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INTEGRAL SYSTEM OF FRAUDULENT BANKRUPTCY EVALUATION

The research aims at clarifying the opinion of experts to identify factors indicating possible intentional nature of bankruptcy and its assessment. In the article, the authors analysed such concepts as fraudulent bankruptcy, criminal bankruptcy, etc., distinguish division of bankruptcy and defined its distinctive characteristics. On the basis of literature review and expert estimation, the authors searched indicators of fraudulent bankruptcy. The study is based on opinions of the experts related to fraudulent bankruptcy (insolvency administrators, investigators, academics of accountancy and forensic accountants), using the analytic hierarchy process (AHP method). Experts identified the 10 most popular indicators related to fraud bankruptcy cases and evaluated them. The authors tested the possibility of the appearance of these indicators in non-criminal insolvency cases in various conditions of three internal characteristics of the company (quality of management, organisation of accounting and internal control of the company) using the simulation approach. The results of the empirical research can be applied to the construction of models for fraudulent bankruptcy evaluation. The authors summarized also the terminology of fraudulent bankruptcy in different countries' law and identified a common concept – deliberate illegal activity or fraud. At least three forms of fraudulent bankruptcy were identified: fictitious, intentional and hidden. The authors proposed also their own definition – fraudulent bankruptcy is a white-collar crime, which contains any type of offences and detrimental transactions, which result in company's bankruptcy.

Key words: fraudulent bankruptcy, criminology, non-financial indicators, analytic hierarchy process (AHP).

Krāpnieciska bankrota novērtēšanas integrālais modelis

Pētījuma mērķis ir precizēt ekspertu viedokli, lai noteiktu faktoros, kas norāda uz iespējamo bankrotu tīšo raksturu. Rakstā autori analizēja tādus jēdzienus, kā “krāpniecisks bankrots”, “krimināli sodāms bankrots”, u.c., lai nodalītu bankrota veidus un formas, kā arī noskaidrotu tā atšķirīgās pazīmes. Autori apkopoja literatūru un ekspertu grupas novērtējumus, lai noteiktu 10 visbiežāk sastopamos krāpniecisko bankrotu indikatorus. Pētījums veikts, pamatojoties uz ekspertu, saistīto ar krāpnieciskiem bankrotiem (maksātspējas administratori, izmeklētāji, tiesu grāmatveži un akadēmiskie grāmatveži) viedokļiem, izmantojot hierarhiju analīzes metodi (AHP). Autore ar simulācijas analīzes metodi pārbaudīja krāpniecisko bankrotu indikatoru iespējamību parādīties nekriminālās maksātspējas lietās uzņēmuma trīs iekšējo raksturojošo apstākļu (vadības kompetence, grāmatvedības uzskaites organizācija, kompānijas iekšējā kontrole) kontekstā. Pētījuma rezultātus var pielietot krāpniecisku bankrotu novērtēšanas modeļu konstruēšanai. Autori arī ir apkopājuši krāpnieciskā bankrota terminoloģiju dažādu valstu likumdošanā un identificēja kopīgu konceptu – plānotu nelegālu darbību vai krāpniecību. Tika identificētas vismaz trīs krāpnieciskā bankrota formas: fiktīva, slēpta un tīša. Autori piedāvā arī savu definīciju – krāpnieciskais bankrots ir “balto apkaklišu” noziedzība, kas ietver jebkāda veida nodarījumus un kaitnieciskus darījumus, kā rezultātā iestājas uzņēmuma bankrots.

Atslēgas vārdi: krāpniecisks bankrots, kriminoloģija, nefinanšu rādītāji, hierarhiju analīzes metode.

Интегрированная модель оценки мошеннического банкротства

Цель данного исследования – выявление факторов, указывающих на возможный преднамеренный характер банкротства и его оценка. В статье авторы проанализировали концепции определений «мошенническое банкротство», «уголовно наказуемое банкротство» и др., его виды и формы, установили их отличительные характеристики. Авторы провели также обзор научной литературы и изучили мнения экспертов для определения показателей мошеннического банкротства. Исследование основывалось на оценках экспертов, связанных с мошенническим банкротством (администраторы несостоятельности, следователи, бухгалтера-академики и судебные бухгалтера), используя метод иерархического анализа (АHP). В результате проведённого исследования эксперты идентифицировали 10 наиболее часто встречающихся показателей, связанных с мошенническим банкротством, и оценили эти показатели. Авторы с помощью симуляционного подхода проверили вероятность появления идентифицированных экспертами показателей в случаях некриминальной неплатежеспособности в контексте трёх внутренних характеристик фирмы (компетентности руководства, организации бухгалтерского учета, внутреннего контроля компании). Результаты эмпирического исследования могут быть применены к построению моделей оценки мошеннического банкротства. Авторы также систематизировали терминологию, связанную с мошенническим банкротством и встречающуюся в законодательных актах различных стран, и выявили общий элемент данного понятия – умышленная нелегальная деятельность или мошенничество. Выявлены по крайней мере три формы мошеннического банкротства: фиктивная, преднамеренная и скрытая. Авторы предлагают также своё определение мошеннического банкротства как преступления «белых воротничков», включающего в себя любые нарушения или трансакции, приведшие фирму к банкротству.

