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A study on the integration mechanism of change leadership and corporate performance based on big data technology

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Abstract

How to use big data technology to study the whole mechanism of change leadership and corporate performance is a hot topic of current social concern. In this paper, firstly, multiple linear regression model is proposed on the basis of big data technology, and the multiple linear regression model is mainly analyzed by significance verification for research. Then, based on the data from the survey and analysis, the evaluation indexes of change leadership and enterprise performance integration mechanism were constructed, and the indicators of change leadership were divided into 8 indicators and the evaluation indexes of enterprise performance integration mechanism were divided into 5 indicators, and finally, the multiple linear regression model was used to analyze the data of the evaluation indexes of change leadership and enterprise performance integration mechanism. The results show that: The mean values of reliability, validity and differentiation of change leadership indicators are 80.75%, 78.95% and 78.79%, and the mean values of reliability, validity and differentiation of corporate performance indicators are 74.94%, 73.71% and 70.16%. This study verified that there is an impact of change leadership on corporate performance, and the impact of change leadership on corporate performance is mainly generated through the intellectual stimulation of leaders, while improving employees' problem-solving skills.

Keywords: *Big data technology, multiple linear regression model, evaluation indicators, change leadership, corporate performance.*

Introduction

As external markets continue to change, the ability to adapt to rapid environmental change has become a focal point of contemporary research attention. In line with this issue is transformational leadership behavior, which enables transformational leaders to achieve high levels of performance through leadership charisma (or idealized influence), leadership inspiration, intellectual stimulation, and personalized care by flexibly and creatively adapting the internal organization to enable employees to maximize their potential (Donkor, 2022) (Wang & Chen, 2011). Studies have been conducted to explore the mechanisms of transformational leadership behaviors on corporate performance from direct, indirect, and dimensional perspectives (Ng, 2017) (Guan, Cao, Ren, & Song, 2022).

The transformational leadership behavior of start-ups has a negative impact on the organization.

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At the same time, the hypothesis that there is a role relationship between transformational leadership, corporate entrepreneurship, and dynamic capabilities can be obtained from existing studies (Rizki, Parashakti, & Saragih, 2019) (Normeza & Mohammad). However, the existing studies have not explored in depth the specific mechanisms of action between the variables, thus failing to obtain an effective path to enhance corporate performance through transformational leadership (Ogbonnaya & Nielsen, 2016) (Ekaningsih, 2014). Moreover, similar to the relationship between transformational leadership and firm performance, there is a conditionalization of the role here. Charismatic leadership behaviors of transformational leaders do not have a significant effect on firm performance in general settings, but have a significant positive relationship with firm performance in uncertain settings (Ramadhanti, Singh, & Kularajasingham, 2021) (Abdulqader & Al Marri, 2020).

The paper (Samad & Abdullah, 2012) discussed management innovation and knowledge sharing from a new perspective of the mechanism of transformational leadership on corporate performance, and suggested that logistics companies should strengthen the cultivation of transformational leaders, optimize organizational structure and team management, and improve the efficiency and effectiveness of knowledge sharing. Based on the top echelon theory and the "too much is too little" theory, the paper (Shi R 2015) explored the non-linear impact of CEO transformational leadership on corporate performance in the context of innovation failure and introduced failure learning (single-loop and double-loop) as a mediating mechanism. Through hierarchical analysis, it was found that CEO transformational leadership has a significant positive impact on failure learning, CEO transformational leadership has a significant inverted U-shaped relationship with firm performance, failure learning (single-loop vs. double-loop) has a significant inverted U-shaped relationship with firm performance, and failure learning (single-loop vs. double-loop) plays a mediating role in the relationship between CEO transformational leadership and firm performance. The literature (Yanney, 2014) verified the hypothesis that differentiation strategies mediate the relationship between transformational leadership dimensions and SME performance. In addition, the innovation climate moderates the effect of differentiation strategies on SME performance.

The literature (Alrowwad, Obeidat, Tarhini, & Aqqad, 2017) will discuss the impact of corporate innovation when transformational leadership is used, using corporate culture as a moderating variable. The more liberal and open the corporate culture is under transformational leadership style, the more innovative the firm is. Transformational leadership is significantly and positively related to corporate innovation. The literature (Hui & Gengui, 2016) quantitatively analyzed the research on the relationship between transformational leadership on team performance for different performance types and different team types, respectively. The results show that transformational leadership is significantly positively related to team performance, and team type and performance type have moderating effects on this correlation, in addition, the effect values of the relationship between transformational leadership and team performance in teams of scientific and technological

talents are found to be larger.

