PUBLISHED BY
VOPROSY
EKONOMIKI
N. P.

Russian Journal of Economics 9 (2023) 57–70
DOI 10.32609/j.ruje.9.81283
Publication date: 13 April 2023

Russian
Journal of
Economics

www.rujec.org

Emerging economies and investment in intellectual capital in crisis time: The case of Russia

Carlos M. Jardon[a,b,*], Xavier Martinez Cobas[a]

[a] *Universidad de Vigo, Vigo, Spain*
[b] *HSE University, Perm, Russia*

Abstract

Emerging economies have specific characteristics that condition the use of intellectual capital. The economic crisis has had important consequences for emerging countries. The investments in intellectual capital could slow down this influence. This paper uses a new model for assessing the effects of an investment in intellectual capital on the performance of Russian companies in a period of crisis. The model is applied in Russian companies with data from 1,096 companies for the period 2004–2014 and 12,056 observations were made. The panel data included only active companies (from January 2004) listed with annual reports and were obtained from Bureau Van Dijk's Ruslana database. Each company's data cover at least seven years. The study used hierarchical linear models to unravel the effect of intellectual capital on value-added. The results show that investments in structural capital and relational capital have a direct effect on the stock of intellectual capital and generates value. The results show that investments in structural capital and relational capital have a direct effect on the stock of intellectual capital and generates value.

Keywords: intellectual capital, Russia, measurement models, financial data, crisis.
JEL classification: D89, M21, M41, O1.

1. Introduction

Economic crises tend to have a greater effect on emerging economies. The business environment in these countries is volatile, risky, and uncertain (Gunasekaran et al., 2001; Jumpponen et al., 2008). In changing circumstances, particularly during times of crisis, the ability of organizations to maintain and replenish their competitive advantage becomes very important. Could the in-

* Corresponding author, E-mail address: cjardon@uvigo.es

vestments in intellectual capital reduce the effects of crises in these countries? Berezinskaya (2017) suggests that investment constraints on fixed asset limited the growth of the Russian economy during the 2008 crisis. This paper considers a similar approach to investments in intellectual capital.

Several scholars have studied the effect of intellectual capital on the performance of Russian companies (Molodchik and Jardon, 2017; Urban and Joubert, 2017; Volkov and Garanina, 2010). Some authors used financial information (Goebel, 2015; Tawy and Tollington, 2012) to measure components of intellectual capital. These methods mix investments with the stock of intellectual capital (Pulic, 2000; Ståhle et al., 2011). The approach used in this article splits investment in different components of intellectual capital to evaluate how they generate value through the stock of intellectual capital (Jardon and Martinez-Cobas, 2021). Our method directly estimates each component of intellectual capital. This is the first objective of this study.

The economic crisis produced noticeable effects on the functioning of the Russian economy. Voskoboynikov (2017) indicates how productivity fell in different sectors due to the crisis. Investments in intangibles could help to get out of the crisis. Two questions then arise in this regard: does crisis affect the generation of value in Russian companies? And does crisis precondition or influence the effect of investments in intellectual capital? This will be the second objective of this paper.

This study contributes to the management of aspects of intellectual capital in situations of risk in emerging economies (the Russian context during crisis). In particular, the paper analyses the possible incidence trajectories of investments in different components of intellectual capital on performance (Jardon and Martos, 2012), and the crisis effect.

As a result, this research reconciles the use of financial measures for the management of intellectual capital, and its antecedents in triangulated indices. Also, it determines relationships through path coefficients, between constructs developed from a general conceptual model, based on the academic and professional literature. In addition, it assesses the relative position of the participating organizations, so that intellectual capital resources can be reallocated more effectively, and establishes a basis for online trends, standards, and intellectual capital forecasts using Russian companies' financial data recorded during the crisis period. It thus complements previous studies of emerging economies.

Unlike previous papers, this one contributes to two aspects:

1. Theoretically, it suggests issues of intellectual capital suitable for increasing performance in emerging markets during an economic crisis. The COVID-19 pandemic has generated a crisis in all economies, affecting the Russian economy (Voskoboynikov et al., 2021). Analyzing the effects of the slowdown in times of crisis can help suggest solutions to problems that may arise during current and future crises in the Russian economy and emerging countries.

2. Methodologically, it allows studying the impact of investment in each component of intellectual capital, on the stock of intellectual capital, which previous studies (Goebel, 2015) do not differentiate clearly. Complementarily, it allows estimating the impact of the intellectual capital stock on performance, which in the case of the component model (Lev et al., 2016) is not studied, but rather encompassed within the investments.

2. Data and methods

The sample used contains annual data from 1,096 Russian companies for the period 2004–2014. The panel data included only active companies (from January 2004) listed with annual reports and were obtained from Bureau Van Dijk's Ruslana database. Each company's data cover at least seven years. The distribution components of the following economic sectors were surveyed: (a) construction and real estate; (b) manufacturing; (c) chemical and energy; (d) services; (e) trade and related services; (f) finance and insurance. Manufacturing accounted for 25% of the companies studied. Data only up to 2014 was used to highlight the crisis effect since in that year the crisis had ended but sanctions were imposed on it for annexing Crimea thereby causing a mixed effect which this study does not intend to include. Missing data were estimated using the multiple imputation method of STATA 14.0.

As an intangible, intellectual capital needs to be clearly defined to be measured. Previous literature has presented multiple methods of evaluating this (Goebel, 2015; Hunter et al., 2005; Krušinskas and Bruneckienė, 2015). The present study adopts an investment-based approach (Lev et al., 2016). This uses information from the profits account and considers expenses related to intellectual capital as an investment (Sydler et al., 2014). Personnel costs are an indicator of investment in human capital (Pulic, 2000); R&D costs are an indicator of investment in structural capital (Andrikopoulos, 2005); and advertising expenses are an indicator of investment in relational capital (Nazari and Herremans, 2007). However, these were used only as indicators of investment in intellectual capital, not of the stock of intellectual capital.