Ключевые слова: мошенническое банкротство, криминология, судебная криминалистика, нефинансовые показатели, метод иерархического анализа.

Introduction

An integral part of any activity aimed at making a profit is its risk component. Initially, the institution of insolvency was created to reduce the possible damage from doing business and protect against the behaviour of counterparties. However, the report of the Insolvency Control Service of the Republic of Latvia (2018) shows that only 31% of secured creditors were able to recover their claims in 590 insolvency proceedings notified in 2017. The percentage of recovered claims of unsecured creditors is much less – only 4%. Out of the mentioned persons 61% did not have any assets for debt return, and the bankruptcy would be the intended solution for such proceedings.

While all bankruptcy cases cannot be considered wrong, many aspects may be viewed as morally questionable: abuse of credit; living beyond one's means; failure to manage one's personal finances or business (Wickowski 2007). Dishonest participation in the bankruptcy system undermines its central aims – distribution of debtor's estate to his creditors and debtor's relief to have a fresh start financially. Under modern conditions, the term “bankruptcy” is increasingly associated with such social and negative phenomena as fraud, raider seizures, etc.

Questionnaire organised by the Latvian Chamber of Commerce and Industry highlights that 74% of the surveyed persons have encountered insolvency abuse, 77% of victims of abuse reported that there were no negative legal consequences for the

abusers (Deloitte 2016). Statistics on crime investigation into insolvency are not encouraging in Latvia.

According to statistics released by the Ministry of Interior of the Republic of Latvia, only three criminal proceedings of fraudulent bankruptcy were initiated in 2016 and nine – in 2015. Out of the proceedings, which were initiated in the previous period, thirteen were terminated in 2016 and eighteen proceedings – in 2015. The termination causes of proceedings are the following: no crime was detected in eight proceedings in 2016 and eleven in 2015; the prosecution period expired in six proceedings in 2016 and seven in 2015 (Rozenbergs 2017). Based on the data of the Court Administration, there were no convicted persons for such crimes in the period of 2017–2016 in Latvia, only one person was convicted in 2015, two persons – in 2014, and one person in 2013, etc. (Court Administration 2017).

Investigation of fraudulent bankruptcy and other economic crimes differs from other types of offenses. The gist of economic crime or “white-collar crime”, as it was named by Edwin H. Sutherland in 1940, is related to a set of illegal actions performed by persons with high social status and position (Kipena, Vilks 2004). In cases of economic crime, a perpetrator is often known, but the investigators must disclose the content of the crime. It is very important to determine the economic beneficiary from fraudulent bankruptcy because this person is usually the perpetrator (Lavikkala 2000).

The aim of the study is to identify the fraudulent bankruptcy indicators and to check the possibility of their appearance in non-criminal insolvency cases. The authors reveal the social and other non-financial characteristics as causes of inducement leading to offenses. The authors use the method of analytic hierarchy process to demonstrate the significance of non-financial components of fraudulent bankruptcy.

The paper is structured as follows: Section 1 provides the definition of fraudulent bankruptcy and distinguishes its main forms; Section 2 demonstrates the architecture of fraudulent bankruptcy mechanism and describes the non-financial indicators that characterise fraudulent bankruptcy based on literature review; Section 3 reports on the research methodology to prioritize the indicators of fraudulent bankruptcy and to reveal the possibility of their appearance in the non-criminal insolvency cases; the concluding section presents the results of the research.

1. Definition and forms of fraudulent bankruptcy

According to the Criminal Law of the Republic of Latvia (Section 213, Part 2), intentional driving into insolvency or “fraudulent bankruptcy”/ “bankruptcy fraud” / “criminal bankruptcy”, as a crime of this kind called in other sources of literature, refers to economic crimes (Saeima 1998).

One of the signs of financial relations is the redistribution of funds, which also takes place in the fraudulent bankruptcy cases (Lvova 2006). It means that fraudulent bankruptcy is substantially related to economic activities, and the main methods for detection of such crime must contain economic approaches.

In turn, economic activities are the tools to perform the commercial activity for the purposes of gaining of profit in legal activity, following the Commercial Law (Saeima 2000). In general, the result of fraudulent bankruptcy is a substantial harm

to other persons' interests (Saeima 1998); the fraudulent bankruptcy initiators' purpose is to gain income by violating the rights of others (Lvova 2006); synonyms of word "intentional" are "purposely", "wilful", "deliberate" (Latvian Academy of Sciences 2018). Thus, fraudulent bankruptcy is an element of the illegal economic, which highlights high social danger of this phenomenon (Lvova 2006).

Fraudulent bankruptcy is classified as a "white-collar crime", in which, as many believe, physical violence is not applied. However, the study of Brody and Kiehl (2010) shows, that being afraid of disclosure of the crime and loss of social status, own reputation and recognition of the family, such fraudsters are even capable of murder, introducing the term "red-collar crime" and emphasising the danger of these offences.

