Modeling the contribution and benefits of company stakeholders

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Abstract. The article reviews the theory and methodology and searches for relevant tools for modeling stakeholder contribution and benefits. The methodological framework comprises the stakeholder approach, the concept of sustainable growth and shared values. The study presents two econometric models of stakeholder value contribution and a mathematical model of stakeholder benefits. The models are built on panel data of several Russian banks. The authors look upon banks as constituents of the financial infrastructure essential for the existence of integrated business structures. Our findings show that the most appropriate proxy indicator for modeling monetary stakeholder value is sales revenue. We conclude that, for practical use, it is necessary to explore the relationships between different models and possible ways of their integration and develop a methodology for their evaluation and comparison. Further research should be related to the choice of factors affecting the model, the validity of the choice, the analysis of the regression model in order to infer the stakeholder contribution. To achieve technological breakthroughs, it is important to study value assessment procedures for stakeholders in the conditions of innovative and technological transformation of new forms of business organization, including network-based models, smart industries and ecosystems.

Keywords: corporate governance; stakeholder approach; stakeholder value; econometric modeling; stakeholder contribution; stakeholder benefits; stakeholder relations.

INTRODUCTION

Despite the fact that the stakeholder approach has long been recognized as a management tool, it is still underdeveloped in terms of methodology and usage. Methodological and applied difficulties arise when an attempt is made to establish a powerful method for creating stakeholder value. Nevertheless, although the experience of empirical substantiation of how stakeholder value can be measured is still relatively limited, this theory generates considerable research interest. Such aspects as stakeholder partnership and interaction between stakeholders based on defined value would offer new perspectives for research and management. The relevance of the problem is connected with the translation of the stakeholder approach into the field of corporate governance (CG) and the emergence of a new paradigm of relations between business, society and the state, where corporate value is created for the benefit of not only the business owners and management, but also a wide range of internal and external stakeholders.

The first step in defining stakeholder value is to identify the most significant groups of stakeholders; analyze the prerequisites of their partnership, or integration; identify interests of different groups; evaluate stakeholders' contribution to the creation of firm value and, finally, calculate the type of payment that can be offered to cover the input of each stakeholder group. At the same time,

we should take into account that the stakeholder model should target the creation of value for stakeholders and the balance of their multiple interests. Stakeholder value is understood as value co-created for numerous actors and stakeholders, for a network of stakeholders [Agrawal, Kaushik, Rahmanc, 2015; Hein et al., 2017]. Maximizing shareholder value should not be treated as the only measurement factor of company performance: it should be evaluated by the total expanded value for multiple stakeholders involved in co-creation of value. The measurement of stakeholder value creation helps to determine the relative importance of the contribution of each stakeholder group. However, this concept remains unclear and requires criteria to judge its performance, both financial and non-financial.

The relevance of the topic is aggravated by the apparent contradiction between numerous debates and research literature on the issues of stakeholder interest considerations and a marked lack of assessment tools. Both researchers and business practitioners are facing a number of questions related to methodology and application of the theory of stakeholders and the assessment of stakeholder value, e.g. How to maximize stakeholder value if, by increasing the value for some stakeholders, we risk to deprive others of their share, thus neglecting their interests? How do individual stakeholders create the

company value, and what reward do they receive? How to measure the created value?

In most recent studies researchers have proposed various techniques of assessing stakeholder value: monetary and non-monetary methods of evaluation; methods of assessing the contribution of stakeholders through questionnaires, interviews, expert assessments, econometric analysis, multiple regression models and others. The purpose of the paper is to review the theory and methodology of stakeholder value assessment, and search for relevant tools for modeling stakeholder value, contribution and benefits using econometric models built on panel data of the Russian banking sector.

LITERATURE REVIEW

The research in the field of measuring stakeholder value creation is still at an early stage. In their most recent ground study Tapaninaho and Kujala [2019] stated that the definition of stakeholder value itself and the understanding of how stakeholder value is created vary significantly. Stakeholder studies range from narrow to broad conceptualizations of who creates value, what kind of value is created, and with and for whom it is created. Moreover, along with the "financial" approach to stakeholder value understanding, its definition often considers non-financial values or even extends to social, environmental conditions under which firms are more likely to create ecological value [Sunny et al., 2018].

Brandenburger and Stuart [1996] based their calculation of stakeholder value on the analysis of the value chain suggested by Michael Porter in his book *Competitive Advantage* [1985]. They suggested that stakeholder value might be calculated by the difference between the supplier's willingness to pay and the buyer's opportunity costs.

The importance of measuring the creation of stakeholder value was reported by Figge and Schaltegger [2000]. Shareholder value can be expressed as the cash value of all the surplus funds available in future for distribution to shareholders. The shareholder value approach therefore attempts to determine how much a company is worth as far as the shareholders are concerned. On the other hand, stakeholder value can be interpreted as a value contributed by a specific stakeholder towards helping the firm meet its business goals or enhancing its value.

Harrison and Wicks [2013] argued that stakeholder value is created when each interested party provides resources or influence expecting to receive some material and/or intangible asset in return. The outcome of this situation is an allocation of value from which all of the firm's stakeholders benefit. Mitchell et al. [2015] introduced a theory of value-creation stakeholder accounting, emphasizing the role of stakeholder partnerships. Hall, Millo and Barman [2015] examined the use of social return on investment as an accounting methodology that allows managers to manage and communicate about the

social value created for different stakeholders. In his most recent research Fisher [2018] looked upon the creation of stakeholder value as an organizing principle for the firm's strategic planning, the need to involve the stakeholders in defining what value means to them.