This paper first proposes a multiple linear regression model to study the integration mechanism of change leadership and corporate performance. According to the multiple covariance means that there is a strong correlation between the influencing factors, then the multiple linear regression model can be optimized and improved by introducing Bayesian inference theory. Then the change leadership and corporate performance evaluation index system is constructed based on the research data, and the four dimensions of change leadership can be divided into two major categories, which are group-oriented (role model influence and morale inspiration) and individual-oriented (personalized care and intellectual stimulation). The comprehensive assessment of corporate performance can be divided into five dimensions: financial aspects, customer level, employee productivity aspects, quality of products and services, and innovative products and services. Finally, the research object is determined according to the research purpose, and the multiple linear regression model is used to analyze the three aspects of reliability, validity, and differentiation of change leadership and corporate performance evaluation indicators. This study analyzes the significant relationship between change leadership and corporate performance impact factors, which has reference and guiding value for corporate market development and culture construction.

Big data technology

Figure 1 illustrates the Big Data technology framework. The world of Big Data is not just a single, huge computer network, but an ecosystem composed of a large number of active building blocks and multiple participant elements, with a series of participants such as end-device providers, infrastructure providers, network service providers, network access service providers, data service enablers, data service providers, touchpoint services, data service retailers, and so on, working together to build the Ecosystem. Big data includes structured, semi-structured and unstructured data, and unstructured data is increasingly becoming a major part of data. Big Data requires special techniques to efficiently process large amounts of data that tolerate elapsed time. Technologies for big data, including massively parallel processing databases, data mining, distributed file systems, distributed databases, cloud computing platforms, the Internet, and extended storage systems. Big data predictive analytics techniques, commonly used in data mining, mainly analyze the correlation, association or causality of individual sets.

In practical application, correlation analysis is inseparable from regression analysis, which studies the interrelationship between factors and explores whether they are positively or negatively correlated and the magnitude of the correlation between factors with specific relationships. The influencing factors are diverse, and regression analysis includes univariate regression and multiple regression, where univariate regression refers to the functional relationship between a dependent variable Y and a variable X.

Multiple linear regression analysis algorithm is the study of the relationship between a set of variables on a dependent variable, and can be applied to the study of the integration mechanism of

change leadership and corporate performance (Zehir, Karaboğa, & Başar, 2020).

