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ANALYSIS OF ACCOUNTANTS' ATTITUDES ON REGULATION USING DATA MINING

Analiza stavova računovođa o regulativi primenom Data Mining-a

Abstract

The subject of this research is evaluation of legal and international accounting regulations in terms of major deficiencies from the perspective of their users. Identification of the shortcomings of the current accounting regulations is important for improvement of laws governing accounting and audit practices, as they are in the process of public debate in the Republic of Serbia. The research was conducted to provide answers to the following research questions: What are the main deficiencies of regulations as considered by accountants? How do accountants get information on accounting regulations? And are the two research questions related? The targeted population comprises accountants and auditors employed in the private sector. Data collection was carried throughout the period of six months, during which we collected 338 fully completed questionnaires for the purposes of the study. Collected data was analysed using clustering data mining technique. Clustering algorithms enabled segmentation of surveyed accountants into well-separated and homogeneous groups of similar accountants. Analysis of the resulting clusters gave insights into the opinion and stance of accountants who exhibit similar characteristics. These insights form a solid basis for drawing conclusions on deficiencies of accounting regulations perceived by accountants in Serbia, which they are dealing with in day-to-day business.

Keywords: *accounting regulations, financial reporting, opinion, users, quality, information, clustering analysis.*

Sažetak

Predmet istraživanja u radu jeste procena zakonske i međunarodne računovodstvene regulative u pogledu glavnih nedostataka iz perspektive njihovih korisnika. Identifikacija nedostataka aktuelne računovodstvene regulative važna je zbog unapređenja zakona u oblasti računovodstva i revizije, čiji nacrti se u trenutku pisanja ovog rada nalaze na javnoj raspravi u Republici Srbiji. Istraživanje je sprovedeno sa ciljem pružanja odgovora na sledeća istraživačka pitanja: Koji su glavni nedostaci regulative po mišljenju računovođa? Kako se računovođe informišu o računovodstvenoj regulativi? I da li su dva pomenuta istraživačka pitanja povezana? U ovu svrhu, identifikovali smo ciljanu populaciju koja obuhvata računovođe i revizore iz privatnog sektora. Prikupljanje podataka sprovedeno je tokom perioda od šest meseci, nakon kojih su za potrebe istraživanja uzeta u obzir 338 kompletno popunjena upitnika. Prikupljeni podaci analizirani su upotrebom data mining tehnike klasterovanja. Algoritmi za klasterovanje podataka omogućili su segmentaciju anketiranih računovođa u jasno razdvojene i homogene grupe sličnih računovođa. Analiza rezultujućih klastera dala je uvid u mišljenje i stavove sličnih računovođa. Ovi uvidi predstavljaju osnovu za donošenje zaključaka o nedostacima zakonske računovodstvene regulative koje uočavaju računovođe u Srbiji i sa kojima se nose u svakodnevnom poslu.

Ključne reči: *računovodstvena regulativa, finansijsko izveštavanje, mišljenje, korisnici, kvalitet, informacije, analiza klastera.*

Introduction

Financial reporting is a legal obligation of all legal entities in the Republic of Serbia. Bookkeeping and preparing financial reports is a complex process that should be governed by regulations. Depending on the hierarchy and the legislator, the regulatory framework is classified into international, statutory (legislation) and internal accounting regulation. International accounting regulations (IAR) embrace standards, guidelines, interpretations, and a framework adopted by professional accounting organisations. Legislation, i.e., statutory accounting regulations (LAR) include laws and by-laws that directly regulate the field of accounting and auditing in the Republic of Serbia. Depending on the regulations which are used to recognise, evaluate, present and disclose positions in the financial reports and regulations used for bookkeeping, legal entities in the private sector of the Republic of Serbia are divided into the following three groups:

1. Legal entities applying International Financial Reporting Standards (IFRS) as part of IAR;
2. Legal entities applying International Financial Reporting Standard for Small and Medium-Sized Entities as part of IAR;
3. Legal entities applying the by-law issued by the Minister of Finance, titled the Rulebook on the Manner of Recognition, Valuation, Presentation and Disclosure of Positions in Individual Financial Reports of Micro and Other Legal Entities.

The criterion for the application of a particular reporting basis is the size of the legal entity, the parent company issue, as well as the voluntary basis. In addition to the above, all three groups of legal entities are obliged to apply the laws and by-laws in the field of LAR.

Poor legal solutions expose legal entities to additional costs and damage the reputation of the accounting profession. Changes in regulations, such as new bookkeeping account codes, changes to account groups in the chart of accounts, or some terminological changes related to the formulation of balance sheet items, require correction in accounting software, changes in accounting schemes and bring additional costs to legal entities, which usually exceed the benefits of these changes. There is much room for LAR improvement,

which would significantly advance the quality of financial reporting, contribute to greater comparability of financial reports and their easier understanding by users. It would also significantly reduce errors in recording business changes and creating financial reports. High quality of the regulatory framework leads to an improved quality of financial reports, which further increases transparency of the financial position of a reporting entity. It also leads to an increase in investments, reduction of financial risks and overall better economic situation in the country.

When referring to the quality as a feature of financial reports, it is important to emphasise that quality is only relevant from the perspective of users of financial reports, in terms of whether their expectations regarding information needs are met or not. Considering the consequences financial reports have on business decisions, their quality is a matter of public interest. Business decisions are made based on the information provided in financial statements. With respect thereto, poor quality of financial statements can have consequences on business decisions, and the quality of the financial statements can be viewed as a matter of public interest. For these reasons, this issue is a subject of interest in the field of accounting regulations, professional institutions and organisations, authorities, and the scientific literature.