Another narrative concerns understanding the role of various stakeholders in value creation. As an example, Ramírez and Tarziján [2018] considered the distribution of stakeholder values for one group of stakeholders, i.e. employees, and concluded that stakeholder value might increase in response to the impact of exogenous factors (changes in the price of the firm's products), as well as of changes in institutional structures and types of ownership, and quality of management. Eskerod and Ang [2017] viewed the role of various stakeholders from a broader perspective and investigated the role of five specific stakeholder types (i.e. project owners, project members, local businesses and non-profit organizations, local citizens, and the general public). They also acknowledged that different types of stakeholders might relate to different kinds of values.

The issue of stakeholder value can be addressed from a social aspect. Castro-Martinez and Jackson [2017] suggested that the interaction between the firm and its external stakeholders may generate trustworthiness signals which may become factors for creating stakeholder value.

Some researchers have attempted to design instruments for measuring stakeholder value. Apitz et al. [2017] presented the Stakeholder Values Assessment (SVA) tool that was developed to quantitatively address environmental, economic and social costs and benefits based upon diverse stakeholder values. A similar approach aiming to find a balance between interests of different stakeholder groups was suggested by Abrosimova and Sedelnikova [2011]. They presented the evaluation scale which enabled one to identify stakeholders whose interests were most or least satisfied. The total values of the scale then were used to calculate the "balancing" average.

The tools offered to measure stakeholder value vary from the index of stakeholder value impact [Dreyer et al., 2017; Novozhilova, 2017]; and the index of sustainable growth, where the stakeholder contribution was expressed as long-term sustainable company growth, and the index of balanced interests where value was created for strategic stakeholders [Dolmatova, 2013] to a stakeholder value index, which is computed as the proportion of the created economic benefit (financial indicator) to the costs related to building relationships with stakeholders [Ivashkovskaya, 2016] and a multiple regression model which combined monetary valuation of the company and non-monetary valuation of indicators and factors of stakeholder value creation, which showed how satisfied (or dissatisfied) were stakeholders with their interaction with the company [Samokhina, 2014; Efimova, 2013; Efimova, Samokhina, 2014]. The value of the company showed its utility for the stakeholders and resulted from

synergy of resources and benefits of economic and non-economic nature [Kharin, Gareev, 2014; Tkachenko, 2017].

On the basis of the assumption that stakeholders have a financial value to the firm that can and should be accounted for through the firm's financial reporting system, Carlon and Downs [2014] proposed a three-step "stakeholder valuing" process which started with codifying the firm's identity as a stakeholder entity, moved to assessing stakeholder value consistent with that identity, and concluded with accounting for and reporting that value.

Based on the value-creation perspective, Tantalo and Priem [2016] made an attempt to integrate business strategy, stakeholder theory and essential stakeholders' multi-attribute utility functions. They developed the stakeholder synergies theory showing how top managers can create new versatile value for several essential stakeholder groups simultaneously, thereby increasing the size of the utility "pie" for those system members.

A thread of literature addresses the question of how stakeholder value is created in cooperative relationships. Some studies provide managers with ideas on how to conceive value creation through stakeholder networks [Schneider, Sachs, 2015; Hein et al., 2017]. Firm-stakeholder relationships are examined from the managerial or organizational perspective, as well as through understanding the accrued effects of the networks in which firms participate. In stakeholder value networks, economic and social exchanges are represented by value flows between stakeholders. Sease et al. [2018] propose a tool to visualize the data created during the stakeholder value network analysis and to model stakeholder and their value exchanges.

While most studies focus on monetary approaches to assessing stakeholder value, some authors challenge non-monetary and integrated approaches. Neto et al. [2018] study how value judgments of stakeholders will affect decision-making on the incorporation of new health technologies when budgetary resources are limited. Lankoski, Smith and Van Wassenhove [2016] suggested that stakeholders judge the value created or destroyed by firms not in absolute but in relative terms – as losses and gains against a reference state that might differ across stakeholders and change over time, and where losses weigh more heavily than equally sized gains. The authors highlight direct managerial relevance of understanding stakeholder judgments of value, since it is managers who make decisions about how to allocate resources and this affects the value that stakeholders receive.

There were made attempts to focus on modeling stakeholder value. Fernández-Guadaño and Sarria-Pedroza [2018] aimed to discover whether the development of corporate social responsibility (CSR) generated value for certain stakeholders. They calculated value added as: Value Added = Financial year result + Corporation Tax + Personnel Expenses + Depreciation Charges + Financial Expenses and so on. The results showed that CSR had a negative influence on the distribution of value in favor of employees as primary stakeholder; a positive influence on the state as secondary stakeholder and had no influence on other stakeholders.

The reviewed research allows us to conclude that, to date, the issues of stakeholder value creation and stakeholder value assessment have been approached from many different perspectives, including financial, non-financial and integrated ones.