Intangible assets must be identifiable, but they are neither monetary nor physical. In addition, they must meet the definition of an asset, i.e., they are manageable (or they can be managed), and they can bring economic benefits. They are an indicator of the stock of intellectual capital, but accounting restrictions condition their content (Fernández and Aparicio, 2013). However, a certain proportionality was assumed between what was and what was not an identifiable intangible asset as an indicator of the stock of intellectual capital.

Finally, value added was measured by revenue minus current costs and indicated the value created by investments in intellectual capital (Pulic, 2000). The sector activity is included as a control variable and will be included in the methodology chosen as a random variable (Goebel, 2015). To eliminate the effect of firm size (Soriano and Castrogiovanni, 2010), all variables were divided by total assets. Consequently, the equations of the model were recursive, allowing each one to be estimated separately.

Linear effects equations with random parameters:

$$\frac{R\&D\ Costs}{Tot.Assets} = \beta_{01} + \beta_{11}\frac{Pers.Costs}{Tot.Assets} + \beta_{21}\,crisis + \beta_{31}\frac{Pers.Costs}{Tot.Assets}\cdot crisis + \\ + \varepsilon_1, \tag{1}$$

$$\frac{Adv.Costs}{Tot.Assets} = \beta_{01} + \beta_{12}\frac{Pers.Costs}{Tot.Assets} + \beta_{22}\,crisis + \beta_{32}\frac{Pers.Costs}{Tot.Assets}\cdot crisis + \\ + \varepsilon_2, \tag{2}$$

$$\frac{Intang.assets}{Tot.Assets} = \beta_{03} + \beta_{13}\frac{R\&D.Costs}{Tot.Assets} + \beta_{23}\frac{Adv.Costs}{Tot.Assets} + \beta_{33}crisis + \\ + \beta_{43}\frac{R\&D.Costs}{Tot.Assets} \cdot crisis + \beta_{53}\frac{Adv.Costs}{Tot.Assets} \cdot crisis + \varepsilon_3, \quad (3)$$

$$\frac{Value\ added}{Tot.Assets} = \beta_{04} + \beta_{14}\frac{Intang.Assets}{Tot.Assets} + \beta_{24}crisis + \\ + \beta_{34}\frac{Pers.Costs}{Tot.Assets} \cdot crisis + \varepsilon_4. \quad (4)$$

Random effects equation:

$$\beta_{0i} = \gamma_{0i} + u_{0i};\ \ var(u_{0i}) = \sigma_i^2,\ i = 1, ..., 4. \quad (5)$$

The study used hierarchical linear models (HLM) as the most appropriate method to determine the effect of intellectual capital on value-added, after considering the industry and considering the nested nature of the data. It helps to evaluate the effects due to factors associated with the industry from the specific effects of the variable. Consequently, all the control variables associated with the industry are included in this random effect. We include an indicator variable to measure crisis and interaction variables in the models to analyze the crisis effect, from 2009 to 2011. Therefore, the research controls the effect of the industry. Hierarchical linear modeling allows more precise relations between different levels and supports complex structures for residual terms (Aguinis and Molina-Azorín, 2015; Bamiatzi et al., 2016). The industry was the control variable by which different levels could be examined. The calculations were made with STATA 14.0.

3. Theoretical framework

The economic crises have had adverse effects on all economies, limiting the performance of companies. This has also affected the emerging economies, including the Russian one (Beliaeva et al., 2020). One way to alleviate these effects is through investments in intangible assets since these allow the use of assets that do not deteriorate in those periods and specific innovations to manage or contain arising imbalances during the crisis.

Intellectual capital is a construct that includes intangible assets that create value for a company. Traditionally, intellectual capital is divided into three categories: human, structural (i.e., organizational), and relational (i.e., the customer) (Urban and Joubert, 2017).

Human capital refers to the set of values, attitudes, skills, and abilities of employees that can generate value for a company (Bontis et al., 2000). It encompasses knowledge, experience, creativity, teamwork, loyalty, training and education, problem-solving ability, loyalty, and motivational strengths (Hormiga et al., 2011). It is usually tacit (Nonaka and Takeuchi, 1995).

Structural capital is "knowledge that internalizes company (generating value for it) and remains in the organization even when their employees leave their homes at night" (Roos et al., 1997, p. 42); therefore, structural capital is independent of

individuals and is generally explicit knowledge (Hormiga et al., 2011). It includes intellectual property (e.g., patents, licenses, and trademarks), technology incorporated into the company, the organizational system, culture, and so on (Bontis et al., 2000).

Relational capital is the value of business relationships to the company (Bontis et al., 2000; Hormiga et al., 2011). This capital includes relationships with external stakeholders, supplier networks, distributors, trade organizations, partners, customer relationship management (e.g., image creation, loyalty, partner, and investor networks), and brands (e.g., attitude, preference, reputation, and brand recognition; (Welbourne and Pardo-del-Val, 2009). It usually combines explicit and tacit knowledge.

Russia's unstable business environment (Gunasekaran et al., 2001; Jumpponen et al., 2008) is the result of the weak legitimacy of formal institutions. Puffer et al. (2010) criticized these institutions for being ineffective and noted that pressure from government officials, amongst others, undermined both business and national systems (Ledeneva, 2008). This created a vacuum that has been filled by traditional and informal institutions, and these have influenced the way business decisions are made (Puffer et al., 2010). However, these informal institutions have become increasingly formal over time (Kim and Kang, 2009).