The primary objective of the research presented in this paper is to evaluate the attitudes of accountants as direct beneficiaries of IAR, LAR and financial reporting quality. The secondary objective of the research is to identify current LAR deficiencies in relation to IAR.

The paper is organised as follows. The section following Introduction provides an overview of relevant research conducted in this domain. The next section presents methodology applied to our research, the process of selection and collection of data, as well as the approach to their analysis. The fourth section is the central part of the paper where we present developed models and provide an in-depth analysis of accountants' opinions and attitudes towards IAR, LAR and quality of financial reporting. In this section, and corresponding subsections, we also provide interpretation of identified deficiencies of IAR and LAR. The last section provides conclusions and directions for future work.

Related work

Accounting regulations represent a relatively new research area. Scientific literature overview of accounting regulations has shown that there is a lack of scientific papers on accountants' attitude about their quality in Serbia. Our paper aims to reduce this gap in the scientific literature. Research on accounting regulations in Serbia was not conducted prior to 2014. The research presented in our paper is part of a more comprehensive study that is also the first of this kind in Serbia [16], followed by a research study of the Serbian professional organisation [15]. In the mentioned context, the following papers and studies especially testify to the scientific and professional elaboration of the analysed issue.

The study of the Association of Accountants and Auditors of Serbia [15] created on the basis of the analysis of attitudes of accountants on the existing regulatory framework and the quality of financial reporting, was aimed at examining the actual situation in this field from the perspective of accountants who are greatly informed on current problems. Identification of weak points in the field of adoption of LAR, the application of IAR and the training of accountants was the second goal of the research study. The third goal was to provide a constructive support to regulatory institutions in the process of adopting new LAR. At the end of the study, the following key positions of accountants were observed: poor legal solutions and lack of an updated translation of IAR led to the jeopardized public interest and deterioration in the profession; given the undeniable advantages of IAR application, all reporting entities should be allowed to apply IAR, regardless of the character of their classification by size; finally, specific improvements of LAR in the domain of reporting basis, charts of accounts, delivery deadlines, signing and control of financial reports have been proposed.

At the end of each year, the International Federation of Accountants conducts a research on the challenges faced by small and medium-sized entities around the world. The latest study carried out at the end of 2016 [13] showed that most entities in Europe (47%) stated that their biggest challenge in business was keeping pace with new regulations and standards.

The European Commission [7] conducted a public consultation on the effects of the application of IFRS in the EU in order to seek the opinion of all stakeholders on the Regulation no. 1606/2002 [30]. The Commission supports IFRS as global standards and continues to invite the US Securities and Exchange Commission (SEC) to adopt IFRS to be used by domestic companies. Results showed that most of respondents (86%) think that the application of IFRS in the EU, as the main part of IAR, improved the transparency of companies' financial reports compared to what it was before the mandatory adoption. Most respondents think that the introduction of IFRS contributed to a greater comparability at national, EU and global level (70%, 92%, and 79% respectively) compared to what it was before the mandatory adoption. More than two-thirds of respondents (71%) state that introduction of IFRS improved investor protection through better information and stewardship by management. Around one-third (32%) of respondents believe that IFRS improved investors' protection to a great extent.

In their empirical study, authors of [26] found that accounting standards' convergence increases the comparability of the accounting information of Chinese enterprises with that of IFRS-compliant countries. According to the study presented in [33], accounting standards' convergence and improved accounting information quality can increase the comparability of information, which is affected by the institutional environment of the country wherein the enterprise is located. Authors in [9] provided direct evidence that comparability of accounting information increases the total volume and quality of corporate information and reduces analysts' information acquisition costs. Many other studies found that the comparability of accounting information is one of the features of financial reports and accounting information quality.

Data mining clustering algorithms are often used in research from the accounting domain for various problems. Accounting databases are successfully clustered into homogeneous and well-separated groups of similar transactions, clusters, and the results allowed the authors of [1] to provide comparable information in financial reports. Another task successfully solved by the clustering technique

is discrepancy detection in the field of audit. The authors in [31] examined applicability of clustering for automation of filtering fraudulent activities during an audit. They used cluster analysis to help auditors focus their efforts when evaluating group life insurance claims. A number of papers deal with the issue of assessment of accounting convergence [4], [5], [6], [10], [19], [20], [23], [25], and in some of them the authors deal with the development of new methods, based on underlying concepts of data mining approaches, to measure advances in harmonization [11], [21]. In [21] the authors propose a new method of matching and fuzzy clustering analysis to assess the convergence progress of the latest China's accounting standards (CAS) with IFRS from whole and single standards respectively. To the best of our knowledge, cluster analysis was not used to analyse accountants' opinion on regulations in Serbia in order to identify the aggravating aspects of using LAR and IAR. The research presented in our paper takes into account opinion of accountants on various aspects of LAR and IAR, drawn from the survey, and the results of the clustering analysis enabled us to gain insights on key aspects where accountants are experiencing problems using LAR and IAR in everyday business transactions. Generated insights are also useful from the perspective of harmonisation of LAR with IAR and for identifying ways to improve quality of financial reports and accounting information.

Methodology

The subject of this research is evaluation of LAR and IAR quality in terms of their major deficiencies. An identification of deficiencies of current accounting regulations is important for improving the Law on Accounting and the Law on Auditing of the Republic of Serbia. Numerous discussions and roundtables are underway on this topic, and this paper is a useful scientific basis for substantiating the views of accountants during the public debates. The main objective of the analysis presented in this paper is to examine the opinion of accountants regarding accounting regulatory framework, both international and legal, in order to identify their main drawbacks recognised by accountants, and to assess the opinion of the profession on responsibilities for the quality of financial reporting. Such

analysis is useful because it enables identification of sources of dissatisfaction among accountants and directions for LAR improvement. Therefore, more specific objective of the research could be formulated as two questions. What are the main deficiencies of LAR and IAR as considered by accountants? How do accountants get information on LAR and IAR?

