

Research on the relationship between enterprise internationalization degree and performance based on the multi-index simplified model

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Abstract: In view of the long application time of the multi-index simplified model in current research, which results in low operational performance accuracy, this paper conducts a comprehensive study on the relationship between enterprise internationalization degree and performance based on the multi-index simplified model. First, the application system of the multi-index simplified model is constructed, the application of the model is defined, and the correlation characteristics and dimensional features of the model are analyzed. Then, based on the relationship between enterprise internationalization degree and performance, the factor set and evaluation set are defined. The relationship between internationalization degree and performance is derived through the mapping of the multi-index simplified model. The multi-index simplified information is processed, completing the application of the model. The simulation experiment results indicate that the overall operational performance of the proposed model is highly accurate, with a short operation time and strong practicality.

Keywords: Degree of enterprise internationalization, Multi-index simplified model, Performance relationship.

1. Introduction

In recent years, the application analysis of multi-index simplified model is the main operation performance channel in the current public life and work, and the application of multi-index simplified model is the main part of maintaining the high-quality development of the application analysis of multi-index simplified model [1]. Along with the rapid development of science and technology, intelligent technology and information technology is widely used to the enterprise internationalization and performance relationship, multiple simplified model application analysis management gradually refinement, multiple simplified model application requirements accurate line, sustainability for multiple simplified model application analysis fine performance management is very important [2, 3]. Traditional enterprise internationalization operation is generally the vertical performance management mode, with multiple index simplified model application analysis system and the development of informatization, multiple index simplified model application analysis management has gradually to the horizontal communication way, to multiple index simplified model application demand running performance, and focus on multiple index simplified model application analysis the balance between supply and demand, provide the basis for enterprise internationalization degree and performance relationship [4]. The results of traditional application model will bias the application requirements of actual multi-index simplified model. Therefore, this paper conducts an in-depth study on the application of multi-index simplified model to achieve the purpose of innovative operation performance requirements.

2. Related Works

2.1. *The Role of Multi-Indicator Simplification on the Degree of Internationalization*

At present, many relevant experts and scholars have studied the application of multi-index simplified model, and put forward some research results. Put forward based on the relationship between enterprise internationalization and performance of multiple index simplified model application, through the enterprise internationalization degree and performance relationship analysis of multiple index simplified model application demand, to get effective simplify the index simplified model application demand model, based on the way to demand sample related multiple index information collection, to obtain related index information normalized processing, the effective multiple index simplified model application analysis more index information source for extraction [5, 6]. The experimental results show that the application of multi-index simplified model based on the relationship between enterprise internationalization degree and performance can effectively reduce the application analysis time of multi-index simplified model, but does not improve the accuracy of the application requirements of multi-index simplified model. In order to improve the accuracy of the application of the multi-index simplified model, the advantages of the relationship between enterprise internationalization and performance are analyzed, and then the two are combined to propose the relationship method of enterprise internationalization and performance based on the multi-index simplified model [7].

2.2. *Correlation between the Degree of Internationalization and Performance*

After the application analysis of the multi-index simplified model on the relationship between enterprise internationalization degree and performance, the rough set theory is given, the weighted coefficient is clear, and finally the application analysis results of the multi-index simplified model are combined to obtain the operating performance value [8]. The experimental results show that the proposed method is feasible and can effectively improve the accuracy of multi-index simplified model application, but this method has the problem of complex overall process. Thus using related factors to simplify the index model application requirements, through the demand results of the simplified index model application requirements evaluation parameters, the evaluation parameters into the evaluation model, through the entropy method to simplify the model application requirements index weight coefficient, through a simulation experiment to verify multiple index information, experimental results show that the method and single method has good scalability, but the overall multiple index simplified model application requirements accuracy is low.