There is no definition "fraudulent bankruptcy" in the Latvian legislation; however, the term "criminal bankruptcy" is defined in the Credit Institution Law. The definition of fraudulent bankruptcy is provided in the Lithuanian legislation.

According to the Latvian legislation, *criminal bankruptcy* is "the bringing of a credit institution into insolvency or bankruptcy, if the reason thereof is intentional action or neglect, and if it has caused substantial harm to the rights and interests of another natural or legal person, which are protected by the law, and if it has been established by a judgment of a court" (Saeima 1995).

In the Lithuanian legislation, *fraudulent bankruptcy* means "the company's being prosecuted by deliberately poorly managing the company (operation, omission) and / or concluding transactions when it was known or should have been aware that their creation violates the rights and / or legitimate interests of creditors" (Seimas 2001).

According to the Estonian law, *act with criminal elements* is one of possible insolvency causes, which must be determined by the interim trustee (Riigikogu 2003).

The term "fraudulent bankruptcy" is mentioned in insolvency legislation of the USA, Italy, France, Austria, Romania and Greece; phrases "bankrupt committing a fraud", "bankrupt has acted fraudulently" are mentioned in Gibraltar's and Malta's laws of insolvency (Government Printing Office 2006; European e-Justice Portal 2017).

In the United States Code, *bankruptcy fraud* is "a scheme or artifice to defraud and for the purpose of executing or concealing", related with bankruptcy proceeding (Government Printing Office 2006). The general categories of bankruptcy crimes are as follows (Government Printing Office 2006; Clement 2015):

- *Concealment of assets*, when a debtor seeks to avoid forfeiture of certain assets, and knowingly and fraudulently conceals these from creditors. It also means to prevent the discovery of the asset or to withhold knowledge of the asset.
- *False oath or account* encompasses intentionally filing false or incomplete forms with respect to a material matter in relation to any bankruptcy case.
- *Bribery and extortion*, when a person knowingly and fraudulently gives, offers, receives, or attempts to obtain any money or property, remuneration, reward, or promise thereof for acting or forbearing to act in any bankruptcy case.

In the legislation of the Russian Federation, Republic of Belarus and Ukraine, the fraudulent bankruptcy is divided into forms: fictitious, intentional and hidden (State Duma of the Russian Federation 1996; House of Representatives of the National Assembly of the Republic of Belarus 1999; Verhovna Rada of Ukraine 2001):

- *Fictitious bankruptcy* is determined when the debtor objectively and informally has a real opportunity to satisfy all the claims of creditors, but instead, the debtor himself or another person on behalf of the debtor appeals to the court with an application for declaring the bankrupt. There is no real bankruptcy, it is fictitious.
- *Intentional bankruptcy* is an intentional creation or increase in insolvency committed in the personal interests or in the interests of other persons and caused damage in large amount.
- *Hidden bankruptcy* is a deliberate concealment of the fact of persistent financial insolvency through the submission of false data if it caused material losses.

Despite the fact that bankruptcy is not divided into forms in the USA, there is a lot of literature, which describes the special schemes of fraudulent bankruptcy, which distantly resembles the definitions of hidden and intentional bankruptcy (Cruz 2013):

Bustout schemes – “bust out” of the business by filing for bankruptcy, involve establishing a favourable credit rating by false financial statements vastly overstating the business assets and net worth.

Bleedout schemes, when a company’s assets are shifted to insiders; hence, the “bleeding” of failing corporations is caused by the detrimental transactions. They may also be the payments not related to the company.

Literature review shows that there are many different definitions and forms of fraudulent bankruptcy, which the authors combine in one in the article. Thus, in the authors’ opinion, *fraudulent bankruptcy* is a white-collar crime, which contains any type of offences and detrimental transactions, which result in company’s bankruptcy.

2. The architecture of fraudulent bankruptcy mechanism

In general, all methodologies of fraudulent bankruptcy valuation show a common trait, that there are two stages of this crime detection: the first one is the insolvency valuation based on the financial analysis methods; the second one is the determination of fraud transactions for the purpose to evaluate their relationship with bankruptcy.

According to the studies performed by Lvova (2006) and Nabeeva (2017), the second stage of fraudulent bankruptcy detection consists of three modules: the scheme (mechanism) of intentional activities leading to company’s bankruptcy; the financial mechanism of economic activities leading to company’s bankruptcy; the scheme of actions related to company’s bankruptcy – withdrawal of company’s assets. Thus, in economists’ opinion, the problem of identification of intentional activities for fraudulent bankruptcy detection is complex and multilevel.

According to the guidelines to investigators by the Latvian Police Academy, successful detection of economic crimes is not possible without examining disclosed schemes and outlines of such offenses (Lavikkala 2000). Such schemes are published in editions of White-Collar Crime, the first of which was published by E.H. Sutherland in 1949 (Salinger 2013); in the Guide to Forensic Accounting Investigation, first published in 2005 (Golden et al. 2006); in the annual Report to the Nations on Occupational Fraud and Abuse, which has been published by the Association of Certified Fraud Examiners (2018) since 1996. The importance of systemic crime investigation, combining the

causes and circumstances, economic and social aspects is demonstrated in the books of criminology (Kipena, Vilks 2004). Thus, the criminalists' and criminologists' opinion about the complex and systemic approaches necessary for fraudulent bankruptcy detection is the same as the economists' opinion.

