Volume 15 • Issue 2 • 2023

sciendo

ISMSME International Society for Manufacturing, Service and Management Engineering

received: 8 December 2022
accepted: 18 May 2023

pages: 46-54

Improving the assessment of the diversification of construction companies

Romualdas Ginevičius

ABSTRACT
Various indicators are used to determine the level of company diversification. Their adequacy largely depends on the structure of the production programme. Its essential feature is the comparative weight of the main product in the total scope of the company's work. In this situation, the intensity of the diversification process is reflected by the decrease in the volume of this product due to the inclusion of new products in the production programme. In this case, the adequacy of the diversification indicator can be reflected by comparing the scale of the main product with changes in the value of these indicators. The adequacy will be higher with more changes in the values of diversification indicators corresponding to changes in the volumes of the main product. Four indicators of corporate diversification are the most well-known and widely used: the Berry index, the entropy measure, Utton's measure and the DG index. All of them have both strong and weak sides, so it is important to determine situations of the company's production programme in which diversification indicators are appropriate to use, i.e., in which situations their adequacy is the greatest. The research has established that if the comparative weight of the main product of the production programme in the total scope of work is greater than 0.5, then the adequacy of the entropy measure and index DG is higher compared to the Berry index and Utton's measure. If it is lower than 0.5, the other two diversification indicators should be used. The obtained results will help to more efficiently manage the process of diversification as a company's development strategy.

KEY WORDS
strategic management, diversification indicators, their adequacy

10.2478/emj-2023-0011

Corresponding author

Romualdas Ginevičius

Mykolas Romeris University, Lithuania
ORCID 0000-0003-2067-4398
e-mail: romualdas.ginevicius@mruni.eu

Introduction

In the course of market globalisation, companies' competitiveness becomes a condition for their successful commercial activity. In theory and practice, it is understood as the occupied part of both domestic and foreign markets. The company will be competitive if it is able to adapt to constantly changing external conditions. However, in this case, it will be able not only to maintain but also to improve its position. This can only be achieved by continuous development. The continuous development of the company is encouraged by the overall economic result and the

Ginevičius, R. (2023). Improving the assessment of the diversification of construction companies. *Engineering Management in Production and Services, 15*(2), 46-54. doi: 10.2478/emj-2023-0011

Tab. 1. Possible transformations of product development strategies into other development strategies

Objects	Products	
	modification of existing products	new products
Clients	Same	New
Markets	Same	New or same
Transformation to other development strategies	Penetration	Diversification

country's position in international markets. As an economic entity of the country, this encourages the company to increase the scale of its activities; otherwise, it will lose its position and decay. Thus, the pursuit of an ever-increasing market share becomes the condition for the company's competitiveness. They can increase this share and, at the same time, maintain and expand their positions only by maintaining development rates not lower than the overall growth of the market.

In this situation, companies apply various growth strategies, i.e., penetration, product improvement, market development and diversification (Ansoff, 1965; Ansoff, 1957). The simplest and least risky is the strategy of penetration or penetrating the market. In this case, the company only seeks to maintain its position in the markets where it has operated so far. To not lose customers, the quality of existing products is improved, better service is offered, the price is reduced etc. (Pierscionek, 1966).

Although involving more risk, better commercial performance results can be expected by applying a market development strategy. In this case, new products are offered to existing markets, or attempts are made to enter new markets with existing products. The greatest risk in this strategy comes from these market barriers, which protect markets from competitors (Sontheimer, 1989).

A product development strategy aims to increase sales volume by offering new products to existing markets. In this situation, the fundamental problem is the concept of a new product. This reflects the possible transformation of the product improvement strategy into other strategies presented in Table 1.

The most well-rounded is the company's growth diversification strategy. It refers to the release and sale of new products in new markets that differ from those produced so far. It is characterised by high complexity, which is why it is risky. On the other hand, it acquires a special significance under economic recession conditions faced by countries today. It is risky because it requires fundamental changes in the company's entire activity, i.e., technology, management etc. Technological changes are related to the adaptation of the production structure to the release of new products, and managerial changes are related to the reorganisation of the organisational management structure. In addition, implementing this strategy requires new knowledge and specialists who can work effectively with new technologies.

Quantitative assessment of its condition plays a special role in implementing diversification as a development strategy. In addition, effective management of this process is impossible. Several methods have been proposed for measuring unrelated diversification. All of them have strengths and weaknesses. Their scale largely depends on how the structure of the company's production programme is evaluated. Today no answer to this question exists. Therefore, assessing the adequacy of diversification indicators has both scientific and practical significance. The solution to this problem is relevant for engineering technology management because diversification is a new organisational management structure of the company, new technologies etc.