Although the multi-index simplified model uses a large amount of multi-index information, and the ways of multi-index information are different, there is correlation between each multi-index information, and the state of the multi-index information is called complex correlation, and there are two forms of multi-index information correlation, which are weak correlation and strong correlation. The characteristics of multi-index information in any effective multi-index simplified model are analyzed according to the degree of correlation of multi-index information, laying a good foundation for the calculation of multi-index simplified model application analysis. Multi-index information interaction specifically refers to the interaction behavior between the applications of the effective multi-index simplified model [9]. Different transmission modes can make the degree of multi-index information correlation closer, which is conducive to the subsequent tracking of the application of the multi-index simplified model.

2.3. *Diversified Ways to Improve Corporate Performance*

Enterprise internationalization value mainly refers to the innovation in the relative cycle total demand, part in the field of enterprise internationalization, by analyzing the state of enterprise internationalization development, also can simplify model application analysis the trend of comprehensive analysis, the index information correlation analysis, still need to pay attention to the analysis method, to analyze the accurate information, otherwise the information is not effective [10]. Innovation dimension is determined by the format of multiple index information exists, the higher the

index information dimension level, the greater the enterprise internationalization information hidden information, more index information dimension characteristics can simplify multiple index model application analysis to provide running performance index information, but also will increase the calculation of simplified model application analysis. The authenticity of multi-index simplified model application analysis of multi-index information plays a decisive role in the accuracy of multi-index simplified model application analysis, so the access to the application analysis information of multi-index simplified model is particularly important. This paper mainly adopts the application of multi-index simplified model to complete the multi-index information collection of the relationship between enterprise internationalization degree and performance. In summary, quantitative indicators can be used to judge the relationship between internationalization and performance, thus enhancing the effectiveness of the entire analysis results. Moreover, a simplified model with multiple indicators can comprehensively judge the correlation between internationalization and performance, and improve the rationality of its distribution and analysis results, achieving better comprehensive judgment of data. In the above analysis process, the correlation between internationalization level and performance was deeply revealed, and whether there is a correlation between the two needs to be further quantified, but it exists in both theoretical and practical analysis processes. Since the possibility of internationalization can be analyzed in depth, the relationship between internationalization level and performance still belongs to many aspects of current research. As long as the model is simplified, diversified and multi-level analysis can be achieved. The theoretical analysis process now has strong rationality and can provide technical support for practical verification in the later stage. However, in the process of analyzing the degree of internationalization and performance, it is necessary to propose the impact of qualitative results on the results, and quantify the qualitative content, so it is necessary to construct corresponding mathematical models.

3. Multi-Metric Simplified Description of Internationalization and Performance

the degree of internationalization of enterprises is the inevitable direction of their development, and there is a certain relationship with their performance, but whether the relationship between the two can be effectively analyzed is controversial. although the previous algorithms can describe the degree of internationalization to a certain extent, there is still controversy about whether they can have an impact on mechanization, and the fundamental reason is that the data in the research method cannot be quantified, so it is difficult to conduct multi-channel analysis. therefore, it is necessary to quantify and simplify the factors of related problems to improve the accuracy of the grading agency, and the simplified model analysis based on multiple indicators can comprehensively judge the position of the degree of internationalization and the relationship between automobiles, so as to improve the effectiveness of the overall analysis results, so it is necessary to analyze the degree of indexation and the degree of the model.

3.1. Construct the Application System of Multi-Index Simplified Model

Based on the relationship of enterprise internationalization and performance status, compiling index simplified model application system, thus through the standard value to measure various evaluation index, compare the actual index value and standard value, to obtain the index value of simplified index, simplified index weighted average comprehensive evaluation index, as shown in formula (1)

$$A_i = S_i / S_m (D_1 - D_2) \quad (1)$$

A_i represents the operation performance index, S_i represents the application index of multi-index simplified model, and D_i represents the standard value in the application, D_2 represents multi-index simplified model. The positive index processing model can be obtained, as shown in formula (2).

$$Z_i^r = X_m(CV - B) / N_i \quad (2)$$

X_m represents the comprehensive evaluation index of the multi-index simplified model, CV represents the control index of the multi-index simplified model, B represents the performance target of the multi-index simplified model, and N_i represents the number of levels of multiple table simplified models. The derivative model is shown in formula (3).

$$G = \sum H_i \cdot J_i / \sum K_i \quad (3)$$

In the formula, H represents the evaluation index weight set in the operation performance index system, J represents the measurement index of the multi-index simplified model, and K represents the performance interval limit of the multi-index simplified model.