To address these specific objectives, the authors have independently planned and carried out the research in order to collect relevant data [16]. We have opted for a questionnaire as an appropriate approach to the subject of the research. Questionnaire structuring and selection of questions were performed using the Delphi method with ranking [18], while respecting all procedures in iterations as suggested in [12]. The questionnaire contains 33 questions [16]. The answers to the closed-ended questions were created using the Likert scale [8], [14]. The targeted population comprises accountants and auditors employed in the private sector regardless of years of experience. Selection of the statistical sample for our research has been conducted randomly, since each accountant from the population had an equal likelihood of being sampled. Selection of one respondent did not influence selection of other respondents in the sample. Data collection was carried throughout the period of six months. Within this period, we collected 338 fully completed questionnaires. The size of our sample, in terms of its sufficiency, was evaluated according to proposed approach in [28]:

$$N > (50 + 8 * m)$$

where m is the number of independent variables, and N is the sample size. For the purpose of this research, a total of 33 variables were used, and thus $N > (50 + 8 * 33)$, i.e., the sample must be greater than 314 respondents. As we have collected 338 responses, we can conclude that our sample satisfies this prerequisite and that it is statistically significant.

Collected data was analysed using clustering data mining technique. Clustering helps to better understand complex data structures by grouping data in an unsupervised way, and reveals hidden and unique patterns within each cluster, i.e., a group of similar data points or objects [3], [32], [24]. Such grouping of data points ensures that the data grouped into one cluster are closer to each other and

to their "cluster center", i.e., centroid, than they are to the centers of other clusters. This means that one cluster comprises objects which are the most similar to each other and most different from objects of other clusters. This approach has enabled us to group similar respondents according to expressed attitudes towards deficiencies of LAR and IAR and to better understand differences and underlying patterns in collected data. Among different approaches to clustering, we have selected a partition-based clustering approach which rests on the principle that a cluster should contain at least one object, and that each object must belong to exactly one cluster [17]. This can be defined as k-Means problem, where the number of clusters (k) is defined by the analyst and each k is represented by the so-called centroid. A set of n data points $X \subset R^d$ is given [2]. Centroid is usually the mean of a group of data points and is typically applied to objects in a continuous n-dimensional space [29]. The goal is to choose k centres C and to minimise the potential function, i.e., to minimise the total squared distance between each data point and its closest centre:

$$\phi = \sum_{x \in X} \min_{c \in C} \| x - c \|^2$$

Clustering is implicitly defined by the choice of these centres. One cluster is a collection of data points that are closer to their centre than to any other centre and finding an exact solution to the k-Means problem, even for two clusters, is NP-hard [2]. In our research we deployed k-Means algorithm, as one of the most popular partition-based algorithms, which is also the simplest and fastest solution to k-Means problems [3]. This algorithm starts with arbitrarily chosen k centres $C=\{c_1, c_2, \ldots, c_k\}$. Each data point in a dataset is then assigned to the nearest centre, and each centre is recomputed [2]. These steps are repeated until the overall process is stabilised and ϕ is minimised. Determination of the optimal number of clusters is identified as one of the key issues in clustering, since it can introduce a certain amount of subjectivity given the value of k is provided by the analyst. Several approaches are suggested to estimate the ideal number of clusters [3], [17], [22]. For evaluation of optimal number of clusters, we employed the Elbow method where k is the turning point on the graph of k v/s *Avg. distance to centroid* [17], [27].

The objective is to minimise sum of squared distance or the potential function, as explained above.

Results and discussion

As our goal is to assess the opinion of accountants on LAR and IAR, we have developed two different models corresponding to this goal. The first model helped us to evaluate profession's attitudes towards deficiencies of LAR and their opinion on responsibilities towards the quality of financial reporting, while the second model helped us to evaluate profession's opinion on deficiencies of IAR. The first model is presented and discussed in the subsection below, and the second in the next subsection.

Assessment of accountants' opinion on LAR

In assessment of accountants' opinion on main deficiencies of LAR, we have considered the following attributes. The size of the enterprise defines reporting basis which is used in financial reports (see Introduction for more details on this). For this reason we have included the size of the legal entity where respondent is employed (Figure 1: *Size*) in our analysis. The values of this attribute are micro legal entities and medium-sized legal entities using IAR, denoted in Figure 1 as 1 and 2, respectively. Given that among respondents we had accountants, chief financial officers (CFOs), and owners of legal entities, denoted in Figure 1 as 1, 2, and 3 for the attribute Position, respectively, the position of the respondent in a legal entity (Figure 1: *Position*) is taken into account in this analysis. In general, the respondent's position in a legal entity represents an important parameter which can indicate differences in attitudes among various positions that can arise from intensity and frequency of application or use of LAR. Respondents may differ according to the possession of an accountancy qualification (Figure 1: *Accountancy qualification)*, with values 1 (yes) and 0 (no). An accountancy qualification defines, however not solely, the level of professional education and intensity of continuous professional education that the respondent has mastered. Respondents with an accountancy qualification may have more information and knowledge, and with respect to that they may have a better understanding