Another cause of instability is the sharp business cycle of the Russian economy. Pönkä and Zheng (2019) suggest that the oil price is the main determining factor, and fluctuations in nominal oil prices are useful predictors of the Russian business cycle.

Many authors have studied the effect of intellectual capital on performance in Russian companies (Molodchik and Jardon, 2017; Urban and Joubert, 2017; Volkov and Garanina, 2010). Measurements have also been made of the different components of intellectual capital (Andreeva and Garanina, 2017; Jardón et al., 2018), showing that "the true source of economic value is the creation of intellectual capital, which is no longer simply the production of material goods" (Urban, Joubert, 2017, p. 85). Intellectual capital is stored in the company and is used to generate value when it is needed. This is also the case in Russia (Paklina et al., 2018). Barajas et al. (2017) showed the importance of intangibles in the recovery after a crisis. Consequently, the following hypothesis is proposed:

H1: Stock of intellectual capital increases a company's value in the Russian context during a crisis.

H1a: The crisis can condition this effect.

Investment in different components of intellectual capital usually increases the stock of intellectual capital. Generally, the peculiarities of Russian companies suggest that not all investments in intellectual capital components directly generates intellectual capital.

Bontis (1996) proposes a relationship (similar to a diamond shape) model between components of intellectual capital where human capital serves as the bedrock based on which the other components generate value. This model was tested in different contexts (Bontis et al., 2000; Jardon and Martos, 2012). This model was applied to the Russian economy during crisis time.

Human capital in Russian companies presents specific characteristics (Molodchik et al., 2019; Molodchik and Jardon, 2017). The economic crises have affected the productivity of workers in Russia by increasing the human capital of companies (Voskoboynikov, 2017).

Managers in Russia generally have cognitive rigidity (May et al., 2007), and this leads to a certain resistance to change among employees (Michailova, 2000). In addition, Russian managers and employees tend to show lower levels of transformational leadership, especially in terms of charisma and inspiration, than their counterparts in other countries (Ardichvili, 2001).

Leadership in Russian companies is different from other countries. For example, Kets de Vries et al. (2004) argue that founders, in particular, have a particular charisma, and wield more power than their counterparts. They often prefer to maintain control of their companies even after choosing successor CEOs (Shekshnia, 2008). Moreover, Russian companies show limited central planning with decentralized decision-making (Valieva, 2014). Russian entrepreneurs have stronger internal control, and employee participation in decision-making is low (McCarthy, Puffer, 2013). All this points to the importance of human capital in generating structural capital.

However, strategic orientation towards innovation is low, as insufficient levels of investment in innovation indicate a lack of confidence in the business environment, a lack of management experience, or even the belief that competitive products often do not guarantee sales (Filippov, 2011). The limitations of financial resources during crises make investments become substitute goods so that increased investments in human capital can reduce other investments and negatively affect investments in structural capital (Voskoboynikov, 2017). Consequently,

H2a: Investment in human capital can predetermine structural capital investments in the Russian context, during a crisis.

The economic crisis in Russia results in a decrease of investments (Berezinskaya, 2017). Consequently,

H2b: The crisis defines the effect of human capital investments on structural capital investments.

Human capital is the bedrock of the generation of relationships (Jardon, 2015), so it helps to increase relational capital. This is particularly important in times of crisis where relational capital becomes more important in the Russian economy, where informal networks are especially needed (Golikova et al., 2012).

H2c: Investment in human capital increases relational capital investment in the Russian context during a crisis.

H2d: The crisis determines the effect of human capital investments on relational capital investments.

Culture is very important in the business environment of Russian companies (Gaenslen, 1986). Personal relationships are critical for information, sharing opinions, and doing business. Therefore, it is important to have a wide network of contacts (and not only government officials). In other words, social capital is a critical asset in Russia (Fey and Shekshnia, 2011). However, this culture does not show a clear orientation towards innovation, since there is often little involvement of employees in collective decision-making (Jumpponen et al., 2008).

Innovation is an essential performance factor in crises. Indeed, Russian companies faced different innovation-oriented strategic developments to cope with the crisis (Shirokova et al., 2019). This leads to the following hypothesis:

H3a: Investment in innovation increases a company's intellectual capital in the Russian context during a crisis.

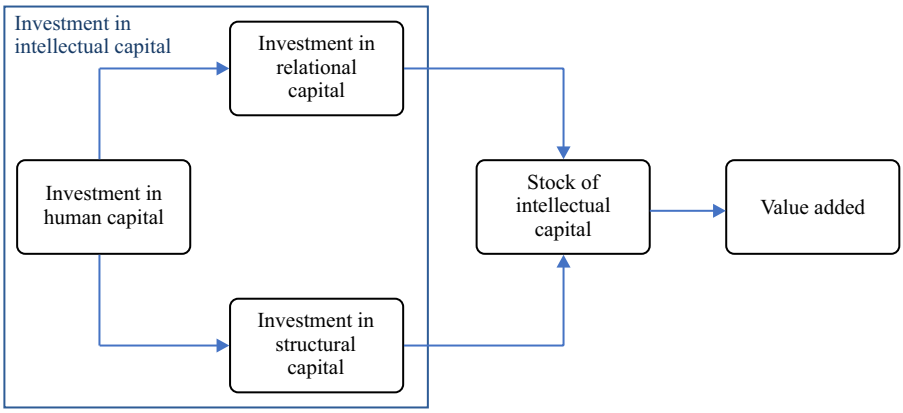

Fig. 1. Russian companies' investment in intellectual capital.

Source: Compiled by the authors.

H3b: The crisis increases the effect of investments on innovation on intellectual capital stock.