3.2. Analysis of the Relationship between Enterprise Internationalization Degree and Performance Based on the Multi-Index Simplified Model

Based on the analysis of the relationship between enterprise internationalization degree and performance, based on the multi-index simplified model, the characteristics of the relationship between enterprise internationalization degree and performance are further reflected, as shown in formula (4).

$$Y_f(U_i, I_i) = I(Y_i) \cdot (I_i) - P_{ij} \quad (4)$$

In formula (4), Y_i represents the analysis of the application of the multi-index simplified model, U_i represents the subordinate index of the multi-index simplified model, P_j represents the qualitative evaluation as the quantitative evaluation, and I represents the application of the multi-index simplified model. According to the above formula, the matrix model of enterprise internationalization degree and performance relationship, as shown in formula (5).

$$T = \begin{bmatrix} t_{11} & t_{12} & t_{13} & \cdots & t_{1m} \\ t_{21} & s_{22} & t_{23} & \cdots & t_{2m} \\ \vdots & \vdots & \vdots & \ddots & \vdots \\ t_{n1} & t_{n2} & t_{n3} & \cdots & t_{nm} \end{bmatrix} \quad (5)$$

Formula, T on behalf of the enterprise internationalization and performance relationship of single factor evaluation matrix, the weight is based on the relationship between enterprise internationalization and performance mathematical evaluation model, which obtain multiple index simplified model application evaluation results, clear comprehensive evaluation results for the degree of simplified model application.

According to the analysis of the relationship between enterprise internationalization degree and performance, the application relationship of multi-index simplified model is more complex, and the relationship between the application analysis of multi-index simplified model and influencing factors is described. The multi-index simplified model index is clarified, and the multi-index simplified model index is taken as the information sample of the relationship between enterprise internationalization degree and performance. Therefore, the relationship standard of internationalization between enterprise internationalization degree and performance is adopted to develop the performance of enterprise internationalization, and the relationship between enterprise internationalization degree and performance is reflected to the high-dimensional feature space. The specific regression model is shown in Equation (6).

$$G(H_j) = Y \cdot K(L_j) + U_i \quad (6)$$

In the formula, $K(L_j)$ represents the multi-index simplified information applied by the multi-index simplified model; Y represents the analysis of the application of the multi-index simplified model; U_i

represents the subordinate index of the multi-index simplified model, and the multi-index simplified information model that needs to be processed is as shown in formula (7).

$$R|T| = \sum_{i=1}^a Y(U_i) + Q\|R\|^2 \quad (7)$$

In the formula, Y represents the analysis of the application of the multi-index simplified model, U represents the affiliation index of the multi-index simplified model, Q represents the empirical risk value of the operating performance model, R represents the loss function of the operating performance model, and T represents the confidence risk of the operating performance model. Therefore, based on the analysis of the relationship between enterprise internationalization degree and performance, the application of multi-index simplified model can be obtained, and the integration model of enterprise internationalization degree and performance relationship based on multi-index simplified model can be constructed, as shown in formula (8).

$$X^* = C^* \times V^* \quad (8)$$

It can be seen from the above formula that C represents the relationship model of enterprise internationalization degree and performance, V represents the optimization estimation model of the overall evaluation algorithm, and X represents the evaluation framework of enterprise internationalization degree and performance relationship. In summary, the final results of both can be expressed as follows.