The article aims to propose ways to assess the suitability of one or another diversification indicator depending on the structure of the construction company's production programme.

1. Literature review

The diversification of companies, as one of their main growth strategies, is characterised by high complexity and is, therefore, quite controversial (Ansof, 1965; 1957). Attempts were often made to reduce or even deny this possibility of increasing production efficiency. It is based on the fact that a significant number of diversification projects have failed. The reason for this approach to this corporate growth strategy is insufficient knowledge of this phenomenon. It prevented a timely and sufficient assessment of the complex of conditions necessary for success. For example, existing organisational management structures that did not meet the operating conditions

of diversified companies were not changed and continued to rely on the existing qualifications of employees etc. The value of diversifying and the changed external situation, the business internationalisation has increased, economic crises have become more frequent etc. All this has made diversification one of the most important business management strategies. Today, it is applied by increasingly more international companies (Li, 2014).

The application of the diversification strategy in companies enables them to use capital flows more rationally to increase the efficiency and competitiveness of commercial and economic activities (Li, 2014; Atanasova & Li, 2019), which provides the opportunity to enter new markets, industry sectors or introduce new products to both existing and new markets (Errasti et al., 2014).

Many studies have focused on the impact of diversification and various aspects of corporate performance: reinvestment strategy (Mackey & Barney, 2013), capital costs and structure (Hann et al., 2013), corporate value (Kuppuswamy et al., 2014; Jara-Bertin et al., 2015; Nazarova, 2015; Hyland, 2003), profitability (Santarelli & Tran, 2016; Zahavi & Lavie, 2013; Becerra & Santaló, 2006; Dosi et al., 2020), production export (Gnangnon, 2021), land efficiency of business enterprises (Nurimbetov, 2017), corporate social responsibility (Patricia & Dastgir, 2017; Zandi et al., 2022) and dynamics of production sector diversification (Shikata et al., 2021).

Analyses have also been performed on the impact of banking diversification on the government securities market (Sawada, 2013) and the impact of technology on the diversification process (Wang et al., 2014; Li et al., 2014). Several studies have been devoted to examining the influence of the ownership form of business enterprises (Chung, 2013; Hernández-Trasobares & Galve-Górriz, 2016; Schmid et al., 2015; Sanchez-Bueno & Usero, 2014).

A separate line of research is geographical diversification (Qian et al., 2013; Yahaya et al., 2009; Chonghui et al., 2013; Thoumrungroje & Tansuhaj, 2005; Mauer et al., 2015; Gaur & Delios, 2015; Boehe & Jimenez, 2019).

An important research subject is the risk of diversification projects (Yücel & Önal, 2015; Busse et al., 2014; Jafarinejad et al., 2018). Diversification processes in corporate networks are also analysed (Chen & Jaw, 2014; Kim et al., 2014; Aivazian et al., 2019).

The literature analysis shows a lack of studies aimed at measuring the level of diversification of companies over several years.

Diversification measures of companies' activities should follow from their nature and forms of manifestation. However, two essential ones are unrelated and related diversification. Assignment to one or another form is determined by the "core" of the company's capabilities. It refers to the cumulative ability to accurately and efficiently combine the knowledge of markets with technology for the purpose of adapting to the external environment and, thus, making a profit (Wrigley, 1970). Related diversification reflects the qualitative side of this process and means the company's expansion into the release of new products, the production and sale of which are located in the "core" area of its capabilities. Unrelated diversification reflects the quantitative side of this process and refers to the inclusion in the production programme of such products, the release of which requires capabilities located outside the mentioned zone. As the globalisation of markets grows and competition intensifies, companies aiming to increase profits and ensure long-term financial stability try to minimise the impact of fluctuations in the volumes of one developed business on others. This can be achieved by entering unrelated markets that are far apart. In connection with this, the evaluation of the

Tab. 2. Measures of corporate diversification

The name of the diversification indicator	Source
Berry index	Berry, Ch. (1971). Corporate Growth and Industrial Diversification. Journal of Law and Economics, 14, 371-383
A measure of entropy	Jaquemin, A. P., & Berry, Ch. (1979). Entropy Measure of Diversification and Corporate Growth. Journal of Industrial Economics, 27, 46-57
Index D_G	Ginevičius, R. (2009). Quantitative evaluation of unrelated diversification of enterprise activities. Journal of Civil Engineering and Management, 15(1), 105-111
Utton's measure	Utton, M. A. (1977). Large Firm Diversification in British Manufacturing Industry, Economic Journal, 87, 96-113

achieved level of diversification of an unrelated company becomes important since this process can be managed if there is an opportunity to measure it.