The problems of fraudulent bankruptcy are characteristic not only of business or crime investigation, but also of science. For example, aspects of scientific fraud and model of its valuation are presented in the research by Leistedt and Linkowski (2016). The Belgium researchers describe the two-dimensional bio-psychosocial integrative model of scientific fraud as follows:

$$M = (F_p, F_n); F_p = (f_1, f_2, f_3); F_n = (f_4, f_5), \quad (1)$$

where F_p – the level of personal skills (micro-level):

f_1 – personality organisation;

f_2 – social competence;

F_n – the level of network skills (macro-level):

f_3 – the triangle of fraud;

f_4 – social network organisation;

f_5 – social engineering.

The key to understanding and controlling fraud within this model is to study both the individuals and the environment in which they work.

Multi-component model, interrelated with all the others at three levels (business and industry sector level, the company's level and financial statement level), is presented in the research by Grundiene (2014). The Lithuanian researcher offers to determine fraud in the financial statements, by establishing the relationship of the fraud components and applying the method of SOM neural networks. The general components of the model are as follows:

- object: action (misrepresentation), inaction (inactivity);
- features: key features (influence on the financial statements to deceive), common features (false financial information affecting user's decision);
- fraud elements: fraud in accounting policy, fraud in accounting process, fraud in the corporate management process.

Relationship between the company's finances, management and fraud is demonstrated in Mohamed and Handley-Schachelor's (2014) research, where the group of interviewees (management, forensic accountant, auditor, etc.) recognised, that the effective corporate governance, management's honesty and integrity were the important components for prevention of financial statement fraud risk in Malaysian companies.

The so-called triangle of fraud, which consists of three components – pressure, opportunity and rationalization (Leistedt, Linkowski 2016), is used in many countries in all spheres related to fraud detection, such as forensic accounting, criminology, etc. It is a general model for explaining the factors that cause someone to commit occupational fraud (Association of Certified Fraud Examiners 2018).

The studies disclosed the relationship of fraudsters' personal characteristics in the cases of fraudulent bankruptcy. In criminologists' opinion, in general, such a fraudster is a 36–45-year-old male, who has obtained a degree in natural sciences, has a high social

status, is married and has children (Association of Certified Fraud Examiners 2018; Pivovarova 2009). Some studies link financial crimes even with the nature of an offender, believing that the offender has signs of “narcissism” and the authoritarian nature of management (Leistedt, Linkowski 2016). Therefore, Vousinas (2018) describes the supplemented model of fraud triangle with one more component – the ego of the fraudster.

The complex analysis methodology for forecasting economic bankruptcy is shown in Mackevicius, Shneiderė and Tamuleviciene’s (2018) research, where Lithuanian and Latvian economists emphasise the great influence of external and internal environmental factors on a company’s financial status. Among the internal factors the authors mention a company’s organisational management structure, managers’ philosophy, leadership style, personnel management policy, accounting and control system (Mackevicius et al. 2018).

Incontestable influence of indicators, which are not recorded in the accounting, such as conflict at management’s high level, overly fragmentation of functions or conversely, etc. (Suglovov, Chernov 2015), is a serious problem of forensic accounting.

Empirical verification of correct classification by groups of methods of statistical analysis of bankruptcy (Models of Linear Discriminant Analysis (LDA), Models of Logistic Regression – Logit, Classification and Regression Trees (C&RT)) from the point of view of their effectiveness shows that such methods can be characterised by high quality of bankruptcy forecasting. For example, 28 financial indicators were used in the research conducted by Brozyna et al. (2016).

The studies of Chen (2014), Plat-Chmielewska and Matuszyk (2018) demonstrate the trend to include also non-financial indicators in the group of important factors to predict the companies’ bankruptcy. For example, Chen (2014) used 33 financial ratios, 4 non-financial indicators and 1 combined macroeconomic indicator. Many studies reveal that qualitative factors are important for the timely prediction of bankruptcy, especially in the case of small and medium-sized enterprises, which account for 99% in the EU. Therefore, Ptak-Chmielewska and Matuszyk (2018), applying the method of intellectual analysis in an integrated approach, included non-financial indicators along with 16 financial indicators, such as the company’s legal form, number of employees, sector, region, and age of the company. The authors used an LDA, Logit and C&RT to investigate the probability of bankruptcy of small and medium-sized Polish enterprises, and the most important financial ratio was capital ratio (equity/total liability). Using an LDA and C&RT, important variables were share of net financial surplus in total liabilities and legal form. Using a decision tree, important non-financial indicators were the age of the company and the number of employees.

