:

Equation 3

$$KS = max_{a\in[L,H]} |F_{BAD}(a) - F_{GOOD}(a)|$$

The KS statistic should be computed both for the development and validation samples. Furthermore, it is expected that the institution sets in place a monitoring framework to enable a timely detection of any degradations of the discriminatory power by computing the KS for each subsequent sample the quarterly values can be assessed against the initial validation value. Depending on the nature, size and specific characteristics of the portfolio as well as considering the institution's risk appetite and regulatory constraints, the institution should define the thresholds for the KS tests. Most often they are also associated with the traffic lights presentation.

4.2. Lorenz Curve (LC) and Gini

The Lorenz curve (LC), Cumulative Accuracy Profile (CAP) or Accuracy Ratio (AR) is a statistical test used to assess the discriminatory power of the risk ranking mechanism (scoring function) as it reflects the ability to dissociate between good and bad obligors (the relationship between cumulative distribution function for good and bad obligors).

The first step of the process is to order all obligors based on the scores predicted by the model, from the lowest probability to the highest. The percentage of defaulted borrowers within each probability band is projected from the lower probability to the maximum probability. The Gini is defined as the ratio of the area between the cumulative function of the model and the cumulative function of the random model and the area between the cumulative function of the perfect model. This ideal model will give the perfect discrimination between pools, assigning events in the desired proportion according to the pools ranking a higher probability of default for ratings as they are closer to default rating.

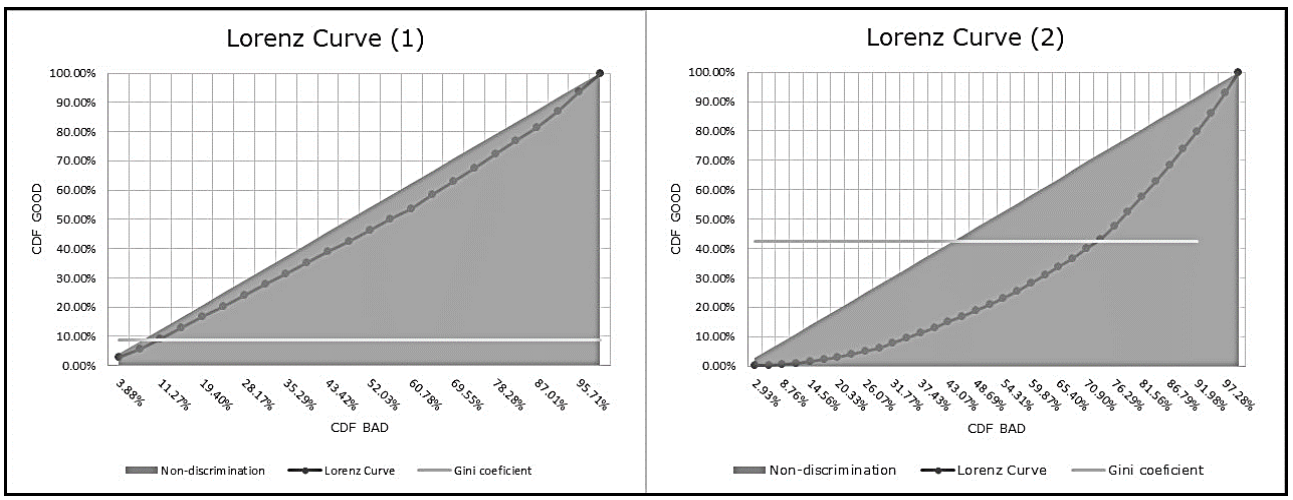
As in the case of the KS, the parametrical function is defined as follows:

$$x = F_{BAD}(a), \ a \in [L,H]$$

$$y = F_{GOOD}(a), \ a \in [L,H]$$

Figure no. 1 presents the results of two models: model A, which had a low discriminatory power, as it is closer to the hypotenuse, and model B, which has a high discriminatory power. In case of a random model (no discriminatory power), the plotted curve would cut the graph in half making a 45-degree angle with the Cartesian axes, while a perfect model would present a curve that will exactly delimit the two adjacent of the triangle.