This literature analysis showed that the same measures of diversification had been used for many years (Table 2).

All reviewed and other literature sources refer to the indicators listed in Table 2. For example, when analysing the diversification of construction companies, the indicator of the number of activities is applied (Šaparauskas & Vilutienė, 2005) and for oil and gas diversification processes — the entropy measure (Kirichenko et al., 2020), for the impact of diversification as a company development strategy on the commercial activity results of manufacturing companies — entropy measure and Berry index (Wang et al., 2018), and for diversification of agricultural systems — Berry index and entropy measure (Phuge et al., 2020) etc.

Most of the diversification measures originate in the US because, at that time, Europe had not yet had research efforts on how to manage this process. All proposals for measuring diversification can be divided into two groups. The first group includes indicators based on the number of activity areas, which are determined by various types of classifications. The indicators of the second group are based on the number of activity areas and the variation of work volumes between them. The indicators of the first group have significant shortcomings. The main ones are:

- difficulty in unequivocally distinguishing one area of the company's activity from another;
- the number of activities does not estimate their significance for production turnover and profit;
- the number of activities does not tell whether there is a relationship between the products produced by the firm (Wolf, 1995a; Wolf, 1995b).

The indicators of the second group are more accurate. The most famous and widely used Berry index (Berry, 1971):

$$D_B = 1 - D_H = 1 - \sum_{i=1}^{n} P_i^2; \quad (1)$$

here, D_B is the Berry diversification index; P_i — the relative volume of the i-th activity of the company; D_H — Herfindahl concentration index; n — number of activities ($i = \overline{1,n}$).

The Berry index was obtained by transforming Herfindahl's concentration index (Herfindahl, 1950):

$$D_H = \sum_{i=1}^{n} P_i P_i = \sum_{i=1}^{n} P_i^2. \quad (2)$$

The Berry index is equal to 0 if the company is specialised, i.e., develops its activities in only one direction. The more diversified it is, the closer D_B gets to 1.0. When there is no variation between the volumes of work, the D_B index is equal to:

$$D_B = 1 - \frac{1}{n}. \quad (3)$$

Based on Berry's index, an indicator was proposed, which is called the entropy measure of diversification (Jacquemin & Berry, 1979):

$$E_D = \sum_{i=1}^{n} P_i \, ln \frac{1}{P_i}, \quad (4)$$

here, E_D is a measure of the entropy of diversification.

Berry's diversification index has certain weaknesses. To avoid them, the proposed index D_G (Ginevičius, 2009)

$$D_G = 1 - \frac{1}{1 + \sum_{i=1}^{n-1} \frac{1 - P_{\max}}{1 - P}}. \quad (5)$$

here, $P_{\max}$ is the volume of the company's largest (main) activity.

In England, Utton's measure is widespread (Utton, 1997):

$$D_U = 2 \sum_{i=1}^{n} i P_i - 1. \quad (6)$$

here, D_U is Utton's measure of diversification.

From the fact that the diversification of the company's activities is proposed to be measured in various ways, it can be concluded that none of them is perfect. To exploit their strengths, it is necessary to determine cases in which it is appropriate to apply one or another method. In other words, their adequacy should be determined according to the current situation.

2. Research methodology

The possibilities and ways of assessing the adequacy of the company's diversification indicators emerge from its definition (Arbeitskreis, 1973). So, it follows the essential feature of diversification, i.e., the ratio of existing products to new ones. The more distant the latter, the more diversified the company's products. The extreme cases of a company's production programme are a specialised one-product company and a company that keeps adding new, unrelated products to its production programme. In this situation, the intensity of the diversification

process is reflected by the decrease in the relative weight of the main product due to the fragmentation of the production programme among a larger number of products. The legitimacy of such an approach is confirmed by indicators that were not so precise but reflected the essence of diversification (Kieser & Kubicek, 1992):

$$D = 100 - D^{\max}, \quad (7)$$

$$D = 100 - \sum_{i=1}^{n-1} \tilde{P}_i, \quad (8)$$

here, D is the diversification rate; $D^{\max}$ — the volume of the largest production programme product, per cent; $\tilde{P}$ — the volume of the i-th product (except for the largest product, %).