Insolvency as a complex economic phenomenon has an internal and external form. The internal form of insolvency of the enterprise is manifested in the inefficiency of business, the external form – in its inability to pay. Any change in the external form is derived from changes in internal content. Lukason and Hoffman (2014) researched the impact of an individual cause (internal or external nature) and some causes (of any kind) on the probability of bankruptcy. The research was conducted by cases of 70 Estonian manufacturing firms (SMEs) that failed between 2002 and 2009. The authors identified 33 causes of internal nature and 23 causes of external nature. Companies’ bankruptcy was valued, using the two Logit models, developed by Ohlson

(1980) and Grunberg and Lukason (2014), with the lag of the study for 2 years. Essential conclusions of this study: the companies that failed by one cause (which are either internal or external for the company) show a slight change in the bankruptcy estimates for the models during the year before the announcement of bankruptcy. In contrast, companies experiencing multiple internal causes have significantly greater changes in their assessment of bankruptcy during the year before bankruptcy, and the average score indicates a very high risk of bankruptcy. This study can serve as a basis for experimental research of the presence or absence of fraudulent bankruptcy based on the application of models of bankruptcy valuation over a period $t-3$ before submitting material for establishing insolvency / bankruptcy status.

In general, all researchers agree that methods for determining the possibility of bankruptcy and its valuation vary depending on the general company's metrics, which conditionally can be named *company's external characteristics*: company's industry, its regional location, legal form and company's size comparing with its assets.

The most important *company's internal characteristics*, which are mentioned as causes of company bankruptcy, are the following:

- Form of business. According to Wilson et al. (2013), the number of bankruptcies is less and levels of debt, if the business is family-owned.
- Company's age and experience. Causes of companies' bankruptcy from one to two years are related to incompetent management rather than fraudulent management, comparing with companies that were established more than three years ago (Pervan, Kuvak 2013; Altman et al. 2015 etc.).
- Management competence, which is characterised in different ways – education, experience, etc. (Wilson et al. 2013; Mackevicius et al. 2018 etc.).
- Organisation policy, which can be characterised by payment behaviour, accounting quality, etc. (Rozenbaha 2017 etc.).

There are a lot of studies that reveal a significant difference in the *reasons* (features, pressure) of bankruptcy:

- “Extrajudicial debt restructuring” or “company duplication” that is characteristic of small-size companies, which cannot or do not want to go through the legal insolvency proceeding and simply take out assets in another company. Another name of this situation is the Phoenix syndrome (Rotem 2011; 2013).
- Internal conflict between shareholders or board (Suglobov, Chernov 2015). The least number of bankruptcies occur in companies where the founders are not the members of the board (Purves et al. 2015).

There is an opinion that management is not well remunerated, but management's salary is not the main cause of bankruptcy. In turn, Altman et al. (2015) indicate, that frequent change in management is one of the causes of bankruptcy, according to a study conducted by Keasey and Watson (1991).

In general, all *abnormal rapid changes* are the main “red flags” for fraud detection, such as illogical payments, reduction of employees, change in the board, auditor, etc.

According to the fraud triangle and forensic theory, one of important components of crime investigation is establishing an *opportunity*, i.e., the lack of control and / or management incompetence in all financial fraud cases.

Reviewing the main components of fraud triangle and forensic theory, it is worth mentioning *rationalization*, which in fraud cases is characterised by:

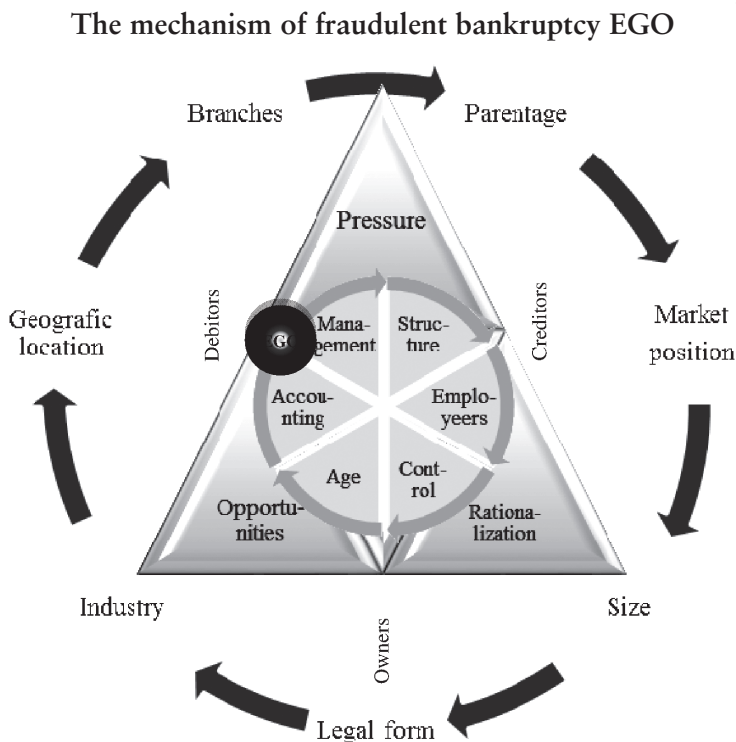
- Fraudster personality, which has already been mentioned above in the present article. The behavioural consistency theory (the concept that individuals demonstrate consistent behaviours across various situations) reveals a robust positive economic relationship between corporate and management personal leverage (Purves et al. 2015).
- Crime income or impunity of crime committing, which is a more important component of Becker model (1974) about the fraudsters' rational (economic) approach to crime.