RESEARCH METHOD

Sampling

The sample comprises 11 medium-sized banks which represents 2.2 % of a universe composed of 447 operative banking institutions in Russia as of the first half of 2019. The banks are comparable in terms of assets and represent 2.97 % of the banking sector's total assets (Fig. 1). In total, the sample panel consists of 83 observations between 2010 and 2017 (Table 1).
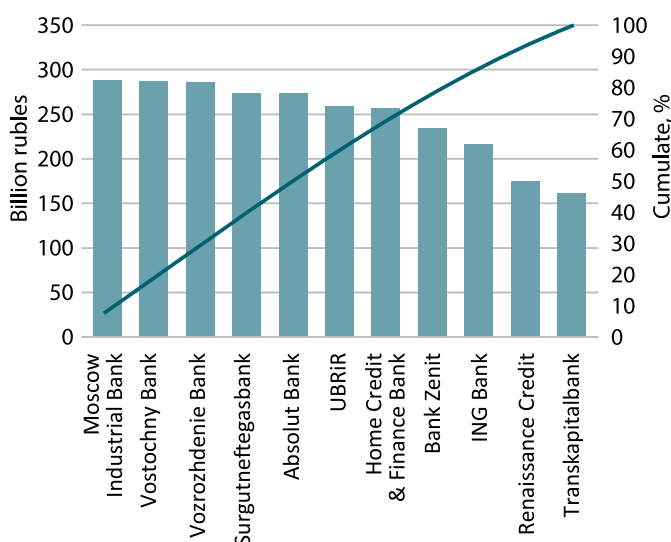

Fig. 1. Sample of banks by assets, as of February 1, 2019[1]
Рис. 1. Выборка банков по размеру активов
(по состоянию на 1 февраля 2019 г.)

Table 1 – The sample panel
Таблица 1 – Выборка исследования

Bank	Period	Observations (n=83)
Absolut Bank	2010–2017	8
Vozrozhdenie Bank	2010–2017	8
Bank Zenit	2010–2017	8
Vostochny Bank (Orient Express Bank)	2010–2017	8
ING Bank	2010–2017	8
Moscow Industrial Bank	2010–2017	8
Renaissance Credit	2013–2017	5
Surgutneftegasbank	2010–2017	8
Transkapitalbank	2010–2017	8
Ural Bank for Reconstruction and Development (UBRiR)	2010–2017	8

[1] Source: Banki.ru. Available at: https://www.banki.ru/banks/ratings/.

For analysis purposes, consolidated data collected from databases available on the IFRS website were considered. As to the type of control, three banks are under public control, four are federal banks, and four are state banks. The other banks are controlled by private entities.

Model specification and construction

The econometric specification for the study is that stakeholder value is determined by proxy values. In order to identify factors that determine company's stakeholder value, four proxies are constructed. These are conventional measurement tools of finance by value: (1) market value or capitalization, (2) EVA (Economic Value Added), (3) net profit, and (4) sales revenue.

The research aims to design a model that allows assessing stakeholder value. The study was divided into three stages. The models were tested on the basis of three database sets (Table 2). The econometric model was built with the use of the R Project for Statistical Computing (https://www.r-project.org).

In assessing stakeholder value, we proceed from the following assumptions: (1) stakeholder value changes along with a proxy-indicator vector; (2) a proxy-indicator does not equal stakeholder value; and (3) changes in a proxy-indicator reflect changes in stakeholder value.

Stage 1

At Stage 1 the study utilized an econometric analysis approach which was chosen for the following reasons. First, econometric models enable one to statistically estimate the relationships among variables. Second, by carrying out regression analysis, it is possible to measure how each variable relates to the resulting quantity.

The econometric model was built with the use of the R Project for Statistical Computing (https://www.r-project.org). However, the results received at Stage 1 were not convincing enough as the number of observations was too small (n=24). Moreover, though the constructed "market value" proxy is quantifiable and takes into account numerous factors and data sources available in the market, it has some limitations. The main challenge to promote market value as a proxy is that it is related to listed companies only, which virtually excludes unlisted companies since they cannot be assessed in terms of capitalization. The findings of Stage 1 are discussed in [Tkachenko, Zlygostev, 2018].

Stage 2

At Stage 2 we made an attempt to identify factors that determined stakeholder value for unlisted companies. The number of observations increased significantly to 240 observations from 80 banks in the period of 2010–2016. Two proxies were tested: EVA and net profit. Both proxies can be applied to analyze listed as well as unlisted companies. The model was constructed for EVA since, in contrast to net profit, it allowed tracking market trends in interest rates. However, R-squared was quite low (0.32), thus the search for a more appropriate proxy was still an issue. The findings of Stage 2 were discussed in [Zlygostev, 2018].

Stage 3

At Stage 3 the study was carried out using the data sourced from 11 companies' sites and totaled 84 observations. The model was tested with sales revenue as a proxy. The sales revenue factor has certain advantages over EVA and net profit as it is never a zero value, which made it possible to logarithm the value and design an econometric model. In addition, sales revenue might be easily correlated with stakeholder groups, which allowed us to build two contribution models. These models provided a different perspective on the patterns of created stakeholder value.

At Stage 3 along with constructing the models of stakeholder value contribution (Contribution Model), we designed a model of stakeholder benefits (Benefit Model). Unlike the contribution models, the benefit model is non-regressional and is computed by simple summation of known benefits for each stakeholder group.

Table 2 – Database used in the econometric analysis
Таблица 2 – Данные для эконометрического анализа

Parameter	Database 1	Database 2	Database 3
Source	Company sites (IFRS) Moscow Exchange	SPARK (Section "Banks"). Russian Accounting Standards (RAS)	Company sites (IFRS)
Designed model	Contribution Model 1	Contribution Model 2	Contribution Model 1. Contribution Model 2. Benefit Model
Proxy indicator	Market value	EVA. Net profit	Sales revenue
Observations	24	240	84
Ownership	Public limited companies	Unlisted companies	Unlisted companies
Stakeholder type	Shareholders (owners). Employees	Shareholders (owners). Employees. Borrowers	Shareholders (owners). Employees. Borrowers. Clients (users of fee-based services)
R-squared	0.88	0.32	0.77 (Contribution Model 1) 0.86 (Contribution Model 2)

The purpose of performing valuation is to identify the contribution of stakeholder groups to the total stakeholder value. Following the typology suggested by Carroll and Näsi [1997], we started with identifying the most significant groups among internal and external stakeholders. The stakeholder value constructs associated with the various stakeholder types are presented in Table 3.