On the other hand, social networks are important business opportunities for Russian companies. People whose relatives or friends are entrepreneurs are more likely to become entrepreneurs themselves, and these relationships help to expand the domestic and international market potential of their companies. There are several similarities between Russian and Chinese entrepreneurs, in that they both use these networks according to their content capital (Djankov et al., 2006). The networks facilitate inclusion in global production chains, encourage foreign investment, especially in a crisis, and assist in opening up foreign markets for Russian companies. This social networking and interaction with foreign companies allow innovation to create value for enterprises, which leads to the next hypothesis:

H4a: Investments in relational capital to increase a company's intellectual capital in the Russian context.

H4b: The crisis increases the importance of investments in relational capital to generate a stock of intellectual capital.

Fig. 1 picks up the model and hypotheses.

4. Results

Table 1 shows the mean and standard deviation of the variables for each of the industrial sectors. The total assets of the energy sector are the highest by far because Russian companies in this area tend to be larger.

Table 2 includes the results of the estimation of the relationships established in the model. The first part of the table notes that intangible assets have a positive and multiplier effect on the generation of added value; that is, for each increase of 1 in the ratio of total assets, intangible assets increase the ratio of value-added to total assets by 0.297; i.e., value-added is increased significantly. This suggests the multiplicative capacity of intellectual capital investment. The result confirms H1: stock of intellectual capital affects performance; this is in line with previous papers (Janosević et al., 2013; Pulic, 2000; Sydler et al., 2014). The crisis

Table 1
Descriptive statistics by sector.

Variables	Sector					
	Building	Manu-facturing	Energy and chemical	Services	Commerce	Finance
Tot.Assets						
Mean	162	276	2,695	545	349	2,009
Std. deviation	507	1,335	17,389	3,456	2,520	7,444
Value Added / Tot.Assets						
Mean	–0.11	–0.18	–0.98	–0.10	–1.89	0.26
Std. deviation	0.91	0.89	3.06	0.80	2.23	1.51
Pers.Costs / Tot.Assets						
Mean	6.23	0.83	0.65	2.10	1.34	15.75
Std. deviation	88.21	13.05	6.56	20.41	7.25	119.50
Advert.Costs / Tot.Assets						
Mean	3.41	0.53	0.41	1.52	10.61	12.95
Std. deviation	27.24	3.15	2.62	7.68	181.48	62.64
R&D.Costs / Tot.Assets						
Mean	0.57	0.10	0.09	0.25	0.23	2.03
Std. deviation	4.20	0.55	0.56	2.24	1.82	12.07
Intang.Assets / Tot.Assets						
Mean	6.26	–0.18	0.68	1.56	115.78	44.74
Std. deviation	140.17	0.89	11.16	19.62	2,375.71	435.97
Observations	1,237	5,098	1,963	1,100	423	99

Source: Authors' calculations.

does not affect this relationship. The industry has a significant effect explaining the 19,5% of the variance.

The second part of the table shows the effect of investment in intellectual capital components on the generation of intangible assets. The effect of R&D and advertising expenses is similar, increasing by 1,46 and 1,89 for each point of these expenses on total assets. In both cases, the effect is very significant. This result shows the importance of investments in intellectual capital components in increasing the intellectual capital of the company, thus justifying the different investment policies in this asset class. So it confirms the importance of components of intellectual capital in generating value. The crisis does not affect the relationship between structural capital investments and the stock of intellectual capital. However, the crisis increases the effect of relational capital by 1,852 additional.

In addition, the results indicate the validity of the models based on inputs (Bontis et al., 2000; Lev et al., 2016; Tawy and Tollington, 2012) as potential indicators of intellectual capital. The combination of these two results is valid for the companies analyzed, and possibly generalizable to other companies. This is in keeping with Jardon, Martos (2012) and Khalique et al. (2015).

Finally, the last section of the table shows the effect of personnel expenditure on R & D costs and advertising expenses. Does investment in human capital improve investment in structural capital and relational capital? The results indicate that only the second of these relationships is significant during crisis time, i.e., an increase in personnel expenses implies an increase in advertising expenses, but not R&D expenses during crisis time. However, the effect of investment in human capital does not makes little difference outside the crisis. This suggests

Table 2
Effects of intellectual capital.

Variables	Coef.	Std. err.	*z*	*P* > | *z* |
Dep: value added				
Intangible assets	0.297	0.076	3.900	0.000
Crisis	0.044	0.142	0.310	0.759
Interaction with crisis	–0.010	0.008	–1.210	0.225
_Const.	0.557	0.056	9.940	0.000
Random-effects Parameters: IND	Estimate	Std. err.	[95% Conf. interval]	
sd(_cons)	0.136	0.040	0.076	0.243
sd(Residual)	0.276	0.003	0.271	0.282
LR test vs. linear model: chibar^2(01) = 339.67 Prob ≥ chibar^2 = 0.0000				
Variables	Coef.	Std. err.	*z*	*P* > | *z* |
Dep: Intangible assets				
Advertising expenses	1.8899	0.2615	7.2300	0.0000
interaction with crisis	1.8518	0.6255	2.9600	0.0030
R & D expenses	1.4597	0.1459	10.0000	0.0000
interaction with crisis	–0.3376	0.4731	–0.7100	0.4760
Crisis	–0.0009	0.0018	–0.5200	0.6020
_Const.	0.0110	0.0038	2.9100	0.0040
Random-effects Parameters: IND	Estimate	Std. err.	[95% Conf. interval]	
sd(_cons)	0.0085	0.0027	0.0045	0.0159
sd(Residual)	0.0591	0.0006	0.0579	0.0603
LR test vs. linear model: chibar^2(01) = 20.49 Prob ≥ chibar^2 = 0.0000				
Variables	Coef.	Std. err.	*z*	*P* > | *z* |
Dep: R&D expenses				
Personnel expenses	–0.0023	0.0010	–2.2500	0.0240
Interaction with crisis	–0.0001	0.0018	–0.0800	0.9340
Crisis	–0.0001	0.0002	–0.3900	0.6940
_Const.	0.0005	0.0002	2.3800	0.0170
Random-effects Parameters: IND	Estimate	Std. err.	[95% Conf. interval]	
sd(_cons)	0.0004	0.0002	0.0002	0.0008
sd(Residual)	0.2761	0.0028	0.2708	0.2816
LR test vs. linear model: chibar^2(01) = 20.49 Prob ≥ chibar^2 = 0.0000				
Variables	Coef.	Std. err.	*z*	*P* > | *z* |
Dep: Advertising expenses				
Personnel expenses	0.0001	0.0006	0.1200	0.9010
Interaction with crisis	0.0029	0.0011	2.7300	0.0060
Crisis	–0.0003	0.0001	–1.9000	0.0570
_Const.	0.0002	0.0001	2.2200	0.0270
Random-effects Parameters: IND	Estimate	Std. err.	[95% Conf. interval]	
sd(_cons)	0.0002	0.0001	0.0001	0.0005
sd(Residual)	0.0035	0.0000	0.0034	0.0036
LR test vs. linear model: chibar^2(01) = 3.32, Prob ≥ chibar^2 = 0.0342				