Figure no. 1. Lorenz curve



Source: Own processing, 2021

The Gini index describes the overall quality of the risk ranking mechanism scoring function which takes values between -1 and 1 under the ideal model the scoring function separates between good and bad obligors, hence the Gini is close to 1while a random model assigning a random score would have n Gini close to 0. In the case of negative Gini values, the values correspond to a model with reversed meaning of scores. Please refer to **Appendix 1** for the underlying data and computation.

The Gini is computed taking into account the bad and good continuous cumulative distributions (F_{BAD}) (F_{GOOD}):

Equation 4

$$Gini = 2\int_0^1 F_{BAD}\,dF_{GOOD} - 1$$

For a discrete approximation the Trapezoidal rule or Simpson's rule is used:

$$Gini \approx \sum_{k=1}^{N}\left[\left(F_{BAD_k} + F_{BAD_{k-1}}\right) * \left(F_{GOOD_k} - F_{GOOD_{k-1}}\right)\right] - 1$$

Where N is the number of observations of BAD and GOOD distributions analysed.

As previously mentioned, the tests should be performed on the development and validation samples. A degradation in their outputs is expected, especially for the out-of-sample and out-of-time samples, however the differences should be within the accepted tolerance level. Hence, institutions should set a monitoring framework to identify early stages of deterioration. It is recommended that the test is performed for both monitoring purposes and annual validation. The thresholds for the test must be set in accordance with the specificity of the portfolio; lower values are expected for corporate and SME portfolio than for residential real estate portfolios.

4.3. Receiver Operating Characteristic curve (ROC)

The ROC depicts the relation between the complements of two CDFs. Given two continuous random variables, X and Y, a point on a graph of an ROC curve is located at P(X ≥ ρ) on the horizontal axis and at P(Y ≥ ρ) on the vertical axis, where "ρ" is a constant that can take on values within the domain of X and Y. In relation to the ROC curve the following concepts are defined:

- True positive rate – hit rate (HR) represents the sensitivity or the events correctly identified;
- True negative rate – specificity represent the non-events correctly identified;
- False negative rate –1-specificity represents false alarm rate (FAR);
- False positive rate –1-sensitivity.

The ROC curve is obtained by plotting HR against FAR for different values of "ρ". Hence ROC curve close to the diagonal (non-discrimination line), indicates a random model, while a curve close to the top left corner presents a model with a high discriminatory power, hence the greater the area under the ROC curve, the better the model.

This leads to another test for assessing the discriminatory power of the model: area under curve (AUC or AUROC) also called coefficient of concordance (c). A value of 0.5 depicts a random model while a value of 1 indicates that ROC curve lies in the top left corner and model is discriminating perfectly.

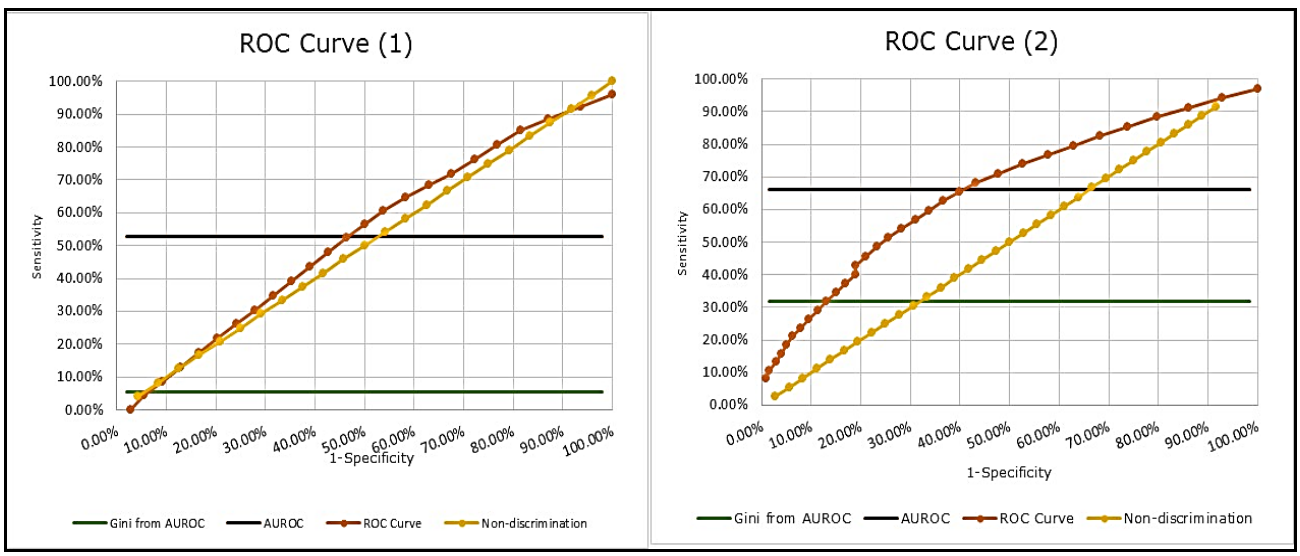
The Gini can be expressed as AUROC:

Equation 5

$$Gini = 2 * AUROC - 1$$

The graphs in ***Figure no. 2*** describes two ROC curves: the one on the right reveals a higher discrimination power for its underlying model than the one on the left.

Figure no. 2. ROC curves



Source: Own processing, 2021

For an exact result, integral calculus is recommended; however, the Trapezoidal or Simpson's rule can be used to approximate AUROC:

$$AUROC_{theoretical} = 1 - \frac{1}{\widehat{D}(N - \widehat{D})} \sum_{i=1}^{K} (N_i - \widehat{D}_i) \left(\frac{\widehat{D}_i}{2} + \sum_{j=1}^{i-1} \widehat{D}_j \right)$$

Where:

N – Number of customers in the portfolio at the beginning of the observation period;

K – Rating grades for non-defaulted exposures;

N_i – The number of customers in the i-th rating grade;

PD_i – PD used to estimate future defaults for the i-th rating grade;

$\widehat{D}_i = [N_i * PD_i]$ – Estimated number of default for rating grade I, where [.] denotes the nearest integer;

$\widehat{D} = \sum_{i=1}^{K} \widehat{D}_i$ – The estimated total number of defaults.

As it can be seen from the above presented example the model used to generate Curve 2 has a better performance than the one used to generate Curve 1.

4.4. Somers' D (D_s)

Somers' D is an ordinal measure which can be defined in terms of Kendall's τ_a. It must be mentioned that the Gini index is a special case of Somers' D.

Given a sequence of bivariate random variables (X,Y) = $\{(X_i, Y_i)\}$ Kendall's τ_a is defined as:

$$\tau(X,Y) = E\left[sign(X_i - X_j)sign(Y_i - Y_j)\right]$$

Where:

E[.] – denotes expectation;

(X_i, Y_i) and (X_j, Y_j): represent the bivariate random variables extracted independently from the same underlying population for PD models X = 1 good and X = 0 if bad, Y represents scores.

Kendall's τ_a shows us the difference between the probability that the two (X,Y) pairs are concordant and the probability that the two (X,Y) pairs are discordant.

Somers' D of a given credit scoring model, denoted as D_s is calculated as follows:

$$D_s = \frac{\sum_i g_i \sum_{j<i} b_j - \sum_i g_i \sum_{j>i} b_j}{n * m}$$

Where:

g_i (b_j) – is number of goods (bads) in i^{th} interval of scores;

n – Number of good;

m – Number of bad.

In other words, less mathematically, Somers' D is defined as:

$$D_s = \frac{ConcordantPairs - DiscordantPairs}{TotalNumberofPairsIncludingTies}$$

Another way to calculate D_s is by Mann-Whitney U-statistic. In order to compute this statistic, the sample must be order in an increasing manner by score value; sum ranks of goods must be performed, let this be R_G.

The D_s is given by:

$$D_s = 2 * \frac{U}{n * m} - 1$$

Where U is given by $U = R_G - \frac{1}{2} * n * (n+1)$

Mathematically Somers' D is equal to Gini index. However, due to that fact that Somers' D is more resource intensive and complex (portfolio size defines the number of potential good/bad pairs) and cannot be properly approximated, Gini is more commonly used. Somers' D analysis is carried out using a software provided by SAS which is commonly used across many financial institutions.

4.5. Information value (IV)

When building a scorecard, the Information Value (IV) statistic is a popular method for selecting predictor variables. Given that default status can be modeled as a binary outcome IV is a good way to assess the predictor power.