It follows from these formulas that the greater the comparative weight of the main product in the total volume of the company's production programme, the lower the value of the diversification indicator will be, and vice versa, as the comparative volume of the largest product decreases, the value of the diversification indicator will increase. Therefore, the adequacy of diversification indicators can be reflected by comparing the extent of changes in the main product with changes in these indicators. The adequacy of one or another indicator will be reflected by the size that shows the extent changes in the volumes of the main product correspond to changes in the values of the relevant diversification indicator:

$$K_{Dj} = 1 - \frac{\Delta P_k^{\max}}{\Delta D_{kj}}, \quad (9)$$

here, K_{Dj} is the adequacy indicator of the j-th diversification index; $\Delta P_k^{\max}$ — the ratio of the main product of the k-th production programme option to the volume of the main product of the next production programme option; D_{kj} — the same, for the j-th diversification indicator.

It follows from formula (9) that the closer in size the changes in the main product and the diversification indicator, the greater its adequacy. Ideally, when these changes coincide, $K_{Dj} = 0$.

Size ΔP_k is determined as follows:

$$\Delta P_{kj} = \frac{P_k^{\max}}{P_{k+1}^{\max}}; \quad (10)$$

here, $P_k^{\max}$ is the comparative weight of the k-th main product of the j-th company in the general production programme of the j-th company.

Size ΔD_{kj} is determined as follows:

$$\Delta D_{kj} = \frac{D_{kj}}{D_{kj+1}}; \quad (11)$$

here, D_{kj} is the value of the j-th diversification indicator of the k-th company.

Based on formula (9), it is possible to determine the case in which the indicator is appropriate to use when calculating the degree of diversification of the company's production programme.

3. Empirical study

To illustrate the application of the proposed methodology for determining the adequacy of diversification indicators, five construction companies with significantly different production programme structures were selected (Table 3).

Table 4 shows what products are offered by companies to the market.

To determine the adequacy of diversification indicators, it is first necessary to know their values. The results of the calculations are given in Table 5.

Table 5 was used to determine the relationships between the values of the main product volumes among the considered companies, i.e., size $\Delta P_k^{\max}$ (Table 6).

Table 6 and formula (11) were used to determine the ratio of values of diversification indicators among considered companies, i.e., size ΔD_{kj} (Table 7).

Knowing this quantity, formula (9) was used to determine the adequacy indicator of the diversification indicator of the considered construction companies K_{Dj} (Table 8).

To obtain a generalised picture of the adequacy of diversification indicators, the results of Table 8 should be converted into ranks (Table 9).

Table 9 shows that the situation of the first, second, third and fourth construction companies is best reflected by indices D_G and E_D and fifth — indices D_B and U_D. Based on this, it is possible to present a generalised model of the adequacy of diversification indicators of the considered construction companies (Fig. 1).

Fig. 1 shows that when the size of the construction company's production programme compared to the rest of it is greater than 50 per cent, it is appropriate to use indicators D_G and E_D for diversification assessment; if less than 50 per cent — indicators D_B and U_D.

Tab. 3. Structure of the production programme of the construction companies

Construction companies	Products						
	first (main)	second	third	fourth	fifth	sixth	seventh
First	0.85	0.05	0.04	0.04	0.02	–	–
Second	0.71	0.14	0.09	0.04	0.02	–	–
Third	0.54	0.39	0.03	0.02	0.02	–	–
Fourth	0.49	0.16	0.13	0.07	0.06	0.06	0.03
Fifth	0.28	0.25	0.20	0.15	0.12	–	–

Tab. 4. Content of the production programme of the construction companies

Construction company	Nature of activity									
	residential, commercial construction	Plumbing works	welfare works	building materials and products	field engineering networks	hydro-technical structures	roads, bridges, overpasses	rental of equipment, mechanisms	railway construction	other activities
First	+	+	–	–	+*	–	+	–	–	+
Second	+ *	–	–	–	–	+	+	+	+	–
Third	+ *	–	+	+	–	–	+	+	–	–
Fourth	–	–	+	+	+ *	–	–	+	–	+
Fifth	+ *	+	+	+	–	–	–	–	–	+

* main product.