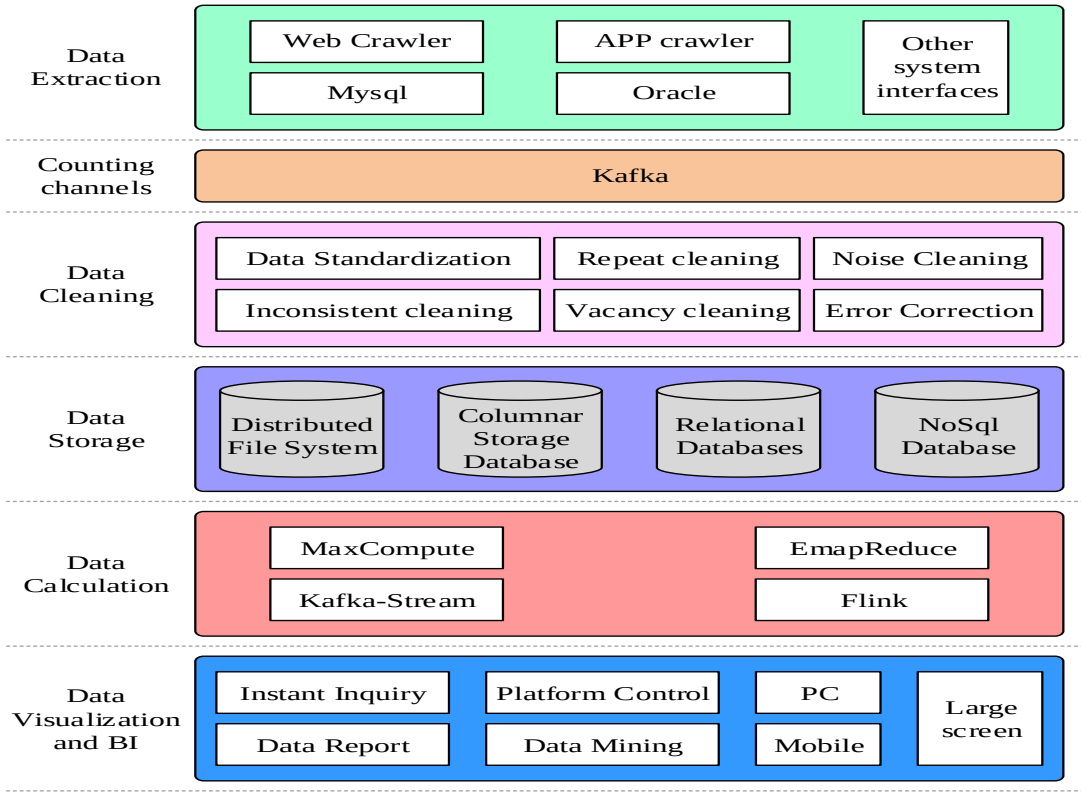

Figure 1. Big Data Technology Framework Diagram

Multiple linear regression model

The regression analysis method is an advantageous way to express the degree of closeness between each other and to build statistical models based on such close relationships, further to make predictions about their structural state and about the model, and it is based on a large number of tests and observations of objective things (Al-Dmour & Al-Dmour, 2018). In multiple regression analysis, if there is a correlation between variable $X_1, X_2, \cdots, X_p$ and random variable y, this further indicates that when $X_1, X_2, \cdots, X_p$ is constant, accordingly y will have a probability distribution to match it. The probability model between the correlated variable $X_1, X_2, \cdots, X_p$ and the random variable y is:

$$y = f\left(X_1, X_2, \cdots, X_p\right) + \varepsilon \quad (1)$$

The random variable y is the dependent variable: $X_1, X_2, \cdots, X_p$ is the independent variable,

$f\left(x_1, x_2, \cdots, x_p\right)$ can be called a deterministic relationship of the general variable $X_1, X_2, \cdots, X_p$, and ε is the random error.

If the regression function is linear in the probability model, both:

$$y = \beta_0 + \beta_1 x_1 + \cdots + \beta_p x_p + \varepsilon \tag{2}$$

where $\beta_0, \beta_1, \beta_2, \cdots, \beta_p$ is called the $p+1$ unknown parameter, β_0 is the regression constant, $\beta_1, \beta_2, \cdots, \beta_p$ is the regression coefficient, y is the explanatory variable (dependent variable), $X_1, X_2, \cdots, X_p$ can also be called the p independent variable that can be accurately measured, $p=1$, is a one-dimensional linear regression model, and $p \geq 2$, is called a multiple linear regression model with random error ε.

If $\left(X_{i1}, X_{i2}, \cdots, X_{ip}; y_i\right), i=1,2,\cdots,n$ is a set of observations of variable $\left(X_{i1}, X_{i2}, \cdots, X_{ip}; y\right)$, then the linear regression model is:

$$y = f\left(x_1, x_2, \cdots, x_{ip}; y_i\right), i=1,2,\cdots,n \tag{3}$$

On the one hand, the very widely used is the regression analysis model. On the other hand, if we want to get more in-depth and accurate results, we will transform the problems that do not have linear relationship into problems that can be solved and studied by linear regression model according to the practical needs under the condition of linear regression model, so it is very important in both theoretical results and practical applications.

In regression analysis, multiple linear regression models are both simple and widely used. Here in this paper, the quantity affecting the integration of firm performance is denoted as y and the integration of firm performance of the i nd firm is denoted as y_i. The general expression form is:

$$y_i = \beta_0 + \beta_1 x_1 + \cdots + \beta_n x_n + \varepsilon \tag{4}$$

Its matrix form is:

$$Y = X\beta + \varepsilon, \varepsilon \bigcap N\left(0, \sigma^2 I_n\right) \tag{5}$$

$$X = \begin{bmatrix} 1 & X_{11} & X_{12} & \cdots & X_{1p} \\ 1 & X_{21} & X_{22} & \cdots & X_{2p} \\ \cdots & \cdots & \cdots & \cdots & \cdots \\ 1 & X_{n1} & X_{n2} & \cdots & X_{np} \end{bmatrix}, Y = \begin{bmatrix} y_1 \\ y_2 \\ \cdots \\ y_n \end{bmatrix}, \beta = \begin{bmatrix} \beta_1 \\ \beta_2 \\ \cdots \\ \beta_n \end{bmatrix}, \varepsilon = \begin{bmatrix} \varepsilon_1 \\ \varepsilon_2 \\ \cdots \\ \varepsilon_n \end{bmatrix} \tag{6}$$

The parameters to be estimated are $\beta_{(p+1)\times 1}$ and σ^2, $Y_{n\times 1}$ is the observation vector, $X_{n\times(p+1)}$ is the known matrix, and $\varepsilon_{n\times 1}$ is the random error vector.