of the reasons for making certain legislative provisions. The main attributes of our analysis are characteristics of LAR and responsibilities for the quality of financial reporting in Serbia. The following characteristics of LAR were assessed by accountants: frequent changes in LAR (Figure 1: *LAR_Changes*), disagreeability of LAR and IAR (Figure 1: *LAR_Disagreeability*), poor LAR solutions (Figure 1: *LAR_Poor solutions*), and marginalisation of the accounting profession (Figure 1: *LAR_Marginalisation*). Respondents evaluated the degree of responsibility for the quality of financial reporting in Serbia of the state and its authorities (Figure 1: *Response_Authorities*), Association of Accountants and Auditors of Serbia (Figure 1: *Response_AAAS*), as well as educational institutions (Figure 1: *Response_EI*). These two key attributes of respondents (accountants) are evaluated on the scale from 0 to 3, as represented in Figure 1, where 0 represents lack of attitude, 1 indicates disagreement, 2 partial agreement, and 3 complete agreement. Although sources of information about changes in regulatory framework fall out of the main scope of our research, we have included these attributes (professional seminars, the internet, professional or printed publications, and colleagues as a potential sources of information) in order to assess whether there are certain links among the main sources of information utilised by

accountants and their perception on deficiencies of LAR. Surveyed accountants evaluated frequency of utilisation of these sources of information on the scale from 0 to 3, as represented in Figure 1, where 0 refers to the source which was never used by respondent, 1 denotes source which is sometimes used, 2 denotes frequent use, and 3 denotes a source which is used on a regular basis. In the modelling phase and according to approach described in the methodology section, we have assessed the optimal number of clusters based on the Elbow method [17], [27], which pointed to the optimum of four clusters. Figure 1 illustrates our optimal model with four clusters and their representative cluster centroids.

Clusters 1 and 4 comprise certified accountants from micro legal entities, while clusters 2 and 3 comprise CFOs, and therefore interpretation of cluster centroids illustrated by Figure 1 will be presented in this order.

Cluster 1 predominantly encompasses accountants with an accountancy qualification, employed in micro legal entities. These accountants often use the internet and professional or printed publications as a source of information on changes in accounting laws and by-laws, while they only occasionally attend professional seminars and consult colleagues to obtain the same information. These accountants strongly criticise LAR in Serbia. In

Figure 1: Visualisation of clusters of accountants according to their opinion on LAR
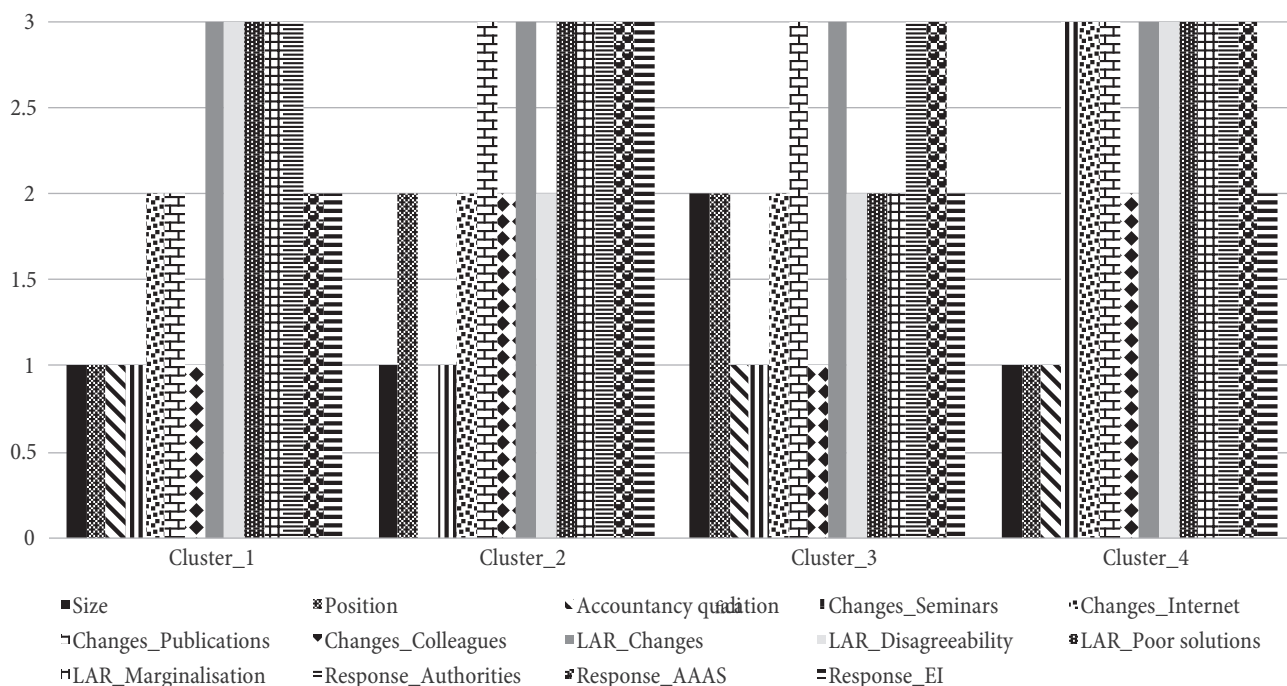
Source: Authors.

their opinion, LAR is completely characterised by frequent changes in laws and by-laws, non-compliance with IAR, poor legal solutions and marginalisation of accounting profession. While complete agreement on responsibility of authorities for the quality of financial reporting in Serbia is notable within all four clusters of accountants, difference among clusters is observable in their attitude towards responsibility of other institutions. Accountants within Cluster 1 believe that the Association of Accountants and Auditors of Serbia and educational institutions in Serbia are responsible to some extent for the quality of financial reporting in Serbia.