Note: Coef = coefficient; Std. err. = standard error; *z* = normal *t*-statistic, *P* > | *z* | = probability tail.
Source: Authors' calculations.

that investment in R&D does not always require a commitment to the acquisition of more highly qualified human resources, which involves increasing these expenses. These investments could be substitutive.

The effect of the industry appears significant in the case of added value. In the other cases, the effect is insignificant, indicating that the behavior is similar in all industries.

5. Discussion and conclusions

This paper assesses the effects of intellectual capital investment on the performance of some Russian companies in periods of crisis by using a new approach of measuring these effects using financial data.

The results show that, in the Russian context, only investment in structural capital and relational capital generates a higher stock of intellectual capital. It was expected that investments in human capital should consequently lead to an increase in investments in structural and relational capital, however, insignificant effects were found. The Russian context highlights the importance of R&D investment as the foundation of intellectual capital stock (Molodchik and Jardon, 2017; Ustinova and Ustinov, 2014; Volkov and Garanina, 2010). In addition, the paper shows the importance of relational capital in a period of crisis, according to (Golikova et al., 2012).

Voskoboynikov (2017) suggests that the lack of growth during the time of crisis was mostly due to the allocation of resources than to the lack of investments. The paper revealed a fall in total productivity during the time of crisis. The effect is more due to the lack of investments in technology than the lack of human capital. This paper shows that there is a substitution effect between investments in human capital and structural capital, confirming these results.

Berezinskaya (2017) suggests the importance of increasing investment demand to cope with the effects of economic crises. This work indicates that these investments should be oriented to R&D and marketing to increase the stock of intellectual capital that improves the added value of the companies.

Dabrowski (2019) suggests that a decline in productivity during the crisis is as a result of specific factors associated with structural and relational capital: a poor business and investment climate, the difficulty of diversifying away from the dominant role of the hydrocarbon sector, and the deterioration of relations policies and economics with the US and the EU that limit opportunities for trade, investment, and innovation. This paper confirms these results, showing the importance of investment in these areas as it increases the stock of intellectual capital and improves the generation of value in companies.

The method distinguishes between investment in intellectual capital and the stock of intellectual capital. Unlike (Jardon and Martinez-Cobas, 2021), this paper directly estimates each of the components of intellectual capital and the intellectual capital stock of intellectual capital. Given the Russian context (Puffer et al., 2016), some additional assumptions were added in the form of propositions that condition the empirical estimation, to check the model's validity. The results suggest that companies that invest in intellectual capital increase its stock and thereby generate value (Chen et al., 2004, 2015; Firer and Williams, 2003; Goebel, 2015; Huang, 2014; Labra and Sánchez, 2013; Lin and Edvinsson, 2012; Liu, 2006; Nazari and Herremans, 2007; Rooney and Dumay, 2016). Intangible assets can be considered a good indicator of the stock of intellectual capital, and investment in human, structural, and relational capital increases it (Iazzolino et al., 2014; Nazari and Herremans, 2007; Pulic, 2000; Sydler et al., 2014).

The results show that the indicators established to evaluate intellectual capital can be accepted, justifying models based on inputs or investments as potential

indicators of intellectual capital (Iazzolino et al., 2014; Nazari and Herremans, 2007; Pulic, 2000; Sydler et al., 2014).

This paper presents several findings that have practical implications for two types of agents. On the one hand, for academics, specialists in accounting, and intellectual capital analysts, intangible assets are a potential indicator of the stock of intellectual capital in companies, though as an accounting concept their use is limited (Cuozzo et al., 2017; Tawy and Tollington, 2012). In addition, according to the previous literature (Hunter et al., 2005; Sydler et al., 2014) expenses can be considered as an investment in intellectual capital.

There are some implications for advisors and managers of companies, especially in emerging countries. Investment in intellectual capital is important, but the key investments relate to human resources and human capital. This suggests that adequate training policies and well-trained human resource management personnel are the essential value generators in the present climate (Kets de Vries et al., 2004; Klochikhin, 2012; Molodchik and Jardon, 2017).

Dabrowski (2019) suggests that to increase its growth potential, Russia needs comprehensive economic and institutional reforms that go along the lines of integrating investments in human capital with other investments in intellectual capital to strengthen its stock. International cooperation and R&D investments are necessary.