Each stakeholder group was assigned with a quantitative index that, as assumed, directly or indirectly characterizes contribution or benefits for the stakeholder. Thus, this index serves as a stakeholder group's impact factor for stakeholder value (target function). However, we do admit that the chosen indicators may not fully reflect the contribution or benefits of stakeholders.

RESULTS AND DISCUSSION

In this paper, we seek to establish a methodology for modeling stakeholder value. As reported earlier, the data obtained at Stage 1 were unconvincing due to a small sample size and limitations of the market value proxy. At Stage 2 we managed to design a model that enabled us to assess stakeholder value of unlisted companies. For now, Stage 3 appears to be the most consistent and satisfactory in terms of results obtained, since it reflects on the experiences with the challenges of modeling at Stage 1 and Stage 2.

To exemplify our calculations of stakeholder contribution patterns based on Database 3, we randomly selected two banks from the sample panel: the Ural Bank for Reconstruction and Development (UBRiR) and Surgutneftegasbank. Stakeholder value contribution was computed for these banks for a period of 2010–2017 using Contribution Model 1and Contribution Model 2.

Model 1

The Database 3 statistics for the variables used in Contribution Model 1 can be found in Table 4 (UBRiR) and Table 5 (Surgutneftegasbank).

Table 3 – Stakeholders in the banking sector: contribution and benefits
Таблица 3 – Стейкхолдеры в банковском секторе: вклад и выгоды

Stakeholder groups	Stakeholder subgroups	Stakeholder benefits	Stakeholder contribution
Internal			
Business owners	Majority shareholders. Bondholders. Depositors	Dividends. Interest on bonds and deposits	Provide bank financing
Employees	Front office. Head office	Salary. Compensation and benefits (monetary). Working conditions and reasonable work time (non-monetary)	Create value for customers and bank
External			
Clients	Corporate. Private	Interest on deposits. Cash back (monetary). Non-cash transactions, money transfers, accounts. Borrowings. Other (non-monetary) banking services	Generate demand for banking services, resulting in bank profit
Local community	Local residents. Municipal authorities	Local budget taxes. Investments in local infrastructure (monetary). Job creation. Production of goods and services (non-monetary)	Source of human capital
Government	Regional authorities. Federal authorities	Local budget taxes. Investments in local infrastructure (monetary). Job creation. Production of goods and services. Smooth functioning of national banking system (non-monetary)	Protection of private property. Creation of "rules for the game". Protection of rights

Table 4 – Data for building Contribution Model 1, UBRiR, 2010–2017, thousand rubles
Таблица 4 – Данные для построения Модели 1 – Вклада стейкхолдеров для УБРиР за период 2010–2017 гг., тыс. руб.

Year	T_income	ClientMoney	Sk	kom_inc	Nma_Os
2010	13,743,535	54,479,347	4,722,043	740,278	5,027,914
2011	15,420,888	69,503,461	7,053,116	1,102,770	5,136,168
2012	21,101,097	95,645,302	9,390,015	2,304,608	5,006,610
2013	33,440,951	125,003,002	11,132,337	5,691,062	5,734,767
2014	43,243,924	149,104,314	12,202,199	5,001,361	6,046,293
2015	59,601,616	189,554,871	14,683,324	3,989,193	5,822,812
2016	58,320,275	215,829,360	16,210,487	3,795,316	8,838,519
2017	57,184,656	220,842,176	17,111,720	4,808,191	8,815,416

Table 5 – Data for building Contribution Model 1, Surgutneftegasbank, 2010–2017, thousand rubles
Таблица 5 – Данные для построения Модели 1 – Вклада стейкхолдеров для Сургутнефтегазбанка за период 2010–2017 гг., тыс. руб.

Year	T_income	ClientMoney	Sk	kom_inc	Nma_Os
2010	3,365,207	34,449,953	3,346,400	1,117,296	1,747,191
2011	3,907,383	30,210,590	5,582,767	1,286,950	1,606,334
2012	4,653,543	6,020,124	6,988,466	1,509,318	1,581,767
2013	5,524,175	6,096,182	7,341,652	1,194,739	1,989,799
2014	7,307,045	66,347,523	7,216,493	1,301,313	1,864,916
2015	11,259,147	95,659,529	7,931,632	1,769,054	1,882,359
2016	12,296,021	114,560,301	10,718,865	1,935,346	2,280,180
2017	19,340,767	220,447,314	13,270,719	1,868,985	2,200,399

T_income is sales revenue totaling fees and interest for the reporting period; *ClientMoney* is customers' account balance at the end of the reporting period; *Sk* is bank stock at the end of the reporting period; *kom_inc* is fee-based income for the reporting period; *Nma_Os* is total intangible assets and fixed assets at the end of the reporting period.a4_brochure_ipos_eng_print.pdf; База данных IPO/SPO. URL: http://www.preqveca.ru/placements/

Contribution Model 1 presents the contribution of four stakeholder groups: (1) business owners; (2) employees; (3) depositors, and (4) clients using fee-based services.