Tab. 5. Meanings of the diversification indicators of the construction companies

Construction company	Diversification indicators			
	Berry index	D_G index	A measure of entropy	Utton's measure
First	0.271	0.384	0.619	0.660
Second	0.465	0.556	0.866	2.040
Third	0.501	0.684	0.965	2.180
Fourth	0.679	0.717	1.307	2.800
Fifth	0.780	0.799	1.566	0.920

Tab. 6. Ratios of main product volumes among the companies under consideration

first		Firm				
		second	third	fourth	fifth	
Firm	first		1.198	1.574	1.735	3.036
	second	1.198		1.315	1.449	2.536
	third	1.574	1.315		1.102	1.929
	fourth	1.735	1.449	1.102		1.750
	fifth	3.036	2.536	1.929	1.750	

Tab. 7. Calculation results of the diversification indicator adequacy of considered construction companies

		Construction company																			
		first				second				third				fourth				fifth			
		D_G	E_D	D_B	U_D	D_G	E_D	D_B	U_D	D_G	E_D	D_B	U_D	D_G	E_D	D_B	U_D	D_G	E_D	D_B	U_D
Firm	first					0.172	0.143	0.301	0.025	0.116	0.010	0.148	0.198	0.071	0.178	0.397	0.591	0.494	0.200	0.055	0.212
	second	0.172	0.143	0.301	0.025					0.069	0.180	0.220	0.231	0.124	0.96	0.008	0.150	0.164	0.402	0.512	0.244
	the third	0.116	0.010	0.148	0.198	0.069	0.180	0.220	0.231					0.051	0.174	0.187	0.142	0.691	0.189	0.239	0.011
	fourth	0.012	0.105	0.307	0.120	0.124	0.045	0.008	0.150	0.051	0.174	0.187	0.142					0.609	0.460	0.523	0.425
	the fifth	0.494	0.200	0.055	0.212	0.164	0.402	0.512	0.244	0.478	0.342	0.400	0.082	0.609	0.342	0.523	0.082				

Tab. 8. Ratios of diversification indicator values among the examined companies

Construction company	Construction company																			
	first				second				third				fourth				fifth			
	D_G	E_D	D_B	U_D	D_G	E_D	D_B	U_D	D_G	E_D	D_B	U_D	D_G	E_D	D_B	U_D	D_G	E_D	D_B	U_D
first					1.448	1.339	1.716	3.091	1.782	1.559	1.849	3.303	1.868	2.112	2.506	4.243	2.032	2.530	2.879	1.394
second	1.448	1.339	1.716	3.091					1.231	1.115	1.078	1.069	1.290	1.510	1.461	1.373	1.403	1.809	1.678	2.218
third	1.782	1.559	1.849	3.303	1.231	1.115	1.078	1.069					1.049	1.355	1.356	1.285	1.141	1.623	1.557	2.370
fourth	1.868	2.112	2.506	4.243	1.290	1.510	1.461	1.373	1.049	1.355	1.356	1.285					1.088	1.199	1.149	3.044
fifth	2.032	2.530	2.879	1.394	1.403	1.809	1.678	1.394	1.141	1.623	1.557	2.370	3.044	1.198	1.199	0.329				

Tab. 9. Ranks reflecting the adequacy of the diversification indicators of the considered construction companies

Firm	Construction company																			
	first				second				third				fourth				fifth			
	D_G	E_D	D_B	U_D	D_G	E_D	D_B	U_D	D_G	E_D	D_B	U_D	D_G	E_D	D_B	U_D	D_G	E_D	D_B	U_D
first					3	2	4	1	2	1	3	4	1	2	3	4	4	2	1	3
second	3	2	4	1					1	2	3	4	3	2	1	4	1	3	4	2
third	2	1	3	4	1	2	4	3					1	3	4	2	4	2	3	1
fourth	1	2	3	4	3	2	1	4	1	3	4	2					4	2	3	1
fifth	2	4	1	3	2	3	4	1	4	2	3	1	1	2	4	4				
Total	8	10	11	12	9	9	13	9	8	8	13	11	6	10	12	12	13	9	1	7
Sum of ranks	8		21		18		22		16		24		15		26		22		8	