Cluster 4 also encompasses accountants with an accountancy qualification, employed in micro legal entities. However, these accountants differ from accountants in Cluster 1 by stronger criticism and more intensive way of getting informed about changes in accounting laws and by-laws, and they are fully up to date with the mentioned changes. They always attend professional seminars, consult online sources and professional or printed publications, and often consult with colleagues. As is the case with the members of the first cluster, they strongly criticise LAR in Serbia, but in contrast to them, they believe that along with authorities, the Association of Accountants and Auditors of Serbia is equally responsible for the quality of financial reporting, while educational institutions are responsible only to some extent.

Cluster 2 encompasses mainly CFOs employed in micro legal entities. These CFOs use available sources of information on changes in accounting laws and by-laws more intensively than accountants in the first cluster do. Professional or printed publications are always used, while CFOs often consult colleagues and the internet sources. Same as accountants from other clusters, CFO's in Cluster 2 believe that LAR in Serbia is subject to frequent changes. They consider the legislation to be partially inconsistent with the IAR with completely poor legal solutions and complete marginalisation of accounting profession. This is the only cluster whose members deem the authorities, the Association of Accountants and Auditors of Serbia and educational institutions equally responsible for the quality of financial reporting in Serbia.

CFOs with an accountancy qualification who are employed in medium-sized legal entities using IAR are encompassed in Cluster 3. These CFOs obtain information on changes in LAR mostly through professional or printed publications, followed by the internet as the source of information. Compared to other clusters, their attitude towards LAR in Serbia is the most favourable. In addition to frequent changes, these CFOs believe that LAR disagrees only to some extent with IAR. Also, they partially agree that LAR has poor solutions and that accounting profession is marginalised. According to the opinion of CFOs in this cluster, responsibility for the quality of financial reporting mostly falls on authorities and the Association of Accountants and Auditors of Serbia, while educational institutions are just partially responsible.

Based on presented results of our analysis, we can conclude that certified accountants employed in micro legal entities (predominantly bookkeeping agencies) have a much stronger attitude towards LAR than CFOs with an accountancy qualification working in medium-sized legal entities. Accountants from bookkeeping agencies use LAR in the widest and most frequent way on a daily basis, so their opinion on LAR is more relevant than the opinion of CFOs, who mostly use IAR and are not primarily directed to enforce LAR. Respondents who are better versed in LAR have a stronger opinion about LAR than respondents who are not as familiarised with LAR. This is expected, because respondents who have more knowledge about LAR and experience using LAR are more aware of the problems and shortcomings thereof. The findings presented in this section for the case of Serbia comply with the results of the study conducted in EU which indicated that the biggest challenge for EU businesses today is to keep pace with new regulations [13]. Accountants from Serbia experience the same challenge, as corroborated by our research. They have indicated the frequent changes of LAR as one of the greatest shortcomings. Also, our findings confirm the results of the Association of Accountants and Auditors of Serbia's study [15] that poor legal solutions led to the jeopardized public interest and deterioration of accounting profession. Very similar weak points in the field of adoption of LAR were identified, too.

Assessment of accountants' opinion on IAR

The second model is focused on the opinion of accountants on IAR. In order to conduct a comprehensive evaluation of their opinion, our model is based on the following attributes. Respondents in our research are accountants, CFOs, and owners of legal entities. This attribute is denoted in Figure 2 and Figure 3 as *Position* with values 1, 2, and 3, respectively. Also, respondents can have an accountancy qualification (Figure 2 and Figure 3: *Accountancy qualification* value 1) or not (Figure 2 and Figure 3: *Accountancy qualification* value 0). Three main attributes refer to 1) the assessment of the quality of IAR, 2) availability of handbooks for crafting the financial reports based on IAR, and 3) the quality of these financial reports. We observed the quality of IAR through their comprehensiveness (Figure 2 and Figure 3: *IAR_Comprehensive*) – whether they cover transactions from different industries and branches; whether they are understandable or not (Figure 2 and Figure 3: *IAR_Understandable*); simplicity (Figure 2 and Figure 3: *IAR_Simple*); extensiveness (Figure 2 and Figure 3: *IAR_Extensive*); number of alternatives accountants have (Figure 2 and Figure 3: *IAR_Alternative*); how good their translation in Serbian is (Figure 2 and Figure 3: *IAR_Translation*); and their coverage (Figure 2 and Figure 3: *IAR_Coverage*) – whether they cover all aspects and types of financial reporting. Evaluation of availability of handbooks for preparation of financial reports based on IAR was conducted based on their actuality (Figure 2 and Figure 3: *Handbook_Actual*), clarity (Figure 2 and Figure 3: *Handbook_Clear*), and sufficiency (Figure 2 and Figure 3: *Handbook_Sufficient*). The quality of financial reports prepared based on IAR is evaluated according to the following criteria: whether they satisfy the information needs of internal and external users (Figure 2 and Figure 3: *IAR_IntUsers* and *IAR_ExtUsers*), quality of information of reports prepared in such way (Figure 2 and Figure 3: *IAR_QualityInf*), comparability of information (Figure 2 and Figure 3: *IAR_Comparability*), and true and fair view of financial position, business success and cash flows of legal entity (Figure 2 and Figure 3: *IAR_TrueAndFair*). These three attributes were assessed by respondents, accountants, on the scale from 0 to 3, as presented in Figure 2 and Figure 3, where 0 refers to lack of opinion on the