This paper has some limitations, so its conclusions should be generalized with some caution. For example, there may exist indicators of intellectual capital other than those discussed herein. In particular, the use of intangible assets as a measure of the stock of intellectual capital is constrained by the accounting concept of these assets, which excludes several other elements of intellectual capital. However, while only one indicator is used for each component, if investment rather than stock is being considered it is not necessary to include all of them. Finally, the data are limited to the Russian economy, and therefore the conclusions cannot be completely generalized to apply to other countries.

References

Aguinis, H., & Molina-Azorín, J. F. (2015). Using multilevel modeling and mixed methods to make theoretical progress in microfoundations for strategy research. *Strategic Organization*, *13*(4), 353–364. https://doi.org/10.1177/1476127015594622

Andreeva, T., & Garanina, T. (2017). Intellectual capital and its impact on the financial performance of Russian manufacturing companies. *Foresight and STI Governance*, *11*(1), 31–40. https://doi.org/10.17323/2500-2597.2017.1.31.40.

Andrikopoulos, A. (2005). The real-options approach to intellectual capital analysis: A critique. *Knowledge and Process Management*, *12*(3), 217–224. https://doi.org/10.1002/kpm.230

Ardichvili, A. (2001). Leadership styles and work-related values of managers and employees of manufacturing enterprises in post-communist countries. *Human Resource Development Quarterly*, *12*(4), 363–383. https://doi.org/10.1002/hrdq.1003

Bamiatzi, V., Bozos, K., Cavusgil, S. T., & Hult, G. T. M. (2016). Revisiting the firm, industry, and country effects on profitability under recessionary and expansion periods: A multilevel analysis. *Strategic Management Journal*, *37*(7), 1448–1471. https://doi.org/10.1002/smj.2

Barajas, A., Shakina, E., & Fernández-Jardón, C. (2017). Acceleration effect of intangibles in the recovery of corporate performance after-crisis. *Research in International Business and Finance*, *42*(1), 1115–1122. https://doi.org/10.1016/J.RIBAF.2017.07.046

Beliaeva, T., Shirokova, G., Wales, W., & Gafforova, E. (2020). Benefiting from economic crisis? Strategic orientation effects, trade-offs, and configurations with resource availability on SME performance. *International Entrepreneurship and Management Journal*, *16*(1), 165–194. https://doi.org/10.1007/s11365-018-0499-2

Berezinskaya, O. (2017). Investment drought in the Russian economy: Structural characteristics and turnaround perspectives. *Russian Journal of Economics*, *3*(1), 71–82. https://doi.org/10.1016/j.ruje.2017.02.005

Bontis, N. (1996). Intellectual capital: an exploratory study that develops measures and models. *Management Decision*, *36*(2), 63–76. https://doi.org/10.1108/00251749810204142

Bontis, N., Keow, W. C. C., & Richardson, S. (2000). Intellectual capital and business performance in Malaysian industries. *Journal of Intellectual Capital*, *1*(1), 85–100. https://doi.org/10.1108/14691930010324188

Chen, J., Zhao, X., & Wang, Y. (2015). A new measurement of intellectual capital and its impact on innovation performance in an open innovation paradigm. *International Journal of Technology Management*, *67*(1), 1–25. https://doi.org/10.1504/IJTM.2015.065885

Chen, J., Zhu, Z., & Yuan Xie, H. (2004). Measuring intellectual capital: A new model and empirical study. *Journal of Intellectual Capital*, *5*(1), 195–212. https://doi.org/10.1108/14691930410513003

Cuozzo, B., Dumay, J., Palmaccio, M., & Lombardi, R. (2017). Intellectual capital disclosure: A structured literature review. *Journal of Intellectual Capital*, *18*(1), 9–28. https://doi.org/10.1108/JIC-10-2016-0104

Dabrowski (2019). Factors determining Russia's long-term growth rate. *Russian Journal of Economics*, *5*(4), 328–353. https://doi.org/10.32609/j.ruje.5.49417

Djankov, S., Qian, Y., Roland, G., & Zhuravskaya, E. (2006). Entrepreneurship in China and Russia compared. *Journal of the European Economic Association*, *4*(2–3), 352–365. https://doi.org/10.1162/jeea.2006.4.2-3.352

Fey, C. F., & Shekshnia, S. (2011). The key commandments for doing business in Russia. *Organizational Dynamics*, *40*(1), 57–66. https://doi.org/10.1016/j.orgdyn.2010.10.003

Filippov, S. (2011). Emerging Russian multinationals: Innovation, technology, and internationalization. *Journal of East-West Business*, *17*(2–3), 184–194. https://doi.org/10.1080/10669868.2011.634779

Firer, S., & Mitchell Williams, S. (2003). Intellectual capital and traditional measures of corporate performance. *Journal of Intellectual Capital*, *4*(3), 348–360. https://doi.org/10.1108/14691930310487806

Gaenslen, F. (1986). Culture and decision making in China, Japan, Russia, and the United States. *World Politics*, *39*(01), 78–103. https://doi.org/10.2307/2010299

Goebel, V. (2015). Estimating a measure of intellectual capital value to test its determinants. *Journal of Intellectual Capital*, *16*(1), 101–120. https://doi.org/10.1108/JIC-12-2013-0118

Golikova, V., Gonchar, K., & Kuznetsov, B. (2012). Does international trade provide incentives for efficient behaviour of Russian manufacturing firms? *Post-Communist Economies*, *24*(2), 277–289. https://doi.org/10.1080/14631377.2012.675163

Gunasekaran, A., Patel, C., & Tirtiroglu, E. (2001). Performance measures and metrics in a supply chain environment. *International Journal of Operations & Production Management*, *21*(1/2), 71–87. https://doi.org/10.1108/01443570110358468

Hormiga, E., Batista-Canino, R. M., & Sánchez-Medina, A. (2011). The role of intellectual capital in the success of new ventures. *International Entrepreneurship and Management Journal*, *7*(1), 71–92. https://doi.org/10.1007/s11365-010-0139-y

Huang, S.-Y. (2014). Intellectual capital measures: Literature review. In *Proceedings of PICMET '14 conference: Portland International Center for Management of Engineering and Technology; Infrastructure and Service Integration* (pp. 1266–1273). Portland: IEEE.