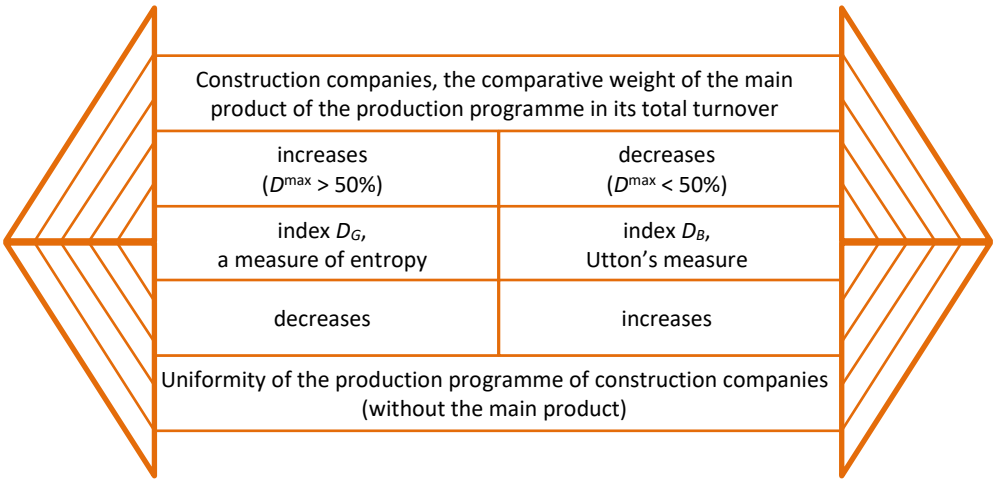

Fig. 1. Adequacy of diversification indicators depending on the structure of the construction company's production programme

Conclusions

With market globalisation and intensifying competition, the strategy of business diversification is becoming increasingly important for companies. It provides opportunities to adapt to constantly changing external conditions and, thus, maintain and improve the position. The success of a diversification strategy depends, to a large extent, on the ability to measure its achieved level at a desired point in time. Today, four indicators for measuring unrelated diversification are the most well-known and widely used: Berry index D_B, the entropy measure E_D, Utton measure D_U and the index D_G. On the other hand, the question remains which indicator to apply in a specific case and, at the same time, increase the adequacy of the assessment. The conducted research found that it largely depends on the structure of the company's production programme, which is sufficiently accurately reflected by the comparative weight of the main product in the total volume of work. As the degree of diversification increases, this share decreases. In this case, the adequacy of the company's activity diversification indicator can be reflected by changes in the scale of the main product compared to changes in the value of this indicator.

It has been established that if the relative size of the main product of the construction company's production programme compared to the rest of its scope is greater than 50%, then it is appropriate to use the Berry index and the entropy measure to assess the

level of diversification if it is less than 50% — Utton measure and index D_G.

The limitations of the proposed methodology can be attributed to the fact that it is more suitable for the evaluation of the structure of the production programme of a construction company with a clear main product. The weakness of the methodology can be attributed to its remaining unclear sensitivity, i.e., to the extent changes in the main product correspond to changes in the adequacy of the considered diversification indicators; on the strong side, compared to the changes in the main product of the production programme, the adequacy indicator changes more.

Literature

Aivazian, V. A., Rahaman, M. M., & Zhou, S. (2019). Does corporate diversification provide insurance against economic disruptions? *Journal of Business Research, 100*(C), 218-233. doi: 10.1016/j.jbusres.2019.03.044

Ansoff, H. (1957). Strategies for Diversification. *Harvard Business Review, 35*(5), 111-125.

Ansoff, H. (1965). *Corporate Strategy.* New York: McGraw-Hill Book Comp.

Arbeitskreis. (1973). Diversifizierung. *Zeitschrift für betriebswirtschaftliche Forschung, 25*, 294-335.

Atanasova, Ch., & Li, M. (2019). Do all diversified firms hold less cash? The role of product market competition. *Journal of International Financial Markets, 59*(C), 134-152. doi:10.1016/j.intfin.2018.11.005

Becerra, M., & Santaló, J. (2006). The Effect of Diversification on Performance Revisited: How the Dominance of Diversifiers Versus Specialists Drives the Diversification-Performance Relationship. *Management Research, 4*(1), 23-34. doi: 10.2753/JMR1536-5433040102

Berry, C. (1971). Corporate Growth and Industrial Diversification. *Journal of Law and Economics, 14*, 371-383.

Boehe, D., & Jimenez, A. (2019). Does the sequencing of related and unrelated export diversification matter? Evidence from Colombian exporters. *International Business Review, 27*(6), 1141-1149.

Busse, M., Dacorogna, M., & Kratz, M. (2014). The Impact of Systemic Risk on the Diversification Benefits of a Risk Portfolio. *Risks, 2*(3), 260-276. doi: 10.3390/risks2030260

Chen, Y.-Y., & Jaw, Y. L. (2014). How do business groups' small world networks affect diversification, innovation, and internationalization? *Asia Pacific Journal of Management, 31*(4), 1019-1044. doi: 10.1007/s10490-014-9385-9

Chonghui, J., Yongkai, M., & Yunbi, A. (2013). International diversification benefits: an investigation from the perspective of Chinese investors. *China Finance Review International, 3*(3), 225-249.

Chung, H.-M. (2013). The role of family management and family ownership in diversification: The case of family business groups. *Asia Pacific Journal of Management, 30*(3), 871-891. doi: 10.1007/s10490-012-9284-x

Dosi, G., Mathew, N., & Pugliese, E. (2020). What a firm produces matters: processes of diversification, coherence and performances of Indian manufacturing firms. *Research Policy*, 104152.