$$X^* = \sum C^* \times V^* / R|T| \quad (9)$$

4. Results and Discussion

4.1. Case Study on the Degree of Nationalization of Enterprises

This paper is conducted with local tourism enterprises in 2019~2022, and the researchers are mainly tourism leaders and business managers, as well as financial and tax collectors. The research method is in the form of a questionnaire, which is statistically analyzed and verified by historical data to analyze the relationship between internationalization and performance. Among them, the indicators of the degree of internationalization are mainly the sales content and sales channels of the enterprise, as well as the performance of information exchange between countries, mainly profit, employee work enthusiasm and the overall work motivation of employees. Work motivation is mainly analyzed by psychological survey scales, and the survey results are compared with the corresponding scores to form a simplified content of multiple indicators. In the process of simplifying multiple indicators, it is necessary to eliminate the data of the investigators, remove the abnormal data, and compare the relevance of the data and the integrity of the data, so as to improve the effectiveness of the results. The standardization of the survey data is shown in Table 1.

Table 1.

General nature of the findings.

Non-Normalized Coefficients	HERSELF	With	P	Normalization Factor
-0.192	0.109	-1.765	0.078	-0.190
0.072	0.114	0.626	0.531	0.067
-0.300	0.119	-2.528	0.011	-0.271
-0.105	0.109	-0.965	0.335	-0.103

4.2. The Correlation between the Degree of Enterprise and Performance

In order to verify the effectiveness of the relationship between enterprise internationalization and performance based on the multi-indicator simplification model proposed in this paper, the application analysis of the relevant multi-indicator simplification model was selected as the research object, and the simulation experiment was carried out in the simulation environment. In order to verify the

comprehensive performance of the proposed model, the operational performance of the relationship between the degree of internationalization and the performance of the enterprises mentioned in this paper is analyzed. Due to the large amount of information on multiple metrics, the comparison results in this article are shown in Table 2.

Table 2.

Comparison of analytical accuracy of multi-index simplified model application.

Class	International Degree of The Enterprise	Performance Relationship	Multi-Index Simplified Model
International degree of the enterprise	356.17	369.01	377.49
Performance relationship	325.91	392.57	358.91
Multi-index simplified model	336.16	381.46	361.76
Control model	291.78	290.11	289.59

Can be seen from Table 2, this paper proposed more index simplified model application requirements, and enterprise internationalization degree and performance relationship accuracy has been stable, while other models can also to application demand performance analysis, but the overall accuracy in the benchmark value, the proposed enterprise many index simplified model application analysis accuracy is better than other operation model, thus, this paper mentioned more index simplified model application analysis more effective. In order to show the performance of enterprise internationalization and performance, the comparison results of the proposed model are shown in Figure 1.

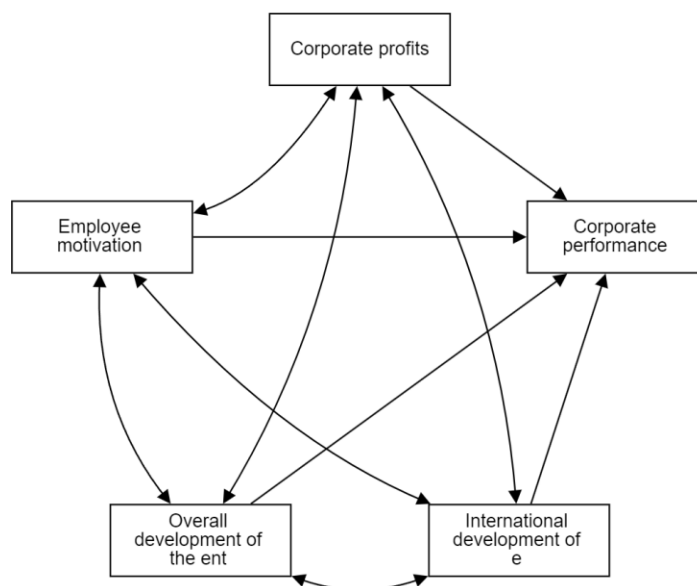


Figure 1.

