

Article

Analysis of The Effectiveness of Product Diversification in The Activities of Construction Enterprises of Uzbekistan

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Abstract: The study examines the reforms implemented to diversify production practices in the country's industrial sector, using the example of local construction enterprises "Durable Stone" and "Durable JBI Company". The diversification practices of production processes in these construction companies are analyzed by evaluating the levels of horizontal, vertical and geographical diversification in the enterprises under comparative analysis. The results are assessed using the international "Entropy" method

Keywords: "Durable Stone", "Durable JBI Company", diversification, vertical and horizontal diversification processes, comparative analysis, "Entropy" method

1. Introduction

To assess the impact of reforms aimed at diversifying production practices in the country's industrial sector on enterprise performance, we have considered it necessary to analyze the operations of certain local construction companies, such as "Durable Stone" and "Durable JBI Company". In recent years, these two companies have ranked among the leaders in the national construction industry. The primary consumers of the products manufactured by these companies include leading construction and housing development firms such as "Discover Invest," "Murad Buildings," "KOC Construction," "Tashkent Index," "Golden House," "Enter Engineering," "Mega Luks," "Orient House," "IT Park," and "The Tower".

The "Durable Stone" construction company produces curbstones, paving blocks, tiles for walkways and peripheral products. Information about the company's activities is presented in Appendix 4, based on which we have deemed it necessary to analyze the efficiency of product diversification indicators in the company's operations. The company is notable for consistently prioritizing the process of diversifying its products. According to the analysis of the company's activities, horizontal product diversification was implemented at the company's base in 2020-2021, while vertical diversification processes have been consistently carried out from 2020 to the present day. This situation leads to the conclusion that both vertical and horizontal diversification processes were implemented simultaneously in the company's operations during 2020-2021.

2. Materials and Methods

In writing the research work, logical and comparative analysis, induction and deduction, analysis and synthesis, and statistical grouping methods were used.

3. Results

According to the analysis of the data provided by the "Durable Stone" construction company, in 2020, the product diversification in the company's operations accounted for 100.0% relative to the volume of products manufactured by the company. However, in 2021, this indicator equaled 14.0%. Specifically, the vertical diversification processes of

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product manufacturing in the company reached 86.0% in 2021, while this indicator amounted to 100.0% in 2022-2023.

At the same time, the product diversification processes implemented in the operations of the “Durable Stone” construction company during 2022-2023 proved effective, enabling the company to enter foreign markets and begin exporting its products. This situation allows for the conclusion that the horizontal and vertical diversification processes carried out in the company laid the foundation for the emergence of geographical diversification. According to the analysis, the share of construction products exported by the company in 2022-2023 increased from 2.2% to 7.1% of the total product composition. This indicator can also be evaluated as a measure of the geographical diversification processes in the company’s operations.

To ensure the efficiency of diversification processes, the “Durable Stone” construction company has consistently prioritized equipping its production processes with modern manufacturing technologies. According to the analysis, the number of technologies used in the company’s production processes increased by 1.7 times during 2020-2023, rising from 14 to 24. Additionally, the average annual value of production technologies in the company during the analyzed period increased by 2.9 times.

As a result of the product diversification processes implemented in the company’s operations, the number of products manufactured by the company increased by 20.6%, and the value of the products produced rose by 59.9% during the analyzed period. This situation indicates that, due to the product diversification processes, the company is transitioning to the production of high-tech products with high added value. Based on the data provided by the “Durable Stone” construction company regarding the product diversification processes, it can be concluded that the measures being implemented in this direction have a positive impact on the company’s operations.

The second company selected for evaluating the effectiveness of product diversification in a construction company is “Durable JBI Company”. Since 2019, the company has been producing construction products such as reinforced concrete products, large slabs, concrete pipes, cast stairs and other construction materials for residential buildings, various structures and facilities, roads, sewage lines and different industrial sectors. Similar to “Durable Stone”, “Durable JBI Company” has consistently prioritized the process of diversifying its construction product manufacturing. Therefore, we deemed it necessary to analyze the operations of this company.