Hunter, L., Webster, E., & Wyatt, A. (2005). Measuring intangible capital: A review of current practice. *Australian Accounting Review*, *15*(36), 4–21. https://doi.org/10.1111/j.1835-2561.2005.tb00288.x

Iazzolino, G., Laise, D., & Migliano, G. (2014). Measuring value creation: VAIC and EVA. *Measuring Business Excellence*, *18*(1), 8–21. https://doi.org/10.1108/MBE-10-2013-0052

Janosević, S., Dzenopoljac, V., & Bontis, N. (2013). Intellectual capital and financial performance in Serbia. *Knowledge and Process Management*, *20*(1), 1–11. https://doi.org/10.1002/kpm

Jardón, C. M. (2015). The use of intellectual capital to obtain competitive advantages in regional small and medium enterprises. *Knowledge Management Research & Practice*, *13*(4), 486–496. https://doi.org/10.1057/kmrp.2014.4

Jardón, C. M., & Martos, M. S. (2012). Intellectual capital as competitive advantage in emerging clusters in Latin America. *Journal of Intellectual Capital*, *13*(4), 457–484. https://doi.org/10.1108/14691931211276098/FULL/PDF

Jardón, C. M., Molodchik, M., & Paklina, S. (2018). Strategic behaviour of Russian companies with regard to intangibles. *Management Decision*, *56*(11), 2373–2390. https://doi.org/10.1108/MD-04-2017-0399

Jardón, C. M., & Martinez-Cobas, X. (2021). Measuring intellectual capital with financial data. *PLOS ONE*, *16*(5), e0249989. https://doi.org/10.1371/JOURNAL.PONE.0249989

Jumpponen, J., Ikävalko, M., & Pihkala, T. (2008). Management and change in turbulent times: How do Russian small business managers perceive the development of their business environment? *Journal of Business Economics and Management*, *9*(2), 115–122. https://doi.org/10.3846/1611-1699.2008.9.115-122

Kets de Vries, M., Shekshnia, S., Korotov, K., & Florent-Treacy, E. (2004). The new global Russian business leaders: Lessons from a decade of transition. *European Management Journal*, *22*(6), 637–648. https://doi.org/10.1016/j.emj.2004.09.027

Khalique, M., Bontis, N., Abdul Nassir bin Shaari, J., & Hassan Md. Isa, A. (2015). Intellectual capital in small and medium enterprises in Pakistan. *Journal of Intellectual Capital*, *16*(1), 224–238. https://doi.org/10.1108/JIC-01-2014-0014

Kim, B.-Y., & Kang, Y. (2009). The informal economy and the growth of small enterprises in Russia 1. *Economics of Transition*, *17*(2), 351–376. https://doi.org/10.1111/j.1468-0351.2009.00348.x

Klochikhin, E. A. (2012). Russia's innovation policy: Stubborn path-dependencies and new approaches. *Research Policy*, *41*(9), 1620–1630. https://doi.org/10.1016/j.respol.2012.03.023

Krušinskas, R., & Bruneckienė, J. (2015). Measurement of intellectual capital of Lithuanian cities by a composite index. *Journal of Business Economics and Management*, *16*(3), 529–541. https://doi.org/10.3846/16111699.2012.729155

Labra, R., & Sánchez, M. P. (2013). National intellectual capital assessment models: A literature review. *Journal of Intellectual Capital*, *14*(4), 582–607. https://doi.org/10.1108/JIC-11-2012-0100

Ledeneva, A. (2008). Blat and Guanxi: Informal practices in Russia and China. *Comparative Studies in Society and History*, *50*(01), 118–144. https://doi.org/10.1017/S0010417508000078

Lev, B., Radhakrishnan, S., & Evans, P. C. (2016). *Organizational capital: A CEO's guide to measuring and managing enterprise intangibles* (Measuring and Managing Organizational Capital Series, No. 1). New York: Center for Global Enterprise.

Lin, C. Y.-Y., & Edvinsson, L. (2012). National intellectual capital model and measurement. *International Journal of Knowledge-Based Development, 3*(1), 58–82. https://doi.org/10.1504/IJKBD.2012.045570

Liu, C. C. (2006). Developing measurements of intellectual capital in the e-learning platform industry by the analytic hierarchy process. *International Journal of Innovation and Learning*, *3*(4), 374–386. https://doi.org/10.1504/IJIL.2006.009562

May, R. C., Stewart, W. H., Mccarthy, D. J., Puffer, S. M., & Ledgerwood, D. E. (2007). A test of the cross-cultural equivalency of the resistance to change scale in Russia and Ukraine. *Academy of Management Proceedings*, *2007*(1), 1–6. https://doi.org/10.5465/ambpp.2007.26501985

McCarthy, D. J., & Puffer, S. M. (2013). Business and management in Russia: A review of the post-Soviet literature and future research directions. *European Journal of International Management*, *7*(1), 74–111. https://doi.org/10.1504/EJIM.2013.052089

Michailova, S. (2000). Contrasts in culture: Russian and Western perspectives on organizational change. *Academy of Management Perspectives*, *14*(4), 99–112. https://doi.org/10.5465/AME.2000.3979819

Molodchik, M. A., Jardon, C. M., & Bykova, A. A. (2019). The performance effect of intellectual capital in the Russian context: Industry vs company level. *Journal of Intellectual Capital*, *20*(3), 335–354. https://doi.org/10.1108/JIC-10-2018-0190

Molodchik, M., & Jardon, C. M. (2017). Intellectual capital as enhancer of product novelty: An empirical study of Russian manufacturing SMEs. *Journal of Intellectual Capital*, *18*(2), 419–436. https://doi.org/10.1108/JIC-06-2016-0059

Nazari, J. A., & Herremans, I. M. (2007). Extended VAIC model: Measuring intellectual capital components. *Journal of Intellectual Capital*, *8*(4), 595–609. https://doi.org/10.1108/14691930710830774

Nonaka, I., & Takeuchi, H. (1995). *The knowledge-creating company: How Japanese companies create the dynamics of innovation*. New York: Oxford University Press.