The last component of the forensic theory is *fraud action*. Many activities related to fraudulent bankruptcy are mentioned in the legislation, specified in the guidelines and identified in the scientific studies, but each of them is not obligatory a crime:

- Activities aimed at the company's bankruptcy, such as debt cession, etc.
- Activities related to the company's bankruptcy, such as withdrawal of assets, etc. (Zager et al. 2016).

Based on the literature review, the authors present the mechanism of fraudulent bankruptcy (see Figure 1).

Figure 1



Source: created by the authors.

3. Method of the research

The empirical research was based on the opinions of the experts related to the fraudulent bankruptcy. To collect information on the main factors of fraudulent bankruptcy, a survey of expert group was conducted. To create an expert group, specialists of our types of profession participated in completing the questionnaire: insolvency administrators, investigators, forensic accountants and academics of accountancy.

The size of simple random sampling needs to be clarified by formula (Shulca 2010):

$$n = \frac{t^2 N v (1 - v)}{t^2 v (1 - v) + \Delta_v^2 N}, \quad (2)$$

where n – sampling size;

N – general number of respondents;

t – ratio of likelihood, 1.0 (with likelihood of 0.683);

v – relative frequency in the sampling, 0.5;

Δ_v – relative error, 0.317 (with likelihood of 0.683).

The focus group of experts was created by evaluating experts' competence concerning their knowledge level and experience in the case of fraudulent bankruptcy. The respondents marked how often they encountered circumstances indicating fraudulent bankruptcy. The main assessment parameters were their education level (higher education), work experience (not less than 3 years) and experience in the case of fraudulent bankruptcy (no less of one case). Consequently, the first part of the questionnaire consisted of some basic information about the experts.

The second part of the questionnaire consisted of questions about indicators of fraudulent bankruptcy, which experts detected themselves or were known to them from their practice. The experts were asked to select the ten most important indicators from 34 offered by them and evaluate the indicators. Measuring instrument for indicator assessment was a 10-point scale, simplified for respondents' perception. According to the 10-point scale from 1 to 10 (where 1 means low key, and 10 – high key), the experts evaluated the indicator importance in the assessment of fraudulent bankruptcy.

The average experts' estimation of indicators was calculated and rated. The calculated quantitative differences of ratings were scored from 1 to 9 using the Saaty scale (see Table 1) (Saaty 2008).

At the next stage of empirical research, the weights of each indicator of fraudulent bankruptcy were calculated, using the method of analytic hierarchy process. Accuracy of results is characterized by consistency ratio (CR), which must be less or equal to 0.1 (Saaty 2008; Mu, Carroll 2016). The mathematical calculations were created using Excel and Online Matrix Calculator "Bluebit" (Bluedit Software 2002) tools.

Table 1

The fundamental scale of absolute numbers

Intensity of importance	Definition	Explanation
1	Equal importance	Two activities contribute equally to the objective
2	Weak or slight	
3	Moderate importance	Experience and judgement slightly favour one activity over another
4	Moderate plus	
5	Strong importance	Experience and judgement strongly favour one activity over another
6	Strong plus	
7	Very strong or demonstrated importance	An activity is favoured very strongly over another; its dominance is demonstrated in practice
8	Very, very strong	
9	Extreme importance	The evidence favouring one activity over another is of the highest possible order of affirmation

Source: Saaty 2008.

The authors' evaluation of the possible appearance of fraudulent bankruptcy indicators in non-criminal insolvency was based on Mu and Carroll's (2016) study about development of a decision model for prioritizing potential fraud cases.

Table 2

Simulated cases of company's three internal characteristics

Case No	C1	C2	C3	C4	C5	C6	C7	C8	C9
Management incompetence	H 0	H 0	H 0	H 0	M 0.5	M 0.5	L 1	L 1	M 0.5
Accounting incompetence	H 0	M 0.5	L 1	M 0.5	M 0.5	M 0.5	M 0.5	M 0.5	H 0
Insufficient internal control	H 0	L 1	H 0	M 0.5	M 0.5	L 1	M 0.5	L 1	H 0

Source: created by the authors.

The authors simulated nine cases of most popular situations of three aspects, which are mentioned as causes of bankruptcy in all criminal cases: management incompetence, accounting incompetence and insufficient internal control. All aspects are company's internal characteristics; these were evaluated by the authors' created scale (see Table 2):

- 1 – a low level of competence (L);
- 0.5 – a medium level (M);
- 0 – a high level (H).

Using the AHP method, the assessment of preference of these three aspects was conducted by the authors of the article and their colleagues.

The possibility of appearance of the indicated factors in non-criminal insolvency was simulated by the authors and evaluated using the scale created by Mu and Carroll (2016): 1 – very possible, 0.6 – medium possible, 0.2 – unlikely possible (see Table 3).