issue, 1 indicates that respondents disagree with the issue, 2 indicates partial agreement, and 3 complete agreement of respondents. Similar to the evaluation of LAR, we took into consideration the sources of information about IAR novelties, professional seminars (Figure 2 and Figure 3: *Novelties_Seminars*), the internet (Figure 2 and Figure 3: *Novelties_Internet*), professional or printed publications (Figure 2 and Figure 3: *Novelties_Publications*), and colleagues (Figure 2 and Figure 3: *Novelties_Colleagues*) as a potential sources of information on IAR. The main motivation for using these attributes was to assess whether there are some links between the informational approach of accountants and the drawbacks of IAR they have emphasised, or difficulties they encounter during IAR use. Respondents evaluated frequency of utilisation of these sources of information on the scale from 0 to 3, as represented in Figure 2 and Figure 3, where 0 refers to the source which was never used by respondent, 1 denotes source which is sometimes used, 2 denotes frequent use, and 3 denotes source which is used on a regular basis. Finding the model with optimal number of clusters was conducted based on the Elbow method [17], [27] as explained in the methodology section. Collected data is optimally grouped into seven clusters. Clusters 1, 4, and 7 exhibit certain similarities, while the same applies for Clusters 2, 3, 5, and 6. Therefore, the interpretation of the resulting model will be presented in this order and visualisation of cluster centroids and their values for each attribute is grouped accordingly and presented in two figures. Figure 2 illustrates Clusters 1, 4, and 7, while Figure 3 illustrates Clusters 2, 3, 5, and 6.

Cluster 1, presented in Figure 2, encompasses accountants with an accountancy qualification who often use all available sources of information on novelties in the domain of IAR. These accountants are not fully satisfied with the quality of IAR and perceive them as partially comprehensive, understandable or clear for use. According to them, IAR is not as extensive nor with many alternatives and it does not cover all necessary aspects of drafting financial reports in Serbia. They consider as a problem an inadequate translation of IAR into Serbian. Handbooks for preparation of financial reports based on IAR and other written materials are completely actual

Figure 2: Visualisation of clusters of accountants according to the opinion on IAR: Clusters 1, 4, and 7
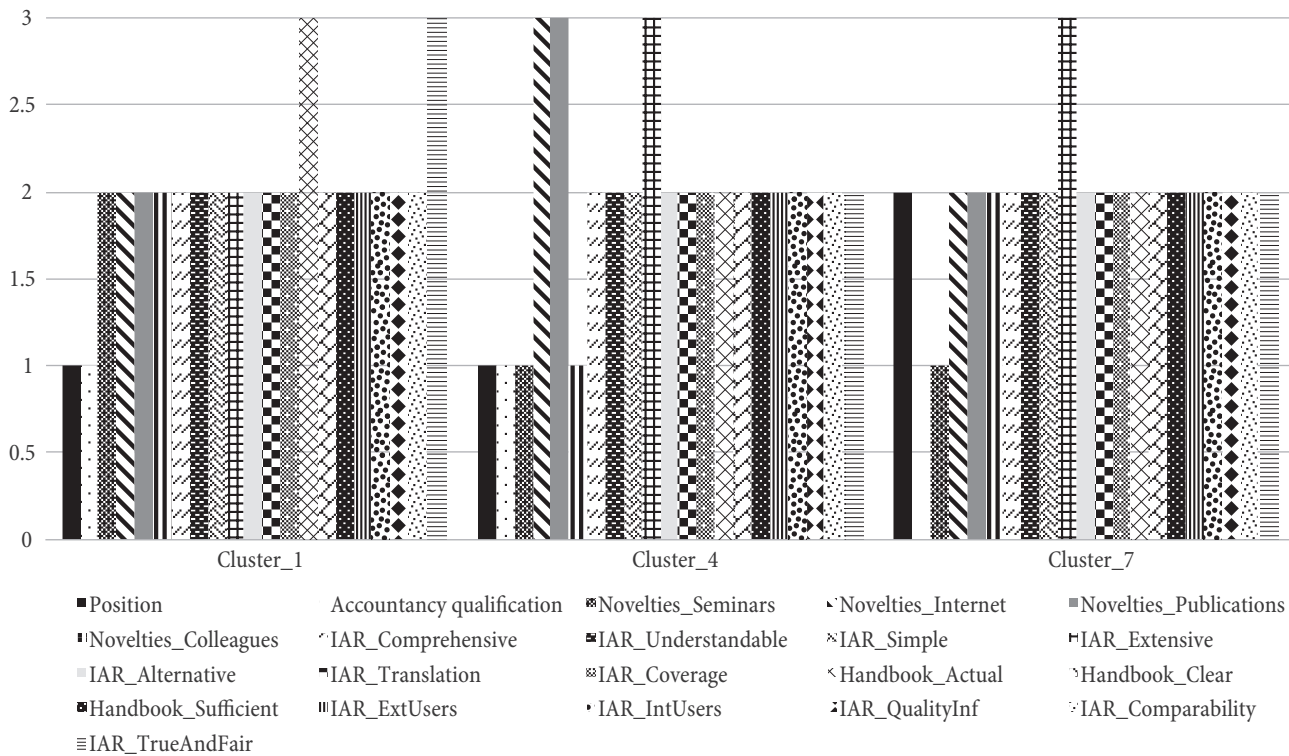
Source: Authors.