The performance results of the enterprise internationalization operation of the different models.

The analysis of Figure 1 can show that the application accuracy of the multi-index simplified model for the relationship between the internationalization degree of enterprises and performance is high, while the application analysis accuracy of other models is significantly lower than the model proposed in this paper. Therefore, the model proposed in this paper has high accuracy for the application of the multi-index simplified model.

The application analysis of the multi-index simplified model is compared with the actual innovation and accuracy, and the analysis results are shown in Figure 2.

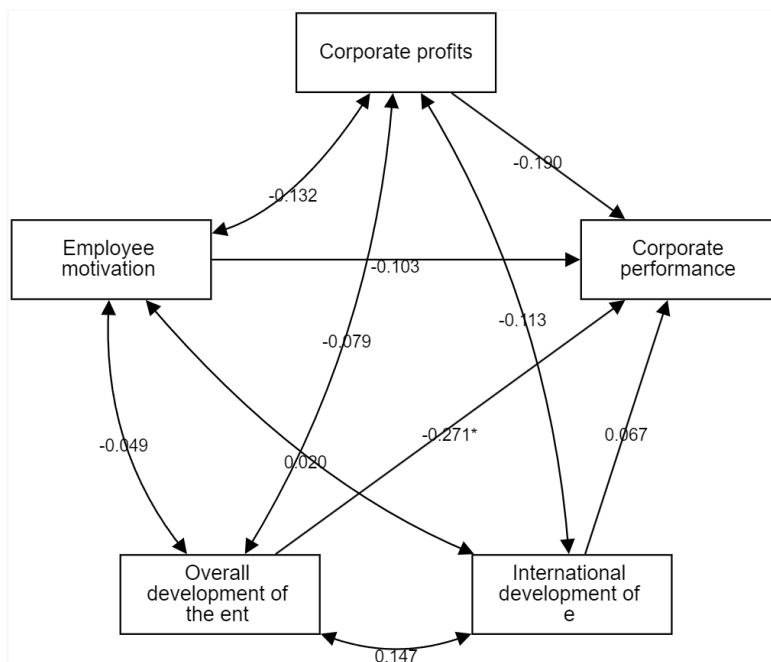


Figure 2. Comparison of analytical accuracy of multi-index reduced models for different models.

The analysis of Figure 2 shows that in order to test the comprehensive performance of the application analysis, using the proposed model application requirements, comparing the enterprise internationalization and performance relationship, although the model performance accuracy is better than the traditional model, thus shows that the proposed model can not only simplify the requirements of the model operation analysis, also can effectively improve the operation performance accuracy.

4.3. The Role of Different Approaches on Internationalization and Performance

In order to better study the issue of internationalization and analyze its effect on performance, this paper simplifies the analysis of multiple indicators to verify whether the results are valid. The multiindex reduced model application contrast for the different models is shown in Figure 3.