Table 6 provides the descriptive statistics for the variables used in Model 1. Multicollinearity is absent (correlation matrix, ViF test). The Breusch-Pagan Test showed the presence of homoscedasticity in the regression model. Positive autocorrelation is observed, which shifts the nominal estimates of the resulting indicator, but it does not affect the relative contributions of each factor. All coefficients are statistically significant; the number of observations is sufficient. *F*-statistic is <0.05, adjusted *R*-squared equals 0.769, which indicates a close relationship between the factors (group of stakeholders) and the target variable.
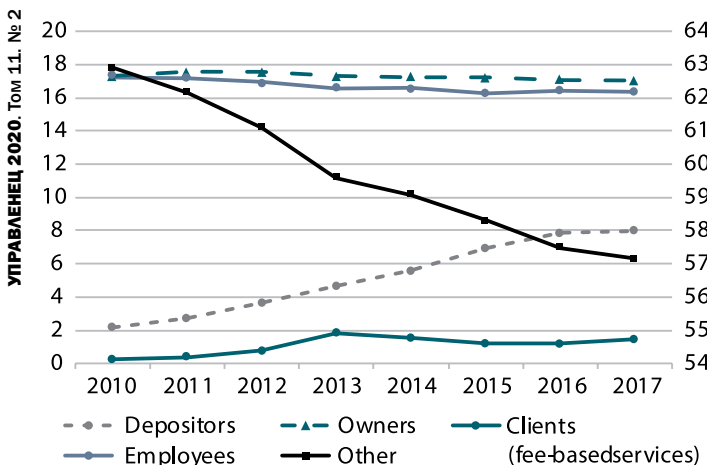
The analyzed banks are comparable in terms of contribution values of different stakeholder groups, e.g. employees' contribution at both UBRiR and Surgutneftegasbank ranged from 15 % to 18 %. The patterns of contributed stakeholder value seem to be similar at both banks. At the same time, as shown at Fig. 2[1] during the analyzed period, the proportion of employees' contribution at UBRiR was higher than at Surgrutneftegasbank (17.38–16.37 % vs 16.56–15.35 %). The analysis of the depositors' contribution showed the difference in trends: while at UBRiR the depositors' contribution demonstrated an upward trend, at Surgutneftegasbank the dynamics displayed an irregular pattern (Fig. 3).

[1] In Figures 2, 3, 4 and 5 the "Other" group data are plotted along the right vertical axis. The data for other groups of stakeholders are plotted along the left vertical axis.

Table 6 – Model 1 of Stakeholder Value Contribution (Contribution Model 1)
Таблица 6 – Модель 1 – Вклад в стейкхолдерскую стоимость (Модель 1 – Вклад стейкхолдеров)

Model 1					
Formula	log(T_income) = ClientMoney + log(Sk) + kom_inc + log(NMA_Os)				
Coefficients:	Estimate	Std. Error	*t* value	Pr(>|t|)	
(Intercept)	7.00900000000	2.51200000000	2.791	0.007	**
ClientMoney	0.00000000442	0.00000000110	4.023	0.000	***
log(Sk)	0.28880000000	0.11810000000	2.446	0.017	*
kom_inc	0.00000003752	0.00000001177	3.187	0.002	**
log(NMA_Os)	0.28900000000	0.05997000000	4.820	0.000	***
Signf. Codes:0 '***'0.001 '**' 0,01 '*'					
Residual standard error: 0.3795 on 78 degrees of freedom					
Adjusted *R*-squared: 0.769					
F-statistic: 69.42, *p*-value <0.000					
Confidence interval	2.50 %		97.50 %		
(Intercept)	2.00859200000		12.00938000000		
ClientMoney	0.00000000223		0.00000000661		
log(Sk)	0.05375240000		0.52392640000		
kom_inc	0.00000001408		0.00000006096		
log(NMA_Os)	0.16966280000		0.40843570000		

Fig. 2. Contribution Model 1, UBRiR (2010–2017)
Рис. 2. Модель 1 – Вклад стейкхолдеров
для УБРиР за период 2010–2017 гг.

Model 2

Contribution Model 2 of stakeholder groups was constructed for the same sample panel which integrated Database 3 and the proxy (Table 7). The statistics for the variables for Model 2 were similar to Model 1 (see Tables 4 and 5).
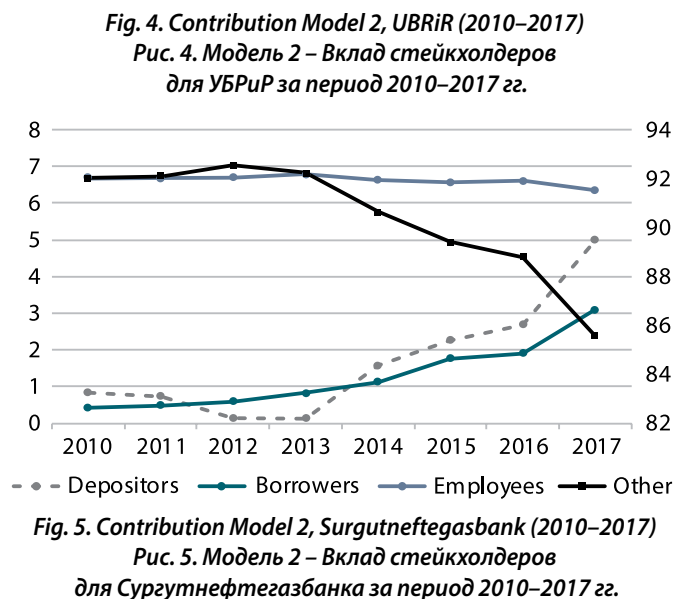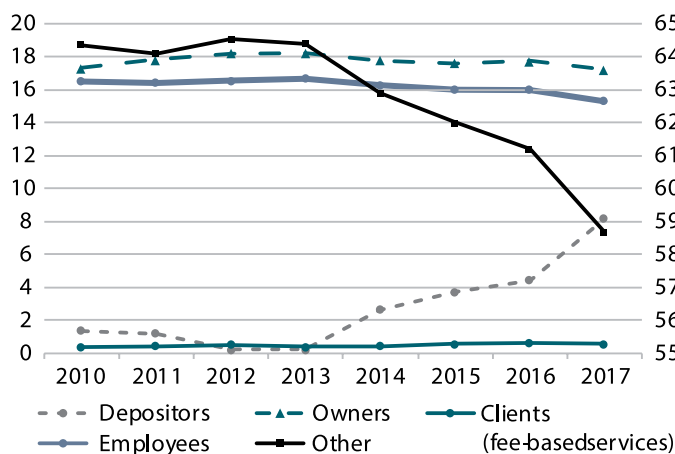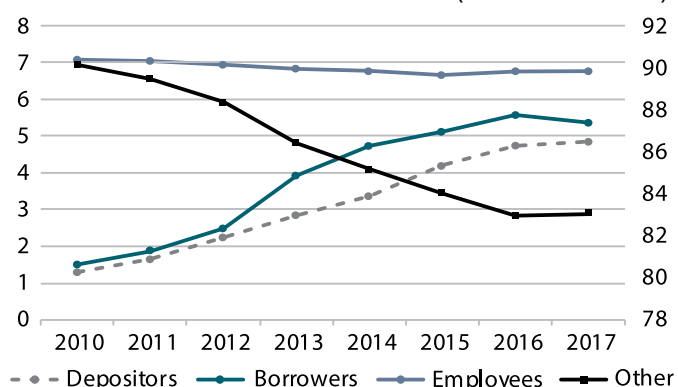