Errasti, N., Zabaleta, N., & Ruiz, M. (2014). Competitive intelligence as a key tool for SMEs' diversification process. *7th International Conference of Education, Research and Innovation (ICERI),* (pp. 1062–1068). Seville.

Gaur, A., & Delios, A. (2015). International Diversification of Emerging Market Firms: The Role of Ownership Structure and Group Affiliation. *Management International Review, 55*, 235-253. doi: 10.1007/s11575-015-0240-0

Ginevičius, R. (2009). Quantitative evaluation of unrelated diversification of enterprise activities. *Journal of Civil Engineering and Management, 15*(1), 105-111. doi: 10.3846/1392-3730.2009.15.105-111

Gnangnon, S. (2021). Manufacturing exports and services export diversification. *The International Trade Journal, 35*(3), 221-242.

Hann, R., Ogneva, M., & Ozbas, O. (2013). Corporate Diversification and the Cost of Capital. *Journal of Finance, 68*(5), 1961-1999. doi: 10.1111/jofi.12067

Herfindahl, O. (1950). *Concentration in the US Steel Industry. Dissertation.* New York: Columbia University.

Hernández-Trasobares, A., & Galve-Górriz, C. (2016). The influence of family control on decisions regarding the specialization and diversification of business groups. *BRQ Business Research Quarterly, 19*(2), 73-89. doi: 10.1016/j.brq.2015.09.001

Hyland, D. C. (2003). The Effect of Diversification on Firm Value: a Pre- and Post- Diversification Analysis. *Studies in Economics and Finance, 21*(2), 22-39. doi: 10.1108/eb028773

Jackuemin, A. P., & Berry, C. H. (1979). Entropy Measure of Diversification and Corporate Growth. *Journal of Industrial Economics, 27*, 46-57.

Jafarinejad, M., Ngo, T., & Escobari, D. (2018). Disentangling the impacts of industrial and global diversification on firm risk. *Global Finance Journal, 37*(C), 39-56.

Jara-Bertin, M., López-Iturriaga, F. J., & Espinosa, Ch. (2015). Diversification and control in emerging markets: The case of Chilean firms. *BRQ Business Research Quarterly, 18*(4), 259-274. doi: 10.1016/j.brq.2015.01.002

Kieser, A., & Kubicek, H. (1992). *Organization. 3. Völling neu Bearb. Aufl.* Berlin, New York: de Gruyter.

Kim, S. W., Kim, T., Choi, K.-H., & Yang, J. A. (2014). Comparative Analysis on the Diversification Effects between Firm Performance and Whole Supply Chain Performance in Korea and Japan. *Journal of Korea Trade, 18*(1), 1-27.

Kirichenko, O. S., Komzolov, A. A., Nazarova, Y. A., Shcherbakova, N. S., & Kirichenko, T. V. (2020). Diversification of Russian Oil and Gas Upstream Companies. *International Journal of Energy Economics and Policy, 10*(3), 112-118. Retrieved from https://econjournals.com/index.php/ijeep/article/view/9194

Kuppuswamy, V., Serafeim, G., & Villalonga, B. (2014). The Effect of Institutional Factors on the Value of Corporate Diversification. *Finance and Strategy, 31*, 37-68. doi: 10.1108/S0742-332220140000031000

Li, D., Li, L., & Huang, Y. (2014). Technological Diversification Effect on Business Performance: a Probing into Intermediaries Role of Product Innovation Strategy. *8th International Conference on Intelligent Systems and Knowledge Engineering (ISKE)* (pp. 181–190). Shenzhen.

Li, L. (2014). The Research on Management of Private Enterprise in Diversification Strategy Environment.

Mackey, T. B., & Barney, J. B. (2013). Incorporating opportunity costs in strategic management research: The value of diversification and pay-out as opportunities forgone when reinvesting in the firm. *Strategic Organization, 11*(4), 347-363.

Mauer, D. C., Wang, S., Wang, X., & Zhang, Y. (2015). Global diversification and IPO returns. *Journal of Banking & Finance, 58*, 436-456. doi: 10.1016/j.jbankfin.2015.05.015

Nazarova, V. (2015). Corporate Diversification Effect on Firm Value (Unilever Group Case Study). *Annals of Economics and Finance, 16*(1), 173-198.

Nurimbetov, T. (2017). Diversification of the manufacturing activity in the agricultural sector and methodological approaches to evaluate its level. *ISJ Theoretical & Applied Science, 10*(54), 77-82.