Table 3

Appearance of fraudulent bankruptcy indicators in non-criminal insolvency

No	Indicators of fraudulent bankruptcy	Management incompetence	Accounting incompetence	Insufficient control
1	Fictitious deals	0.2	0.6	–
2	Owners start a new business	–	0.2	–
3	Inappropriate assets revaluation	0.2	0.2	–
4	Account records not saved	–	1.0	0.2
5	Rapid rise in creditors	0.6	0.2	1.0
6	Sharp decline in long-term funds	0.2	–	–
7	Management or owner loans	0.6	0.2	–
8	Dependence on the key creditor	0.6	–	0.2
9	Bad bargain with related persons	0.6	0.2	–
10	Rapid stock decline	0.2	0.2	1.0

Source: created by the authors, based on Mu, Carroll 2016.

The final results – the verbal possibility of appearance of fraudulent indicators in non-criminal insolvency under influence of three internal aspects – were received using AHP (Saaty 2008; Mu, Carroll 2016). Consistency ratio and other mathematical calculations were performed using Excel and Online Matrix Calculator “Bluebit” (Bluebit Software 2002) tools.

4. Results of the research

During the time of the survey (June – August 2018) 24 questionnaires were completed. The following persons agreed to participate in the survey: 5 insolvency administrators, 7 criminal bankruptcy investigators, 7 forensic accountants and 5 academics of accountancy.

One questionnaire was incomplete because it had identical answers with other questionnaires received from the same group of experts (investigators). Some of the respondents did not meet the criteria of expert’s level and their answers could not testify indicators of fraudulent bankruptcy.

Therefore, the final number of processed questionnaires filled by recognised experts was 13.

Representation group evaluation by formula 2 showed that the number of respondents with likelihood of 0.683 was enough. The number of respondents must be increased to gain higher likelihood (see Table 4).

Table 4

Characteristics of respondent groups

Group of respondents	General number of group	Scientific sampling size	Survey participants	Recognised experts
Insolvency administrators	255	3	5	3
Investigators \leq 10	2	7	2	
Forensic accountants	9	2	7	6
Academics of accountancy	\leq 10	2	5	2

Source: created by the authors based on Shulca 2010.

On the basis of the recognised experts' opinion, the 10 most often encountered indicators in fraudulent bankruptcy cases were identified. Non-financial indicators were also marked: "account records not saved", "owners start a new business", etc.

Based on the consistency ratio (NR) 0.0%, there is consistency in experts' opinions (see Table 5).

Table 5

The experts' indicators of fraudulent bankruptcy and their weights by AHP

No	Experts' selected indicators	Experts' selected indicators, CR=0.0%										Weights %
		1	2	3	4	5	6	7	8	9	10	
1	Fictitious deals	1	2	6	3	5	2	3	7	1	8	20.4
2	Owners start a new business	1/2	1	5	2	4	1	2	6	1/2	7	14.2
3	Inappropriate assets revaluation	1/6	1/5	1	1/3	1/2	1/4	1/3	2	1/6	3	3.8
4	Account records not saved	1/3	1/2	3	1	2	1/2	1/2	4	1/4	5	7.7
5	Rapid rise in creditors	1/5	1/4	2	1/2	1	1/3	1/2	2	1/5	2	4.8
6	Sharp decline in long-term funds	1/2	1	4	2	3	1	2	6	1/2	7	13.5
7	Management or owner loans	1/3	1/2	3	2	2	1/2	1	4	1/3	6	9.3
8	Dependence on the key creditor	1/7	1/6	1/2	1/4	1/2	1/6	1/4	1	1/8	2	2.7
9	Bad bargain with related persons	1	2	6	4	5	2	3	8	1	9	21.5
10	Rapid stock decline	1/8	1/7	1/3	1/5	1/2	1/7	1/6	1/2	1/9	1	2.0

Source: created by the authors.

The assessment of preference of company's three internal characteristics using AHP shows the next priorities: the efficiency of management (47.4% of three components) is the most important component of successful business, which is followed by accounting quality (37.6%) and sufficiency of internal control (14.9%). Consistency ratio 0.0% means the evaluators' consistency in assessment.

Using the experts' estimations of fraudulent bankruptcy indicators as weights, the nine simulated cases were reviewed to determine the possibility of appearance of indicated factors in non-criminal insolvency.

The results of research testify the low probability (less than 2%) of fraudulent bankruptcy indicators appearing in non-criminal insolvency cases, considering the influence of the most important company's internal components: quality of management, accounting and internal control (see Table 6).