The “Durable JBI Company” construction company, unlike “Durable Stone”, has focused more on horizontal product diversification processes over a longer period, specifically from 2019 to 2022. According to the analysis, the horizontal product diversification implemented in 2019 accounted for 100.0% relative to the total volume of products manufactured. In 2020, this indicator was 32.4%, in 2021 it was 23.6% and by 2022 it had decreased to 14.7%. This situation indicates that the product diversification processes in “Durable JBI Company” have gradually transitioned from horizontal diversification processes to vertical diversification processes.

At the same time, as a result of the product diversification processes implemented in the operations of “Durable JBI Company”, the company has started exporting products to foreign markets. This indicates that, similar to “Durable Stone”, geographic diversification has been achieved due to the effectiveness of horizontal and vertical diversification processes. According to the analysis, the share of exported products in the total product composition manufactured by “Durable JBI Company” increased from 1.4% to 6.9%, which demonstrates the rapid development of the geographic product diversification indicator.

In the operations of “Durable JBI Company”, priority has been given to equipping production processes with modern technological tools for the implementation of vertical product diversification. According to the analysis of the data provided by the company, the number of technologies used in the production process increased 3.4 times, from 39 to 134, during the years 2019-2023. During the analyzed period, the average annual value of these technologies increased 3.1 times.

As a result of the product diversification implemented in the operations of “Durable JBI Company”, the number of products manufactured by the company increased 3.3 times from 2019 to 2023, while the value of the manufactured products increased 4.0 times. This indicates that the effectiveness of the product diversification process in the production of construction products at “Durable JBI Company” is higher than the indicator of “Durable Stone”.

At the same time, according to the comparative analysis of the economic efficiency indicators achieved through the implementation of product diversification processes in both companies, it was found that the revenue from product sales at “Durable JBI Company” increased by 7.8 times during the analyzed period, while this indicator at “Durable Stone” construction company decreased by approximately 7.3%.

According to the analysis of the indicators for implementing horizontal product diversification in the activities of “Durable JBI Company” and “Durable Stone” construction companies, initially, both companies prioritized the production of new types of products when entering the construction industry market. Later, based on their relative advantages in the production of construction products, they transitioned to vertical diversification processes, focusing on deep specialization in the production of construction products. As a result, the quality indicators of the products produced by the companies improved, the opportunity to enter external markets was achieved and geographic product diversification took place, leading to the sale of construction products in external markets. This situation indicates that the development pattern of diversification processes in the activities of the construction companies is similar, allowing for nearly identical efficiency outcomes.

In this regard, we found it necessary to evaluate the levels of horizontal, vertical, and geographic diversification in the product manufacturing processes of construction companies through a comparative analysis. For this purpose, we decided to use the “Entropy” method, which is applied in the practices of international organizations to assess the product diversification index in a company. It is calculated using the following formula:

$$D_m = \frac{(100 - \sum M_d)}{100}$$

Here:

$\sum M_d$ – the share of diversified products in the total product composition, in percentage.

Based on the formula provided above, we will first analyze the indicators related to the horizontal product diversification processes implemented in both companies. In this case, calculations will need to be carried out, taking into account the periods during which horizontal diversification was implemented.



Figure 1. The degree of horizontal product diversification in construction companies

According to the calculations carried out, in the activities of “Durable JBI Company”, the coefficient of horizontal product diversification in 2020-2022 increased from 0.676 to 0.853, while in “Durable Stone” construction company, this indicator reached 0.860 in 2021. It should be noted that both companies, namely “Durable JBI Company” in 2019 and “Durable Stone” in 2020, initially prioritized the production of new types of products

upon entering the construction product market, which is why the coefficient of horizontal product diversification in their activities was equal to 1.000.

To form general conclusions regarding the level of horizontal product diversification in construction companies, it is necessary to calculate the arithmetic mean of the results obtained. According to the calculations carried out, in the activities of "Durable JBI Company", the level of horizontal product diversification averaged 0.823, while in "Durable Stone", this indicator was 0.930.