Paklina, S., Molodchik, M., & Jardón, C. (2018). Strategic behavior of Russian companies with regard to intangibles. *Management Decision, 56*(11), 2373–2390. https://doi.org/10.1108/MD-04-2017-0399

Pönkä, H., & Zheng, Y. (2019). The role of oil prices on the Russian business cycle. *Research in International Business and Finance*, *50*, 70–78. https://doi.org/10.1016/j.ribaf.2019.04.011

Puffer, S. M., McCarthy, D. J., & Boisot, M. (2010). Entrepreneurship in Russia and China: The impact of formal institutional voids. *Entrepreneurship Theory and Practice*, *34*(3), 441–467. https://doi.org/10.1111/j.1540-6520.2009.00353.x

Puffer, S. M., McCarthy, D. J., & Jaeger, A. M. (2016). Institution building and institutional voids. *International Journal of Emerging Markets*, *11*(1), 18–41. https://doi.org/10.1108/IJoEM-02-2015-0027

Pulic, A. (2000). VAIC™ an accounting tool for IC management. *International Journal of Technology Management*, *20*(5–8), 702–714. https://doi.org/10.1504/IJTM.2000.002891

Ribeiro Soriano, D., & Castrogiovanni, G. J. (2010). The impact of education, experience and inner circle advisors on SME performance: Insights from a study of public development centers. *Small Business Economics*, *38*(3), 333–349. https://doi.org/10.1007/s11187-010-9278-3

Rooney, J., & Dumay, J. (2016). Intellectual capital, calculability and qualculation. *British Accounting Review*, *48*(1), 1–16. https://doi.org/10.1016/j.bar.2015.07.002

Roos, G., Roos, J., Dragonetti, N. C., & Edvinsson, L. (1997). *Intellectual capital: Navigating in the new business landscape*. New York: New York University Press.

Shekshnia, S. (2008). Founder-CEO succession: The Russian paradox. *European Journal of International Management*, *2*(1), 39–55. https://doi.org/10.1504/EJIM.2008.016927

Shirokova, G., Ivvonen, L., & Gafforova, E. (2019). Strategic entrepreneurship in Russia during economic crisis. *Foresight and STI Governance*, *13*(3), 62–76. https://doi.org/10.17323/2500-2597.2019.3.62.76

Ståhle, P., Ståhle, S., & Aho, S. (2011). Value added intellectual coefficient (VAIC): A critical analysis. *Journal of Intellectual Capital*, *12*(4), 531–551. https://doi.org/10.1108/14691931111181715

Sydler, R., Haefliger, S., & Pruksa, R. (2014). Measuring intellectual capital with financial figures: Can we predict firm profitability? *European Management Journal*, *32*(2), 244–259. https://doi.org/10.1016/j.emj.2013.01.008

Tawy, N. El, & Tollington, T. (2012). Intellectual capital: Literature review. *International Journal of Learning and Intellectual Capital*, *9*(3), 241. https://doi.org/10.1504/IJLIC.2012.047286

Urban, B., & Joubert, G. C. D. S. (2017). Multidimensional and comparative study on intellectual capital and organisational performance. *Journal of Business Economics and Management*, *18*(1), 84–99. https://doi.org/10.3846/16111699.2016.1255990

Ustinova, L., & Ustinov, A. (2014). Studying the impact of intellectual capital at industrial enterprises on their market capitalization. *Asian Social Science*, *10*(1), 15–20. https://doi.org/10.5539/ass.v10n20p15

Valieva, V. (2014). Organizational routines in Russian companies: Review of practices. *Serbian Journal of Management*, *9*(2), 241–262. https://doi.org/10.5937/sjm9-6362

Volkov, D., & Garanina, T. (2010). Intellectual capital structure: Case of Russian companies. In E. Tomé (Ed.), *Proceedings of the 11th European Conference on Knowledge Management: ECKM 2010* (Vol. 2, pp. 1064–1074). Leeds: Academic Publishing.

Voskoboynikov, I. B., Baranov, E. F., Bobyleva, K. V., Kapeliushnikov, R. I., Piontkovski, D. I., Roskin, A. A., & Tolokonnikov, A. E. (2021). Recovery experiences of the Russian economy: The patterns of the post-shock growth after 1998 and 2008 and future prospects. *Voprosy Ekonomiki*, *2021*(4), 5–31 (in Russian). https://doi.org/10.32609/0042-8736-2021-4-5-31

Voskoboynikov, I. B. (2017). Sources of long run economic growth in Russia before and after the global financial crisis. *Russian Journal of Economics*, *3*(4), 348–365. https://doi.org/10.1016/J.RUJE.2017.12.003

Welbourne, T. M., & Pardo-del-Val, M. (2009). Relational capital: Strategic advantage for small and medium-size enterprises (SMEs) through negotiation and collaboration. *Business Management*, *18*(5), 483–497. https://doi.org/10.1007/s10726-008-9138-6