Fig. 4. Contribution Model 2, UBRiR (2010–2017)
Рис. 4. Модель 2 – Вклад стейкхолдеров
для УБРиР за период 2010–2017 гг.

Fig. 3. Contribution Model 1, Surgutneftegasbank (2010–2017)
Рис. 3. Модель1 – Вклад стейкхолдеров
для Сургутнефтегазбанка за период 2010–2017 гг.

Fig. 5. Contribution Model 2, Surgutneftegasbank (2010–2017)
Рис. 5. Модель 2 – Вклад стейкхолдеров
для Сургутнефтегазбанка за период 2010–2017 гг.

Table 7 – Model 2 of Stakeholder Value Contribution (Contribution Model 2)
Таблица 7 – Модель 2 – Вклад в стейкхолдерскую стоимость (Модель 2 – Вклад стейкхолдеров)

Model 1					
Formula	log(T_income) = ClientMoney + log(Sk) + kom_inc + log(NMA_Os)				
Coefficients:	Estimate	Std. Error	*t* value	Pr(>|t|)	
(Intercept)	13.45000000000	0.49190000000	27.346	0.000	***
ClientMoney	0.00000000356	0.00000000074	4.808	0.000	***
log(Sk)	0.00000002796	0.00000000265	10.574	0.000	***
kom_inc	0.15710000000	0.03584000000	4.385	0.000	***
log(NMA_Os)	0.28900000000	0.05997000000	4.820	0.000	***
Signf. Codes:0 '***'0.001 '**' 0,01 '*'					
Residual standard error: 0.3795 on 78 degrees of freedom					
Adjusted *R*-squared: 0.860					
F-statistic: 169.3, *p*-value <0.000					
Confidence interval	2.50 %		97.50 %		
(Intercept)	12.47137000000		14.42943000000		
ClientMoney	0.00000000208		0.00000000503		
X.inc	0.00000002270		0.00000003323		
log(Nma_Os)	0.08580774000		0.22846880000		
log(NMA_Os)	0.16966280000		0.40843570000		

Figures 4 and 5 illustrate the patterns of contributed values in the two sampled banks.

Contribution Model 1 described a larger proportion of stakeholder value and, in addition, identified four groups as compared with the three groups in Contribution Model 2. On the other hand, Model 2 featured the borrowers' contribution, which was not evident in Model 1, while the contribution of clients using fee-based services was exhibited in Model 1 only. As a result, the pattern of stakeholder value contribution revealed in Model 2 was different from Model 1. The share of other groups in Model 1 accounted for 58–60 % while in Model 2 it was bigger – 85–90 %. On the contrary, adjusted R-squared in Model 2 was higher than in Model 1: 0.76 vs 0.86, respectively. For each modeling object, Model 1 and Model 2 showed similar dynamics of contribution to stakeholder value for the same group of stakeholders (employees and depositors). This made it possible to measure which year stakeholders performed better or worse. Analyzing the relative increase in contribution in each bank in Model 1 and Model 2, it is evident that they coincide almost to the decimal, while the share of the stakeholder group contribution may vary, e.g. in 2017 UBRiR employees' contribution accounted for 16.37 % (Model 1) and 6.74 % (Model 2) (Figures 3 and 5).

The comparison of the two models leads to the following conclusions. The model shows an "averaged" pattern for all objects studied. At the same time the model can show distinct patterns of objects, but only for decimals. Sales revenue seemed to be the most appropriate proxy indicator as compared with EVA and net profit as it responded more flexibly to changes in variables, which allowed finding better correlation.

The rationale lying behind selecting sale revenue as a proxy for monetary stakeholder value is explained by the thesis that a firm is a "hub" of communication, creation and distribution of values for a stakeholder network. In that case, all sales revenues received by the company are the value generated by stakeholders, which is then shared among the members of the network as salary, payment to suppliers, dividends, etc. Clients make up a special group of stakeholders as it is their presence that makes the value creation possible, i.e. a created demand for a good or service.

Model 3

Model 3 aimed to evaluate the impact of benefits on stakeholder value for five types of stakeholders: owners, employees, borrowers, depositors and clients using fee-based services. This model is non-regressional and was computed by simple summation of known benefits in each stakeholder group.