Patrisia, D., & Dastgir, S. (2017). Diversification and corporate social performance in manufacturing companies. *Eurasian Business Review, 7*(1), 121-139.

Phuge, S. C., Deorukhakar, A. C., Meshram, A. V., Thorat, V. A., & Kshirsagar, P. J. (2020). Evaluation of Farming Systems for Diversification and Sustainability in North Konkan Coastal Zone of Maharashtra. *International Journal of Current Microbiology and Applied Sciences, 11*, 121-127.

Pierscionek, Z. (1966). *Strategie rozwoju firmy.* Warszawa: Wydawnictwo Naukowe PWN.

Qian, G., Li, L., & Rugman, A. M. (2013). Liability of country foreignness and liability of regional foreignness: Their effects on geographic diversification and firm performance. *Journal of International Business Studies, 44*(6), 635-647.

Sanchez-Bueno, M., & Usero, B. (2014). How may the nature of family firms explain the decisions concerning international diversification? *Journal of Business Research, 67*(7), 1311-1320. doi: 10.1016/j.jbusres.2013.09.003

Santarelli, E., & Tran, H. T. (2016). Diversification strategies and firm performance in Vietnam Evidence from parametric and semi-parametric approaches. *Economics of Transition and Institutional Change, 24*(1), 31-68. doi: 10.1111/ecot.12082

Šaparauskas, J., & Vilutienė, T. (2005). Statybos įmonių veiklos diversifikacijos alternatyvų analizė (Analysis of construction companies diversification alternatives]. *Ūkio technologinis ir ekonominis vystymas (Technological and Economic Development of Economy), 11*(4), 310-318.

Sawada, M. (2013). How does the stock market value bank diversification? Empirical evidence from Japanese banks. *Pacific-Basin Finance Journal*, 40-61. doi: 10.1016/j.pacfin.2013.08.001

Schmid, T., Ampenberger, M., Kaserer, Ch., & Achleitner, A.-K. (2015). Family Firm Heterogeneity and Corporate Policy: Evidence from Diversification Decisions. *Corporate Governance: An International Review, 23*(3), 285-302. doi: 10.1111/corg.12091

Shikata, N., Imahashi, H., & Gemba, K. (2021). An analysis of diversification dynamics of R&D activities and external collaboration in major manufacturing industries in Japan. *Forum Scientiae Oeconomia, 9*(4), 79-97.

Sontheimer, D. (1989). Visual information processing in infancy. *Developmental Medicine & Child Neurology (DMCN), 31*(6), 787-796. doi: 10.1111/j.1469-8749.1989.tb04075.x

Thoumrungroje, A., & Tansuhaj, P. (2005). Entrepreneurial Strategic Posture, International Diversification, and Firm Performance. *Multinational Business Review, 3*(1), 55-73.

Utton, M. (1977). Large Firm Diversification in British Manufacturing Industry. *Economic Journal, 87*, 96-113.

Wang, W. K., Ting, W. K., Kuo, K. C., Kweh, Q. L., & Lin, Y. H. (2018). Corporate diversification and efficiency: evidence from Taiwanese top 100 manufacturing firms. *Operational Research, 18*(1), 187-203.

Wolf, J. (1995). Die Messung des Diversifikationsgrads von Unternehmen (I). *Wirtschaftsstudium, 5*, 439-445.

Wolf, J. (1995). Die Messung des Diversifikationsgrads von Unternehmen (II). *Wirtschaftsstudium, 6*, 519-523.

Wrigley, L. (1970). *Divisional Autonomy and Diversification.* Boston: Harvard Business School.

Yahaya, M. I., Aliyu, M. I., & Kabir, B. (2009). Geographic diversification, performance, and the risk profile of UK construction firms. *Journal of Engineering, Design and Technology, 7*(2), 171-185.

Yücel, E., & Önal, Y. B. (2015). Industrial Diversification and Risk in an Emerging Market: Evidence from Turkey. *Emerging Markets Finance and Trade, 51*(6), 1292-1306. doi: 10.1080/1540496X.2015.1011544

Zahavi, T., & Lavie, D. (2013). Intra-industry diversification and firm performance. *Strategic Management Journal, 34*(8), 978-998. doi: 10.1002/smj.2057

Zandi, G., Shahzad, I. A.,Bajaber, N., Nowodziński, P., & Shahid M. S. (2022). Relationship between corporate governance and cost of equity capital. *Polish Journal of Management Studies*, *26*(1), 386-406. doi: 10.17512/pjms.2022.26.1.24