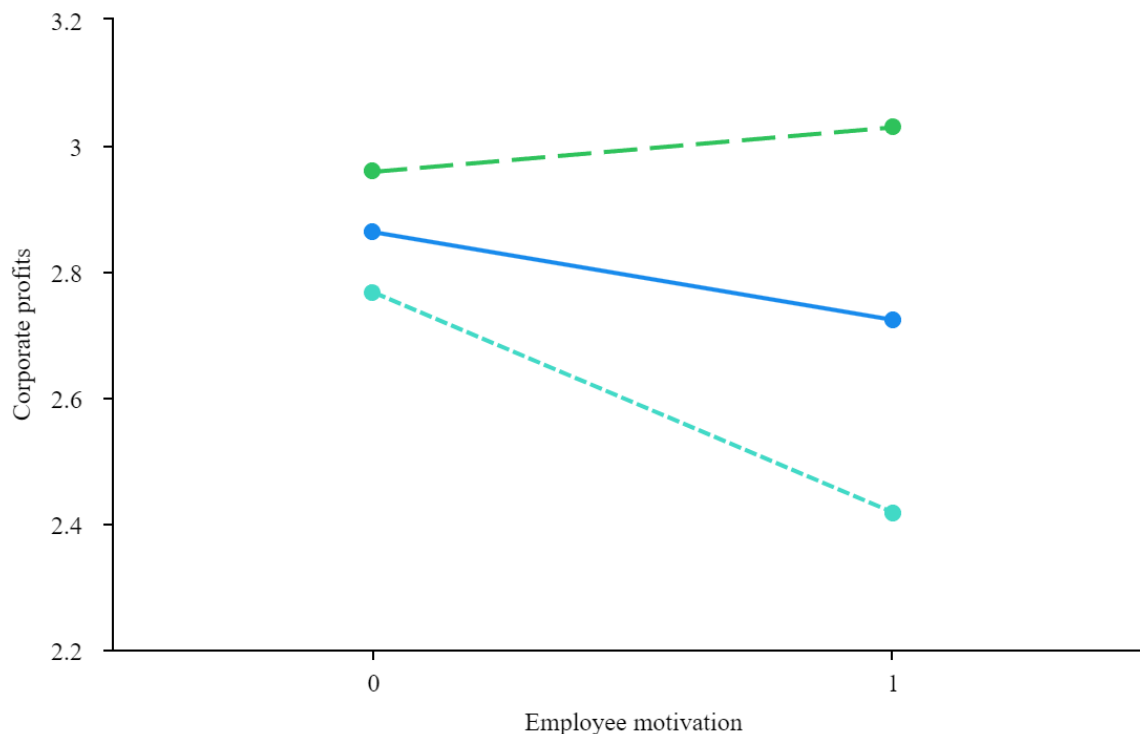


Figure 3. Comparison of the results of multi-indicator simplified model-based on internationalization degree and performance.

As can be seen from Figure 3, the performance time of the proposed multi-indicator simplified model fluctuates greatly, and the performance time of the traditional model experiment fluctuates greatly, and it is concluded that the analysis time of the relationship between enterprise internationalization and performance based on the multi-indicator simplification model is shorter, which can effectively improve the application efficiency of the multi-indicator simplification model, and can clarify the degree of internationalization and performance of enterprises, and the final results of internationalization and performance are shown in Table 3.

Table 3. Correlation between degree of internationalization and performance.

Independent Variable	Dependent Variable	Coef.	Std. Error	With	P	(Std. Estimate)
International development of enterprises	Corporate profits	-0.211	0.210	-1.004	0.315	-0.113
Overall development of the enterprise	Corporate profits	-0.142	0.201	-0.706	0.480	-0.079
Employee motivation	Corporate profits	-0.257	0.219	-1.174	0.241	-0.132
Overall development of the enterprise	International development of enterprises	0.252	0.193	1.303	0.192	0.147
Employee motivation	International development of enterprises	0.037	0.206	0.181	0.856	0.020
Employee motivation	Overall development of the enterprise	-0.086	0.199	-0.434	0.664	-0.049

5. Conclusion

To sum up, the relationship between enterprise internationalization degree and performance is one of the main contents of the application demand analysis of multi-index simplified model, and the performance analysis of enterprise internationalization operation is the main condition to maintain the stable development of enterprises. Combined with the above detailed analysis, based on the characteristics of enterprise internationalization and performance, this paper according to the characteristics of enterprise internationalization and performance, based on the application analysis of multiple index simplified model, compared with the traditional model, the multiple index simplified model operation performance accuracy is higher, and the performance efficiency is relatively faster, thus, this paper for multiple index simplified model application analysis has important reference significance.

Transparency:

The authors confirm that the manuscript is an honest, accurate, and transparent account of the study; that no vital features of the study have been omitted; and that any discrepancies from the study as planned have been explained. This study followed all ethical practices during writing.

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