The next step involves evaluating the level of vertical product diversification in the activities of these companies. It is worth noting that in the case of "Durable JBI Company", vertical product diversification began in 2020 and currently, full diversification processes in this direction are being carried out. In contrast, in "Durable Stone", such diversification processes have been consistently implemented since 2021 (see Figure 2).



Figure 2. Level of vertical product diversification in construction companies

According to the calculations, the degree of vertical product diversification in the activities of "Durable JBI Company" decreased by 54.6%, from a coefficient of 0.324 in 2020-2022 to 0.147 in 2022. By 2023, it was determined that the company had fully transitioned to vertical diversification. At the same time, in the activities of "Durable Stone" construction company, this indicator was equal to a coefficient of 0.140 in 2021 and it was determined that the company fully transitioned to vertical diversification in 2022-2023.

To formulate general conclusions, it is necessary to calculate the arithmetic mean of the level of vertical product diversification in the activities of both companies. According to the calculations, the average level of vertical product diversification in the operations of "Durable JBI Company" amounted to a coefficient of 0.427, while in the case of "Durable Stone," this indicator equaled 0.713.

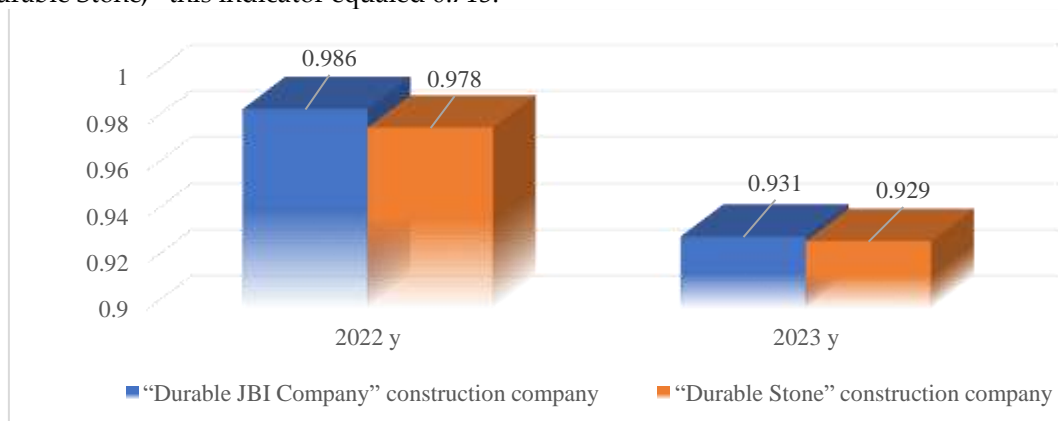


Figure 3. The Level of Vertical Product Diversification in Construction Companies

Considering that geographic product diversification was observed in the activities of both companies during 2022-2023, we deemed it necessary to also evaluate the diversification levels in this direction. According to the calculations performed, during the period under review, the level of geographic product diversification in the operations of "Durable JBI Company" decreased by 5.5%, dropping from a coefficient of 0.986 to

0.931. Similarly, in the activities of “Durable Stone”, the diversification level decreased by 5.0%, falling from a coefficient of 0.978 to 0.929 (see Figure 3).

The arithmetic mean indicators of geographic product diversification levels for the analyzed companies were 0.959 for “Durable JBI Company” and 0.953 for “Durable Stone”.

The choice of the “Entropy” method for evaluating the level of product diversification in construction companies is justified by its relative ease of application in practice compared to other methods and its capability to analyze product diversification levels across various directions. In this regard, we found it necessary to present the average indicators of product diversification levels obtained for the analyzed directions of “Durable JBI Company” and “Durable Stone” in Figure 4 below.