Taking into account that the target is binary, when constructing explanatory variables for a scorecard development, continuous variables cannot be easily validated. Thus, each predictor X observations must be grouped. The number of grades should ensure the correlation between the explanatory and the target variable is relevant. Upon the removal of outliers and identification of trends IV decreases with the decreases of grades.

4.6. Herfindhal Hirschman Index (HHI)

Credit portfolio models must ensure the homogeneity of exposures within the same grade and heterogeneity between grades. The Herfindhal-Hirschman Index (HHI) is

amongst the most common tests used to ensure that the portfolio's segmentation is adequate; none of the grades present high concentration:

$$HHI = \sum_{i=1}^{n} \gamma_i^2$$

Where:

n – Number of facilities/exposures in the portfolio;

γ_i - The exposure of facility "I" relative to the portfolio's total value.

The above formula is applied at portfolio level. However, in order to identify the high/low concentration within each grade the following formula must be applied: HHI to increase, it is useful to have a segmented view. It can be mathematically/expert based assumed that the portfolio is divided in "m" buckets.

$$HHI = \sum_{k=1}^{m} F_k^2 H_k$$

Where:

M- Number of grades;

F_k- Total exposure amount of grade "k" relative to the total value of the portfolio;

H_k-The HHI in each bucket.

HHI can be used to assess concentration in the distribution of obligors/facilities in grades or pools. Firstly, a coefficient of variation is calculated, then the Herfindahl index:

$$CV_{curr} = \sqrt{K \sum_{i=1}^{K} \left(R_i - \frac{1}{K}\right)^2}$$

$$HHI = \frac{CV_{curr}^2 + 1}{K}$$

Where:

K – Number of rating grades for non-defaulted exposures;

R_i – Relative frequency of rating grade "i" at the beginning of the relevant observation period.

4.7. Bootstrap validation

In case the institution has a low sample or short observation period Bootstrapping is used in order to simulate the out-of-sample characteristic of the population. Bootstrap can act as a sampling method and a prerequisite of the validation framework in accordance with the law of large numbers and cannot be considered a standalone method of validation. After the sampling, given sufficient data and concordance between validation test and estimation method, all other statistical tests can be computed (Gini, KS, AUROC, Binomial etc.). Suffice to say, bootstrap validation can be used in a multiple manner. The main drawback of bootstrapping is that it often is computationally expensive.

5. Conclusions

This paper outlines the key quantitative techniques institutions should use to assess the adequacy of its credit-scoring framework for assigning credit grades to exposures and also the benefits of credit scoring. It outlines tests that institutions should use to assess the predictively of its models and how representative the population of exposures the model was developed on is to the population of exposures that the model is applied to. However, it is not simply sufficient for the institutions to perform these tests, they must also ensure that they have suitable thresholds in place to identify when a model fails these tests and ensure appropriate action is undertaken to remediate when a model fails the test. Where possible the tests outlined in this section should be applied at factor level as well at overall grade level to allow the institution to identify any deterioration in performance in an individual factor that may not be evident when tests are performed at an overall credit grade level. Finally, these tests are of upmost importance in determining the adequacy of the rank ordering of the credit grades, however they do not assess the adequacy of the quantification of the provision estimates. These should be assessed at an overall PD parameter level after the model has been calibrated to 1 year PIT PD's for stage 1 estimates and lifetime PD's for stage 2 estimates.

The benefits of credit scoring are as follows: it is requiring less information to make a decision, because the models have been estimated to take in consideration only those variables, which are statistically correlated with the repayment performance. Credit scoring models

take in consideration the aspects of good as well as bad payers. Credit scoring models are based on larger time and information samples than an analyst can remember.

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Appendix 1 – Lorenz Curve and ROC data

Generation of curve 1 - The data used is randomly generated in order to illustrate a ranking system composed of 24 grades.