The stakeholder benefit constructs associated with various stakeholder types and the Database 3 statistics for the variables used in Benefit Model 3 for UBRiR are presented in Table 8. As can be seen from Table 8, bank borrowers accounted for the largest proportion of benefits – around 77 %.

Comparison of Contribution and Benefit Models

To reconcile the contribution and benefit models, we had to take some assumptions. The first assumption is that we have estimated all major benefits for the most significant stakeholders, i.e. we assumed that the Benefit Model allowed us to assess all stakeholders' value and we equated it to the Contribution Model. In theory, the amounts of created and distributed values should balance. The second underlying assumption concerns the understanding that tangible (financial) benefits were recognized partly, as a proportion of the total cost. Through the adjustment coefficient that can be computed by expertise, it is necessary to bring the shared stakeholder value into line with the created value. For example, if we believe that the benefit model reflected 80 % of the total created stakeholder value, then the remaining 20 % can be accountable to other factors.

Another approach to analyzing the patterns of stakeholder contribution and benefits is to find a "spread" between contribution and benefits for a certain group of stakeholders. The larger the difference between stakeholder contribution and stakeholder benefits, the higher the risk the stakeholder network is exposed to when communicating with this stakeholder group. In other words, stakeholders who contribute more and receive less are apt to face conflicts with others in order to protect their own interests.

Since stakeholder groups can vary quantitatively, it might be useful to determine stakeholder contribution per stakeholder rather than per group. Using UBRiR stakeholders as an example we assumed that in 2017 the approximate number of bank clients (both depositors and borrowers) was 200,000. Using the open data for UBRiR employees and owners we computed contribution and benefits per stakeholder group. For each group we identified the difference between contribution and benefits, or a "spread". This enabled us to describe each stakeholder group in terms of

Table 8 – Constructs and data for building Model 3, UBRiR (2017)
Таблица 8 – Данные для построения Модели 3 для УБРиР в 2017 г.

Stakeholder group	Annual benefits	Amount, thousand rubles	Proportion of the total, %
Business owners	Net profit	836,496	0.62
Employees	Payroll budget	3,912,841	2.92
Borrowers	Outstanding loan portfolio less interest payable	103,083,091	76.92
Depositors	Interest earnings	26,180,286	19.54

its status: a donor (more value is created than received); or a recipient (more value is received than created). From the data in Table 9, it is apparent that the groups that contributed almost equally are "donors": business owners and employees (17.3 % and 17.38 %, respectively), while benefits were the largest for borrowers (about 77 %).

With the same assumption about the number of bank clients in mind, the contribution and benefits per stakeholder rather than per stakeholder group were computed. The data in Table 10 show that it is business owners who contributed the most (99.91 %) hence the owner's received benefits are the most substantial (99.19 %), proportionally almost equal to contribution. The change in the pattern also resulted in the change of group status. While the group of owners maintained its status of a "donor", insignificant contribution and benefits of employees calculated per stakeholder turned employees into "recipients", rather than "donors".

However, not all groups of stakeholders can correlate in the models of contribution and benefits. For example, Contribution Models allowed identifying the group of clients who used fee-based services, but failed to recognize borrowers. On the other hand, Contribution Models could take into account "other" categories of stakeholders that are not represented in the Benefit Model.

It is worth noting some limitations of the study. Our approach to stakeholder value assessment is based on some assumptions. One of the assumptions is that our benefit model reflects the total value generated by the contribution model. Another assumption is the determination of factors and indicators accountable for the total contribution and benefits of stakeholders. The choice of

a different set of factors and indicators for a stakeholder group might lead to a different pattern of stakeholder value contribution and benefits. Finally, the proposed models do not take into account non-financial factors of value creation, which are discussed in research literature [Guglya, 2015; Efimova, 2013]. Consequently, monetary assessment of stakeholder value contribution and benefits cannot give us a full picture of what stakeholder value is, however it might tread the path to further understanding of the concept.

Our findings on modeling created and shared stakeholder value were visualized in a dashboard, an instrument that is designed to measure, monitor, and report a degree of satisfaction for key stakeholder groups. This tool can be applied for managing stakeholder risk and relationships with stakeholders. More specifically, the dashboard can serve as a tool unifying the existing satisfaction indices and bringing them to a 100-score scale, which will make them comparable and will allow the management to shape the policy of their relationships with stakeholders (Fig. 6).

One of the advantages of the dashboard is that it can be built on compiling already existing but disaggregated data distilled from the company's reports and surveys, for example, CSAT data for different categories of customers. Along with satisfaction indices the dashboard might include the patterns of stakeholder contribution and benefits which show the stakeholders who make the most tangible contribution (donors) and receive the most significant benefits (recipients). As mentioned earlier, contribution and benefit patters per stakeholder group and per stakeholder may vary significantly. For example, at

Table 9 – Contribution and benefits by stakeholder groups (UBRiR, 2017)
Таблица 9 – Вклад и выгоды стейкхолдерских групп для УБРиР в 2017 г.

Stakeholder group	Contribution, %	Benefits, %	Spread, %	Group status
Business owners	17.30	0.62	−16.68	Donor
Employees	17.38	2.92	−14.46	Donor
Borrowers	?	76.92	?	?
Depositors	2.16	19.54	17.38	Recipient
Users of fee-based services	0.25	?	?	?
Other	62.91	?	−62.91	?

Note: Question marks indicate inconsistent data.

Table 10 – Contribution and benefits per stakeholder (UBRiR, 2017)
Таблица 10 – Вклад и выгоды каждого стейкхолдера для УБРиР в 2017 г.