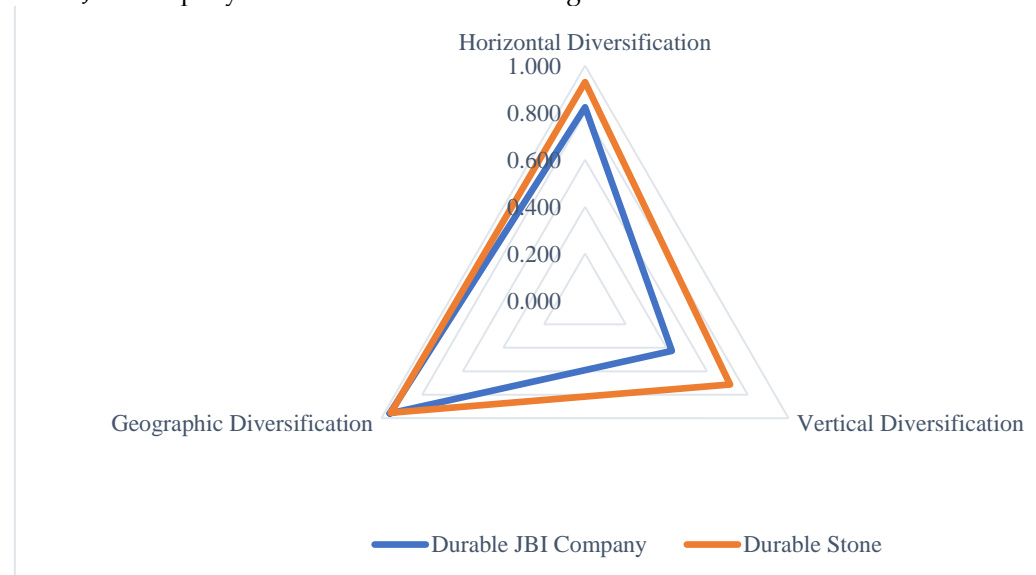


Figure 4. Indicators of Product Diversification Levels by Directions in Construction Companies

According to the data in Figure 4, we can observe that the level of product diversification in “Durable Stone” construction company is stronger compared to the activities of “Durable JBI Company”. Only in the geographic direction of product diversification, the indicator of “Durable JBI Company” (0.959) is slightly higher (0.006) than that of “Durable Stone” (0.953).

The general conclusions for determining the level of product diversification in construction companies through the proposed ‘Entropy’ method are based on the following formula:

$$M_i^d = \sqrt[n-i]{\overline{D_{m_1}} * \overline{D_{m_2}} * \overline{D_{m_3}} * \dots * \overline{D_{m_i}}}$$

Here:

$\overline{D_{m_1}} * \overline{D_{m_2}} * \overline{D_{m_3}} * \dots * \overline{D_{m_i}}$ – the product diversification level in a construction company, based on the average indicators obtained by direction, is expressed as the product of the indicators;

$n = i$ – the number of directions for evaluating the level of product diversification in a construction company.

Considering that the results of the product diversification level evaluation coefficient using the proposed “Entropy” method in construction companies range from 0.001 to 1.000, we believe it is appropriate to classify them in the following manner:

0,001-0,333 – lowly diversified

0,334-0,554 – moderately diversified

0,555-0,700 – significantly diversified

0,701-0,900 – highly diversified

0,900-1,000 – significantly highly diversified.

To obtain the final result based on the indicators of the construction companies being evaluated for the level of product diversification, the calculations will be performed in the following order:

The overall indicator of the product diversification level in “Durable JBI Company”:

$$M_i^d = \sqrt[3]{0,823 * 0,427 * 0,959} = \sqrt[3]{0,337013} = 0,873$$

The overall indicator of the product diversification level in “Durable Stone” company:

$$M_i^d = \sqrt[3]{0,930 * 0,713 * 0,953} = \sqrt[3]{0,631925} = 0,944$$

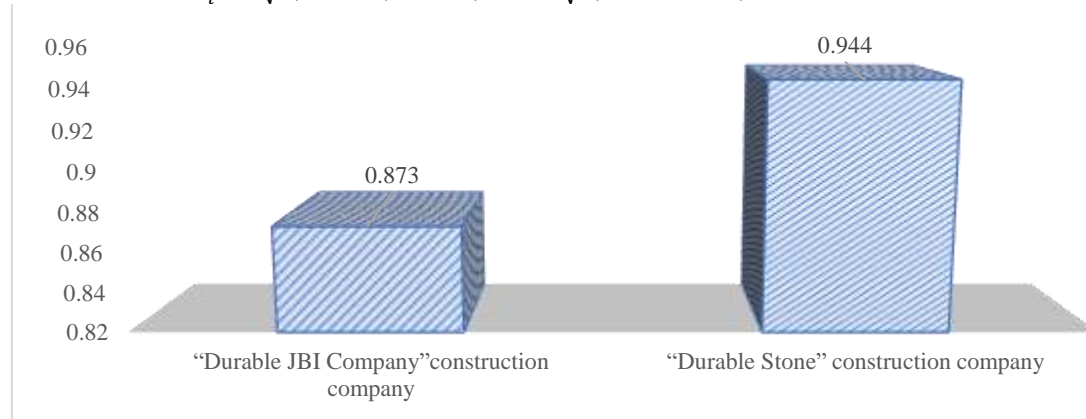


Figure 5. The Level of Product Diversification in Construction Companies

Based on the results of the calculations carried out to form the final conclusions, it was determined that the product diversification level in “Durable JBI Company” is high (0.873), while in “Durable Stone”, it is significantly high (0.944).

4. Discussion

The comparative analysis of product diversification between “Durable Stone” and “Durable JBI Company” highlights the distinct strategies and outcomes achieved by both companies in their efforts to enhance operational efficiency and market reach. The findings reveal that while both companies initially focused on horizontal diversification to expand their product lines, they gradually transitioned to vertical diversification to deepen their specialization and improve product quality. This strategic shift has significantly contributed to their ability to penetrate foreign markets, indicating the emergence of geographic diversification as a direct result of effective horizontal and vertical diversification processes.

The “Entropy” method applied in this study effectively quantifies the levels of diversification across horizontal, vertical, and geographic dimensions. The results show that “Durable Stone” achieved a significantly high product diversification level (0.944), outperforming “Durable JBI Company,” which attained a high diversification level (0.873). This suggests that “Durable Stone” has implemented a more balanced and integrated diversification strategy, leading to superior performance in terms of product variety, technological advancement, and market expansion.

Interestingly, while “Durable JBI Company” demonstrated stronger growth in the number of products and technological capabilities—reflected in a 3.3-fold increase in product variety and a 3.4-fold rise in technological adoption—its overall diversification efficiency was slightly lower than that of “Durable Stone.” This disparity can be attributed to the more rapid and consistent transition of “Durable Stone” towards vertical diversification, which resulted in higher value-added products and more stable revenue streams despite a decrease in total sales revenue during the analyzed period.

Furthermore, the geographic diversification levels of both companies were relatively close, with “Durable JBI Company” (0.959) slightly outperforming “Durable Stone” (0.953). This minor difference suggests that both companies have successfully leveraged their diversification strategies to establish a presence in foreign markets, although “Durable Stone” demonstrated a more robust overall diversification approach.

In conclusion, the study underscores the importance of a balanced diversification strategy that integrates horizontal, vertical, and geographic dimensions. Companies aiming to achieve sustainable growth and competitive advantage in the construction industry should prioritize not only the expansion of product lines but also the deep specialization of products and technological innovation. Additionally, consistent investments in modern technologies and strategic shifts towards high-value products can significantly enhance diversification outcomes, as evidenced by the success of “Durable Stone.”

5. Conclusion

Based on the analysis of the product diversification level in construction industry companies, the following conclusions can be drawn:

- 1) By implementing product diversification, the economic efficiency indicators of company operations improve, leading to an increase in their market share.
- 2) In the initial stages of company operations, priority should be given to horizontal product diversification.
- 3) The measures for product diversification in company operations will gradually shift from horizontal diversification to vertical diversification processes, based on the company’s relative advantages in product manufacturing. As a result, the company’s opportunities to enter external markets will expand.

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