If it is in matrix form, the dependent variable of the multiple linear regression model obeys a distribution of:

$$Y \bigcap N\left(X\beta, \sigma^2 I_n\right) \tag{7}$$

So the likelihood estimation result is:

$$\begin{aligned} L\left(\beta,\sigma \mid Y, X\right) &= \left(\frac{1}{2\pi\sigma^2}\right)^{\frac{\pi}{2}} e^{-\frac{1}{2\sigma^2}(Y-X\beta)^T(Y-X\beta)} \\ &= \left(\frac{1}{2\pi\sigma^2}\right)^{\frac{\pi}{2}} e^{-\frac{1}{2\sigma^2}\left[\left(Y-X\hat{\beta}\right)^T\left(Y-X\hat{\beta}\right)+\left(\beta-\hat{\beta}\right)^T X^T X\left(\beta-\hat{\beta}\right)\right]} \\ &= \left(\frac{1}{2\pi\sigma^2}\right)^{\frac{\pi}{2}} e^{-\frac{1}{2\sigma^2}\left[aS_n^2+\left(\beta-\hat{\beta}\right)^T X^T X\left(\beta-\hat{\beta}\right)\right]} \end{aligned} \tag{8}$$

Where $\hat{\beta} = \left(X^T X\right)^{-1} X^T Y$, $a = n - p - 1$, $\sigma^2 = S_n^2 = \frac{1}{a}\left(Y - X\hat{\beta}\right)^T\left(Y - X\hat{\beta}\right)$.

Significance validation of the regression model

F-test of the regression equation

In a multiple linear regression equation, the significance test of the model refers to whether there is a significant effect of the independent variable $\left(x_1, x_2, \cdots, x_n\right)$ on the random variable y_i as a whole, and if there is a significant effect, it is significant. If the significance test is done on the regression equation using the F test, the original hypothesis H_0 and the alternative hypothesis H_1 are as follows:

$$H_0 : \beta_0 = \beta_1 = \beta_2 = \cdots = \beta_p = 0 \tag{9}$$

$$H_1 : \beta_i \left(i = 1, 2, \cdots, k\right) \neq 0 \tag{10}$$

The statistics of the test:

$$F = \frac{(n-2)\sum_{i=1}^{n}\left(Y_i - \overline{Y}\right)}{\sum_{i=1}^{n}\left(Y_i - Y_i\right)^2}, F\left(p, n-p-1\right) \tag{11}$$

where the F statistic obeys a F distribution with a degree of freedom of $(p, n-p-1)$. According to the F distribution table with a significance level of α, if $F > F_{\alpha}(p, n-p-1)$, the original hypothesis is rejected, indicating that the relationship between the random variables y and $X_1, X_2, \cdots, X_p$ can be fitted with a linear regression model at a significance level of α, the regression equation is significant and the establishment of the regression equation is reasonable, if not, it is considered insignificant.

t-test of regression coefficients

The regression equation is valid, which does not indicate that every variable has a significant effect on the dependent variable. For a large number of indicator variables, it has been desired to recreate a simpler regression equation by selecting those variables from the regression equation variables that have a greater effect on the dependent variable and contain more information for convenience. Therefore it is necessary to test the significance of each variable, that is, to do significance tests on the regression coefficients.

It follows that if an independent variable x_j does not pass the test for y, it will have a coefficient β_j of zero in the regression model, so that the original hypothesis H_0 and the alternative hypothesis H_1 can be determined if variable x_j passes the test:

$$H_0 : \beta_j = 0 \tag{12}$$

$$H_1 : \beta_j \neq 0 \tag{13}$$

The statistic of the selected test:

$$T = \frac{\sum_{i=1}^{n}\left(X_i - \overline{X}\right)Y_i}{\sqrt{\sum_{i=1}^{n}\left(X_i - \overline{X}\right)^2 \sum_{i=1}^{n}\left(Y_i - \hat{Y}_i\right)^2}}, t\left(n-p-1\right) \tag{14}$$

When $|T| > T_{\frac{\alpha}{2}}(n-p-1)$, the regression coefficient is significant, and vice versa, the regression coefficient is not significant.