Stakeholder group	Contribution, %	Benefits, %	Spread, %	Group status
Shareholder	99.91	99.19	−0.72	Donor
Employees	0.09	0.43	0.34	Recipient
Borrowers	?	0.31	?	?
Depositors	0.00	0.08	0.08	Recipient
Users of fee-based services	0.00	?	0.00	?
Other	?	?	0.00	?

Note: Question marks indicate inconsistent data.

Relationships with stakeholders dashboard

Satisfaction (0–100 %)

Customers individuals		2019
		2018
Clients legal entities		2019
		2018
Employees		2019
		2018
Owners		2019
		2018

Contribution

15%
15%
20%
50%

Benefits

16%
17%
27%
40%

Per stakeholder group
- Customers individuals
- Clients legal entities
- Employees
- Owners

Contribution

5%
5%
8%
82%

Benefits

5%
5%
10%
80%

Per stakeholder
- Customers individuals
- Clients legal entities
- Employees
- Owners

Fig. 6. Dashboard of relationships with stakeholders
Рис. 6. Визуализация вклада-выгод стейкхолдеров

a group level, the contribution of business owners may seem to be not as large as compared to the contribution per stakeholder. It is worth mentioning that modeling contribution and benefits in the dashboard would be the most difficult action to perform since experts would be fully responsible for the selection of optimal and objective indicators describing contribution and benefits. This process seems to feature some compromises, assumptions and a high degree of generality.

Thus, the dashboard aims to provide the firm management with the information needed for decision making with regard to company strategy and tactics of interaction with stakeholders. This might lead to a more organic structure of stakeholder values and prevent risks of being involved in conflicts with stakeholders.

CONCLUSION

Since the main objective of the present article was to find tools for assessing stakeholder value, the paper considered the general theoretical provisions of the stakeholder value. The literature review showed that the stakeholder value evaluation presents measurement difficulties and the creation of the stakeholder value is still the point of continuous debates.

In an attempt to find a possible method of the stakeholder value assessment we formulated and tested a methodology based on building two econometric models of stakeholder value contribution and one mathematical model of stakeholder benefits. The results of the study indicated the problem of assessing the quality, choice and interpretation of the models.

The modeling process presented us with challenges of construction and analysis. Building a model requires a proper and thoughtful approach to the selection of variables. Since it is possible to obtain different models for the same objects of observation, a procedure for evaluating and comparing the models in terms of the content and objectivity is of high importance. To be compared the contribution and benefit models must be brought to a common standard – the total extended value to all stakeholders. As proxy indicators of stakeholder value the following econometric tools were tested: market value, EVA, sales revenue and net profit. Changes in the pattern of contribution to the stakeholder value for each model were analyzed. We found that the most appropriate proxy indicator for modeling monetary stakeholder value was sales revenue. However, since sales revenue shows only the external, visible movement of stakeholder values (exchange value), it is unlikely to identify non-financial factors of value creation.

The study of assessing stakeholders' contribution and benefits allows us to conclude that the stakeholder model of CG may be beneficial for both unearned increment of business and creating value for financial and non-financial stakeholders since these processes are interdependent. However, despite the approbation of new tools for the stakeholder value assessment, the latter at the moment is conventional and based upon many assumptions, which does not allow us to focus on one stakeholder value model only. For practical use, it is necessary to explore the relationships between different models and possible ways of their integration, develop a methodology for their evaluation and comparison.

Further research should also be related to the choice of factors, the validity of the choice, the analysis of the regression model in order to infer the stakeholder contribution. The impact of stakeholder networks on attaining synergy should be explored. To achieve technological breakthroughs, an important research area is stakeholder value assessment under the conditions of innovation and technology transformation of business organizations, including networks models, models of smart production and ecosystems, all forming the basis of high-tech sectors of the economy. ■

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Моделирование вклада и выгод стейкхолдеров компании

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Аннотация. Статья посвящена исследованию стейкхолдерской стоимости, поиска адекватного инструментария для моделирования вклада и выгод стейкхолдеров. Методологической базой исследования послужили парадигма устойчивого развития, концепция общих ценностей, стейкхолдерский подход. В исследовании представлены две эконометрические модели вклада заинтересованных сторон и математическая модель выгод для стейкхолдеров. Модели построены на панельных данных российского банковского сектора. Авторы рассматривают банки как объекты финансовой инфраструктуры, без которой невозможно существование сетевых интегрированных структур бизнеса. Протестированы с помощью эконометрических инструментов следующие прокси-переменные стейкхолдерской стоимости компании: рыночная стоимость, EVA, выручка. Проанализированы изменения структур вклада в стейкхолдерскую стоимость по каждой модели в динамике. Наиболее подходящей для оценки стейкхолдерской стоимости является монетарная прокси-переменная «выручка». Сделаны выводы о том, что для практического использования инструментария необходимо изучить взаимосвязи между различными моделями и возможные пути их интеграции, разработать методологию их оценки и сравнения. Дальнейшие исследования должны быть связаны с поиском и обоснованием факторов, влияющих на стейкхолдерскую стоимость, анализом моделей с целью определения вклада и выгод заинтересованных сторон. В условиях инновационно-технологической трансформации форм организаций бизнеса, в том числе сетевых моделей, моделей умных производств и экосистем, важны исследования процедур оценивания ценности для стейкхолдеров.

Ключевые слова: корпоративное управление; стейкхолдерский подход; стейкхолдерская стоимость; эконометрическое моделирование; вклад стейкхолдеров; выгоды стейкхолдеров; взаимодействие стейкхолдеров.

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