Table 6

**Priority of fraudulent bankruptcy indicators appearing
in non-criminal insolvency**

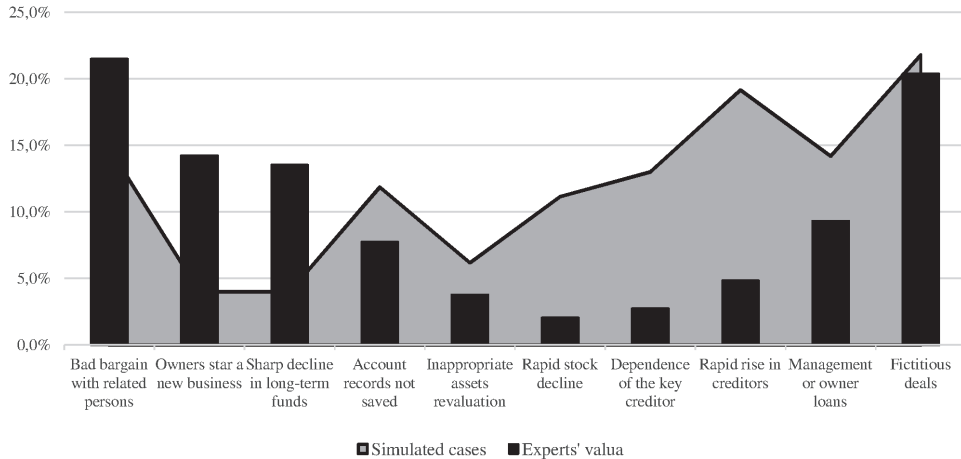
Indicators / Cases	C1	C2	C3	C4	C5	C6	C7	C8	C9
<i>Totals (Priorities)</i>	0	0.006	0.011	0.006	0.012	0.012	0.018	0.019	0.006
Fictitious deals	0	0.010	0.019	0.010	0.033	0.033	0.056	0.056	0.023
Owners start a new business	0	0.007	0.013	0.007	0.007	0.007	0.007	0.007	0.000
Inappropriate assets revaluation	0	0.002	0.004	0.002	0.003	0.003	0.005	0.005	0.001
Account records not saved	0	0.002	0.000	0.001	0.016	0.017	0.030	0.031	0.015
Rapid rise in creditors	0	0.014	0.014	0.010	0.012	0.016	0.014	0.018	0.002
Sharp decline in long-term funds	0	0.006	0.013	0.006	0.006	0.006	0.006	0.006	0.000
Management or owner loans	0	0.013	0.026	0.013	0.017	0.017	0.020	0.020	0.004
Dependence of the key creditor	0	0.005	0.008	0.004	0.004	0.005	0.004	0.005	0.000
Bad bargain with related persons	0	0.010	0.020	0.010	0.018	0.018	0.026	0.026	0.008
Rapid stock decline	0	0.004	0.002	0.002	0.003	0.005	0.004	0.006	0.001

Source: created by the authors.

In addition to the main aim of the research, the authors discovered the partly inverse correlation between the indicators appearing in the non-criminal insolvency cases and experts' estimation of indicators of fraudulent bankruptcy (see Figure 2).

Figure 2

Comparison of indicators in fraudulent and non-criminal bankruptcy cases



Source: created by the authors.

It means that all insolvency cases are not a crime. There are also some specific indicators, which are more characteristic of fraudulent bankruptcy cases, for example, “bad bargain with related persons”, “owners start a new business”, and “sharp decline in long-term funds”. However, such indicators as a “rapid rise in creditors”, “rapid stock decline”, etc. are more typical of non-criminal insolvency cases. Such indicators as “account records not saved” and “fictitious deals” are possible in both cases (see Figure 2).

Conclusions

The research contributes to the study of fraudulent bankruptcy from the standpoint of systematization of its essential characteristics generalized on the basis of literature data, and those studied by empirical research.

The authors summarized the terminology of fraudulent bankruptcy in different countries' law and identified a common concept – deliberate illegal activity or fraud. At least three forms of fraudulent bankruptcy were established: fictitious, intentional and hidden. The authors propose own definition – fraudulent bankruptcy is a white-collar crime, which contains any type of offences and detrimental transactions, which result in company's bankruptcy.

According to the researches on the multi-level nature of fraudulent bankruptcy and its connection with personal characteristics of fraudsters, this type of crime has been studied as a system. The concepts of fraudulent bankruptcy as a set of non-financial features, including social-personal and some criminology aspects, were analysed. The article presented a fraudulent bankruptcy mechanism, including components of the fraud triangle, external and internal characteristics of the company.

An empirical study was conducted by authors, based on 13 expert assessment of the importance of indicators of fraudulent bankruptcy. Experts identified the 10 most popular indicators related to fraud bankruptcy cases and evaluated these indicators using the analytic hierarchy process, i.e. AHP method. The authors tested the possibility of the appearance of these indicators in non-criminal insolvency cases in various conditions of three internal characteristics of the company using the simulation approach.

The conducted research has not revealed a close connection among the influence of quality management, organisation of accounting and internal control of the company. Out of the 10 indicators analysed, the significance assessment between the “fictitious deals”, “account records not saved”, etc. essentially does not differ both in the evaluation of bankruptcy and in the fraudulent bankruptcy of a company. There are some specific indicators that are more characteristic of fraudulent bankruptcy cases, for example, “bad bargain with related persons”, “owners start a new business”, and “sharp decline in long-term funds”. The priorities of fraudulent indicators of bankruptcy arising from insolvency have a low value of their manifestation. Summing up, the obtained results confirm the influence of personal factors on fraudulent bankruptcy.

The identification of various forms of fraudulent bankruptcy, the influence of social-personal factors on the multi-level architecture of this crime emphasizes gaps in studding of these sections. The results of the empirical research and other findings can be applied to the construction of models for fraudulent bankruptcy evaluation.

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