and are partially clear and sufficient. Accountants in Cluster 1 consider financial reports prepared under IAR to be of partial quality and to fulfil information needs of external and internal users to some extent, and that they offer partly understandable, relevant and reliable information which are partly internationally comparable. These accountants completely believe that such financial reports reflect financial position of a legal entity truly and fairly, as well as their business success and cash flows.
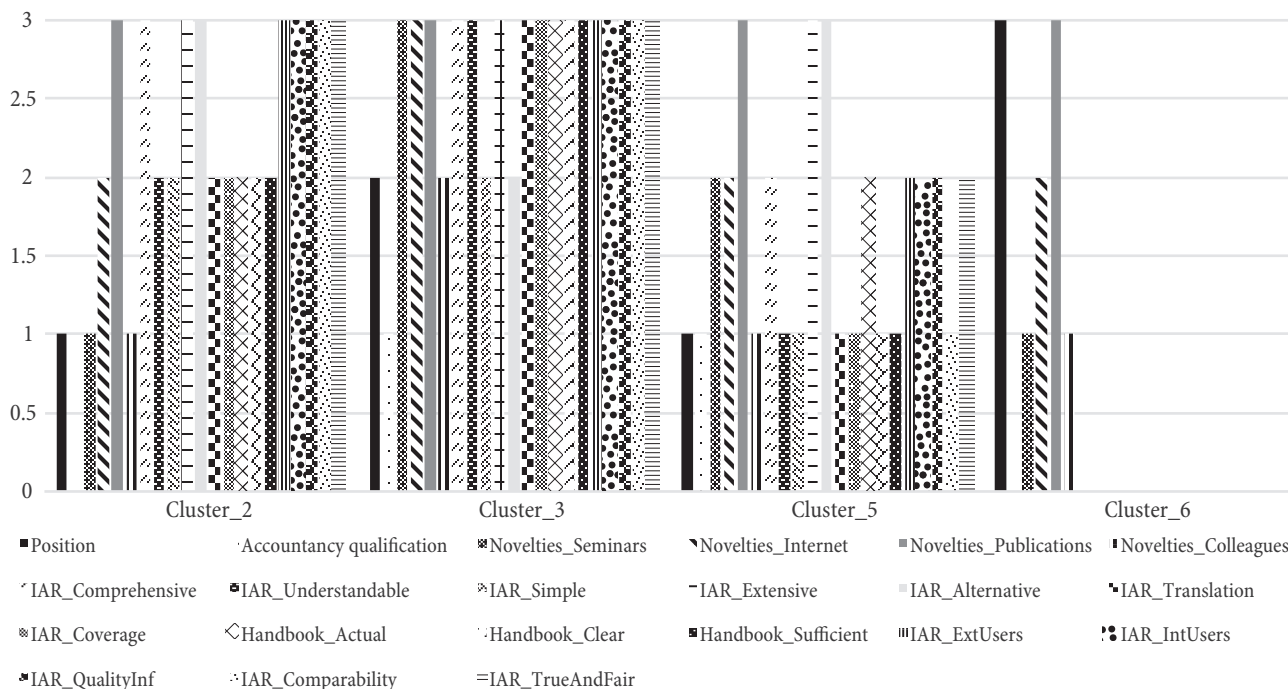
Cluster 4 also comprises accountants with an accountancy qualification who express somewhat different pattern of getting informed on novelties about IAR compared to accountants in Cluster 1. They sometimes attend seminars or consult colleagues, while they always use the internet and professional or printed publications as a source of information. They share most of the attitudes towards the quality of IAR with accountants in Cluster 1. However, we can observe one difference in their stance: accountants in Cluster 4 consider IAR completely extensive. On all other issues, they exhibit partial agreement.

Very similar to accountants in Clusters 1 and 4 are accountants in Cluster 7. They differ on the position of an accountant in a legal entity. Accountants comprised

in Cluster 7 are predominantly CFOs who do not have an accountancy qualification and who only occasionally attend professional seminars. Unlike the first cluster, and in compliance with attitudes of accountants in the fourth cluster, accountants of Cluster 7 consider IAR to be extensive. They also believe that handbooks are partially up-to-date and consider the financial reports prepared under IAR to reflect only to some extent truly and fairly the financial position, business success and cash flows of the legal entity.

Cluster 2 is predominantly comprised of accountants without an accountancy qualification, who always use professional or printed publications to get informed on novelties in the domain of IAR, while they often use internet sources and only occasionally attend professional seminars or consult with colleagues. These accountants believe that IAR is comprehensive, extensive and has many alternatives, while it is partially understandable and easy to use, and partially covers the required aspects of the preparation of financial reports in Serbia. Also, they believe that IAR is not adequately translated into Serbian. These accountants are partially satisfied with the available handbooks for IAR or other written

Figure 3: Visualisation of clusters of accountants according to the opinion on IAR: Clusters 2, 3, 5 and 6

Legend:
- Position
- Accountancy qualification
- Novelties_Seminars
- Novelties_Internet
- Novelties_Publications
- Novelties_Colleagues
- IAR_Comprehensive
- IAR_Understandable
- IAR_Simple
- IAR_Extensive
- IAR_Alternative
- IAR_Translation
- IAR_Coverage
- Handbook_Actual
- Handbook_Clear
- Handbook_Sufficient
- IAR_ExtUsers
- IAR_IntUsers
- IAR_QualityInf
- IAR_Comparability
- IAR_TrueAndFair

Source: Authors.

materials, while they are fully satisfied with the quality of the IAR-based financial reports (they fully meet the information needs of external and internal users, provide comprehensible, relevant and reliable information that is comparable on international level and they truly and fairly reflect financial position, business success and cash flows of legal entity).