	Ascending BAD						
Rating	GRADE	GOOD	BAD	PDF_BAD	CDF_BAD	PDF_GOOD	CDF_GOOD
A	1	162	3	2.78%	2.78%	3.88%	3.88%
	2	157	3	2.78%	5.56%	3.76%	7.65%
	3	151	4	3.70%	9.26%	3.62%	11.27%
	4	155	4	3.70%	12.96%	3.72%	14.98%
	5	184	4	3.70%	16.67%	4.41%	19.40%
	6	184	4	3.70%	20.37%	4.41%	23.81%
B	7	182	4	3.70%	24.07%	4.36%	28.17%
	8	147	4	3.70%	27.78%	3.52%	31.70%
	9	150	4	3.70%	31.48%	3.60%	35.29%
	10	168	4	3.70%	35.19%	4.03%	39.32%
	11	171	4	3.70%	38.89%	4.10%	43.42%
	12	178	4	3.70%	42.59%	4.27%	47.69%
C	13	181	4	3.70%	46.30%	4.34%	52.03%
	14	182	4	3.70%	50.00%	4.36%	56.39%
	15	183	4	3.70%	53.70%	4.39%	60.78%
	16	182	5	4.63%	58.33%	4.36%	65.14%
	17	184	5	4.63%	62.96%	4.41%	69.55%
	18	180	5	4.63%	67.59%	4.32%	73.87%
D	19	184	5	4.63%	72.22%	4.41%	78.28%
	20	184	5	4.63%	76.85%	4.41%	82.69%
	21	180	5	4.63%	81.48%	4.32%	87.01%
	22	182	6	5.56%	87.04%	4.36%	91.37%
	23	181	7	6.48%	93.52%	4.34%	95.71%
	24	179	7	6.48%	100.00%	4.29%	100.00%

GRADE	CDF_GOOD	CDF_BAD	Lorenz Curve	Gini coeficient	KS statistic
1	3.88%	2.78%	0.00%	8.73%	7.07%
2	7.65%	5.56%	0.16%	8.73%	7.07%
3	11.27%	9.26%	0.43%	8.73%	7.07%
4	14.98%	12.96%	0.84%	8.73%	7.07%
5	19.40%	16.67%	1.49%	8.73%	7.07%
6	23.81%	20.37%	2.31%	8.73%	7.07%
7	28.17%	24.07%	3.28%	8.73%	7.07%
8	31.70%	27.78%	4.19%	8.73%	7.07%
9	35.29%	31.48%	5.26%	8.73%	7.07%
10	39.32%	35.19%	6.60%	8.73%	7.07%
11	43.42%	38.89%	8.12%	8.73%	7.07%
12	47.69%	42.59%	9.86%	8.73%	7.07%
13	52.03%	46.30%	11.79%	8.73%	7.07%
14	56.39%	50.00%	13.89%	8.73%	7.07%
15	60.78%	53.70%	16.16%	8.73%	7.07%
16	65.14%	58.33%	18.61%	8.73%	7.07%
17	69.55%	62.96%	21.28%	8.73%	7.07%
18	73.87%	67.59%	24.10%	8.73%	7.07%
19	78.28%	72.22%	27.18%	8.73%	7.07%
20	82.69%	76.85%	30.47%	8.73%	7.07%
21	87.01%	81.48%	33.89%	8.73%	7.07%
22	91.37%	87.04%	37.56%	8.73%	7.07%
23	95.71%	93.52%	41.48%	8.73%	7.07%
24	100.00%	100.00%	45.63%	8.73%	7.07%

For the generation of Curve 2 a random simulated portfolio was used, the portfolio was grouped into 36 grades, as follows:

	Ascending BAD						
Rating	GRADE	GOOD	BAD	PDF_BAD	CDF_BAD	PDF_GOOD	CDF_GOOD
A	1	422	4	0.05%	0.05%	2.93%	2.93%
	2	421	12	0.15%	0.20%	2.92%	5.85%
	3	419	24	0.30%	0.50%	2.91%	8.76%
	4	418	36	0.45%	0.94%	2.90%	11.67%
	5	417	44	0.55%	1.49%	2.90%	14.56%
	6	416	56	0.69%	2.18%	2.89%	17.45%
B	7	415	64	0.79%	2.98%	2.88%	20.33%
	8	414	76	0.94%	3.92%	2.87%	23.21%
	9	413	84	1.04%	4.96%	2.87%	26.07%
	10	411	104	1.29%	6.25%	2.85%	28.93%
	11	409	124	1.54%	7.79%	2.84%	31.77%
	12	408	136	1.69%	9.47%	2.83%	34.60%
C	13	407	144	1.79%	11.26%	2.83%	37.43%
	14	407	144	1.79%	13.05%	2.83%	40.25%
	15	405	156	1.93%	14.98%	2.81%	43.07%
	16	405	160	1.98%	16.96%	2.81%	45.88%
	17	405	164	2.03%	19.00%	2.81%	48.69%
	18	405	164	2.03%	21.03%	2.81%	51.50%
D	19	404	172	2.13%	23.16%	2.81%	54.31%
	20	401	196	2.43%	25.60%	2.78%	57.09%
	21	400	212	2.63%	28.22%	2.78%	59.87%
	22	398	224	2.78%	31.00%	2.76%	62.63%
	23	398	224	2.78%	33.78%	2.76%	65.40%
	24	398	224	2.78%	36.56%	2.76%	68.16%
E	25	394	264	3.27%	39.83%	2.74%	70.90%
	26	393	276	3.42%	43.25%	2.73%	73.63%
	27	384	360	4.46%	47.72%	2.67%	76.29%
	28	380	396	4.91%	52.63%	2.64%	78.93%
	29	378	416	5.16%	57.79%	2.62%	81.56%
	30	378	416	5.16%	62.95%	2.62%	84.18%
F	31	376	436	5.41%	68.35%	2.61%	86.79%
	32	376	436	5.41%	73.76%	2.61%	89.40%
	33	371	484	6.00%	79.76%	2.58%	91.98%
G	34	378	514	6.37%	86.14%	2.62%	94.60%
	35	385	544	6.75%	92.88%	2.67%	97.28%
	36	392	574	7.12%	100.00%	2.72%	100.00%

GRADE	CDF_GOOD	CDF_BAD	Lorenz Curve	Gini coeficient	KS statistic
1	2.93%	0.05%	0.00%	42.40%	31.65%
2	5.85%	0.20%	0.00%	42.40%	31.65%
3	8.76%	0.50%	0.01%	42.40%	31.65%
4	11.67%	0.94%	0.03%	42.40%	31.65%
5	14.56%	1.49%	0.07%	42.40%	31.65%
6	17.45%	2.18%	0.12%	42.40%	31.65%
7	20.33%	2.98%	0.20%	42.40%	31.65%
8	23.21%	3.92%	0.30%	42.40%	31.65%
9	26.07%	4.96%	0.42%	42.40%	31.65%
10	28.93%	6.25%	0.58%	42.40%	31.65%
11	31.77%	7.79%	0.78%	42.40%	31.65%
12	34.60%	9.47%	1.03%	42.40%	31.65%
13	37.43%	11.26%	1.32%	42.40%	31.65%
14	40.25%	13.05%	1.66%	42.40%	31.65%
15	43.07%	14.98%	2.06%	42.40%	31.65%
16	45.88%	16.96%	2.51%	42.40%	31.65%
17	48.69%	19.00%	3.01%	42.40%	31.65%
18	51.50%	21.03%	3.58%	42.40%	31.65%
19	54.31%	23.16%	4.20%	42.40%	31.65%
20	57.09%	25.60%	4.87%	42.40%	31.65%
21	59.87%	28.22%	5.62%	42.40%	31.65%
22	62.63%	31.00%	6.44%	42.40%	31.65%
23	65.40%	33.78%	7.34%	42.40%	31.65%
24	68.16%	36.56%	8.31%	42.40%	31.65%
25	70.90%	39.83%	9.35%	42.40%	31.65%
26	73.63%	43.25%	10.49%	42.40%	31.65%
27	76.29%	47.72%	11.70%	42.40%	31.65%
28	78.93%	52.63%	13.02%	42.40%	31.65%
29	81.56%	57.79%	14.47%	42.40%	31.65%
30	84.18%	62.95%	16.06%	42.40%	31.65%
31	86.79%	68.35%	17.77%	42.40%	31.65%
32	89.40%	73.76%	19.63%	42.40%	31.65%
33	91.98%	79.76%	21.60%	42.40%	31.65%
34	94.60%	86.14%	23.78%	42.40%	31.65%
35	97.28%	92.88%	26.17%	42.40%	31.65%
36	100.00%	100.00%	28.80%	42.40%	31.65%

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