Cluster 3 consists of accountants who agree the most with all the aspects that have been evaluated. These are predominantly CFOs with an accountancy qualification who, unlike other clusters, make maximum use of all available sources of information about IAR news (professional seminars, the internet, professional or printed publications are always used, while colleagues are often consulted). Accountants in Cluster 3 perceive IAR positively. They believe IAR is comprehensive, easy to understand, adequately translated into Serbian, covers all necessary aspects of the preparation of financial reports in Serbia, and to some extent easy to use and provides alternatives. This is the only cluster that reflects attitudes of accountants who are fully satisfied with the available IAR handbooks and other written materials. These accountants share satisfaction with the quality of financial reports prepared under IAR with accountants in Cluster 2. Clusters 2 and 3

are the only two clusters that show complete satisfaction with the quality of such financial reports.

Cluster 5 represents the group of accountants with an accountancy qualification who are most dissatisfied. Their pattern of obtaining information does not differ significantly from other clusters, as they frequently attend professional seminars and frequently use online sources to get informed on novelties in the domain of IAR, always use professional or printed publications and periodically consult colleagues. This group of accountants, similar to others, believe that IAR is only partially comprehensive. However, they criticise all other aspects. According to them, IAR is completely incomprehensible, complicated to apply, comprehensive and with many alternatives, it does not cover all necessary aspects of the preparation of financial reports in Serbia and is inadequately translated into Serbian. Also, accountants of Cluster 5 are dissatisfied with the available handbooks and other written materials for IAR use. They find them only partially topical, vague and insufficient. They also express partial satisfaction with the quality of the financial reports prepared on the basis of IAR as they partly meet the needs of internal and external users, provide partly understandable, relevant and reliable information which are not comparable at the

international level, while to some extent they give a true and fair image of the financial position, performance and cash flows of a legal entity.

Cluster 6 comprises predominantly legal representatives who are somewhat informed about IAR. They only occasionally attend professional seminars and occasionally consult with colleagues, while they frequently use online sources of information on IAR, and always read professional or printed publications. The respondents of Cluster 6 did not express their views on other evaluated aspects due to the fact they do not apply IAR in practice and they are not involved in the preparation of financial reports. Therefore, they do not have an opinion thereon.

Based on presented results of our analysis, we can conclude that the more informed respondents are about IAR novelties, and the more frequently they attend various forms of the continuing professional education (training and seminars), the more satisfied they are with all evaluated aspects of IAR. Usually, this is referred to CFOs with an accountancy qualification who are employed in legal entities that use IAR. As such, they are the most competent to evaluate the analysed aspects of IAR. Our results also confirm the results of the earlier study presented in [15], which found that a major disruption to application and understanding of IAR is outdated translation of IAR. Our results confirm that the comparability of accounting information, achieved by applying IAR, is one of the features of financial reports quality as [26], [33], [9], and many other studies found.

Conclusion

On its path to a full EU membership, the Republic of Serbia must harmonise its accounting legislation with international accounting regulations. The accountants' dissatisfaction with current accounting legislation and the quality of financial reporting is a consequence of non-compliance of legislation with international accounting regulations regarding the six major issues listed below.

- The financial reports' quality control: Directive 2013/34/EU requires the national laws of the Member States to regulate the responsibility for the preparation, presentation and disclosure of financial reports.

The regulation implies the adoption of specific legal provisions that define the responsibilities and obligations of administrative, supervisory and administrative bodies, but also sanctions for their non-compliance. The Serbian Law on Accounting does not prescribe these obligations or sanctions for economic offenses. If there are no sanctions of this kind, the financial reports' quality becomes a constantly threatened category.

- The responsibility for the preparation, presentation and disclosure of financial reports: The responsibility is legally divided between the legal representative, managing authority, the supervisory body of the legal entity and the person in charge of bookkeeping and preparing the financial reports. However, the risk of irresponsibility is greatly magnified by the facts stated in the previous paragraph.
- The content of the mandatory annual financial reports' set: Six mandatory financial reports have been prescribed in the national legislation. The existence of the Statement of Other Comprehensive Income impairs comparability, both internationally (because IFRS does not prescribe this report as a separate report in the mandatory set of financial reports) and nationally - between entities of different sizes.
- The extensiveness of financial reports' forms: The Balance Sheet form contains 156 items, whereas IFRS requires 31 items, while the Income Statement form consists of 92 items, whereas according to IFRS this statement should include 30 items. Therefore, official financial reports from the Republic of Serbia are not comparable with financial reports from countries that apply IFRS. In this case, it is confirmed that having too much information is not always an advantage, but leads to opacity, incomparability and higher costs than benefits.
- Status and position of the accounting profession: The national legislation ignores the profession by stipulating that educational background, work experience and other conditions for a person performing bookkeeping and financial report preparation are regulated by a legal entity in its general act. These conditions are a matter of completely free choice of a legal

entity. The institution of a professional accountant is not mentioned in the legislation. Registration of bookkeeping agencies is similarly (not) regulated. The competence (required knowledge, experience and professional competence) of persons directly working on the preparation of financial reports for the account and on behalf of other legal entities is not legally defined, and thus made irrelevant.

- The Code of Ethics and continuing professional education: Two important segments of international accounting regulations (IAR) without which it is impossible to achieve quality financial reporting - International Code of Ethics for Professional Accountants, including International Independence Standards, and International Education Standards - are unknown to the national legislation (LAR). There is no public demonstration of public interest protection that would reflect the existence of procedures that foresee the possibility of losing the right to pursue the accounting profession and the provision of professional services.

Recommendations for further research are in the direction of repeating the research after the adoption of new laws on accounting and audit in the Republic of Serbia, which is expected in the first half of 2020. This paper is just one of many that has recognised the deficiencies in the national legislation in this field, and it remains a hope that future papers will address the benefits of the new laws rather than their disadvantages.

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