At a given significance level α, if there is $H_0 : \beta_j = 0$, i.e., the original hypothesis holds, the constructed t_j statistic obeys the t root with a degree of freedom of $n-p-1$. The critical value $t_{\frac{\alpha}{2}}$, if the value of the statistic falls in the rejection domain when $|t_j| \geq t_{\frac{\alpha}{2}}$ in a two-sided test, rejects the original hypothesis and this coefficient fails the test, if β_j is not zero and the independent variable x_j has a significant effect on the linear representation of the dependent variable y, so it leaves this regression equation coefficient, which passes the test.

Multicollinearity test

Multicollinearity refers to the strong correlation between the influencing factors, and the problem of multicollinearity is often present when building a multiple linear regression model. A common solution is to pass the variance expansion factor, which is usually written as VIF. The formula for the variance expansion factor of the p nd independent variable is:

$$(VIF)_p = \left(1 - R_p^2\right)^{-1} \tag{15}$$

Where R_p^2 indicates the coefficient of determination of the linear regression model between the independent variable X_p and the rest of the independent variables in the model. If the value of the expansion factor VIF is greater than 10, it is determined that there is multicollinearity, and vice versa. When multicollinearity exists, it is generally solved using stepwise regression, principal component analysis, ridge regression, etc.

(1) Stepwise regression

The process of stepwise regression method is in and out. The method adds variables one by one, and when a new variable is added, a F -test is performed on all the variables. If a new variable is filled in again, then the original variables, which do not pass the significance test, will choose to remove that for the variables that pass the test, and this process has been repeatedly carried out, and all the variables that pass the test are selected to do so. This idea effectively improves the shortcomings of the forward and backward methods, and is simple to operate, and can directly propose insignificant variables that will have a deeper impact on the dependent variable Factors

are selected, it is the accuracy of the model is improved, in the process of selecting the variables out, it will lead to produce some loss of information, so the number of variables should be larger when using the method, the effect can be more accurate.

(2) Principal component analysis

Principal component analysis is a kind of dimensionality reduction idea, through the use of orthogonal rotation changes, multiple indicators are converted into several integrated indicators, the information loss is very small, the principal components are reconverted integrated indicators, each regenerated principal components are the original linear combination, they are not correlated with each other, by obtaining the main influencing factors with less information loss to improve the analysis efficiency. In the principal component analysis, the cumulative contribution of the principal components should be guaranteed to a high state so that the method is effective, and secondly, the principal components filtered out must have practical significance and be able to explain the problem well and meet the specific meaning of the problem. Otherwise, even if the cumulative contribution rate reaches a high level, but some meaningless information is screened out, then the method is not valid, so both conditions must be established at the same time, but some information will be lost, and its explanatory meaning has a certain ambiguity, which is also unavoidable in statistical analysis.

(3) Ridge regression

Ridge regression is a modified least squares method, which is a good choice for estimation when there is multicollinearity among independent variables. Ridge regression adds bias factors and reduces the coefficient values to remove variables. After obtaining the corresponding principal components, ridge regression is used if the number of conditions is large.

In building a Bayesian multiple linear regression model, the main study is to identify the important factors that affect the integration of corporate performance with some practical and informative implications.

Bayesian Inference Theory

Point estimation

In classical statistics, the maximum likelihood estimation is generally applied to the point estimation of parameters, i.e., the mean estimation is used based on the maximum likelihood function. Then, after the introduction of Bayesian methods, point estimates are estimated based on the mean, median and pivot of the posterior distribution, of which the mean estimate is the most commonly used.

The posterior mean refers to the:

$$\theta_E = \int \theta p(\theta | y) d\theta \tag{16}$$

The median of the posterior test refers to:

$$\theta_{Me} = P\left(\theta \geq median \mid y\right) = P\left(\theta < median \mid y\right) = \frac{1}{2} \tag{17}$$

The posterior plurality means that the posterior distribution of $P\left(\theta \mid y\right)$, under certain conditions, can achieve the corresponding maximum value in the space to which it belongs, denoted as θ_{MD}. This value is also called the maximum posterior estimate.

The posterior plurality means that the posterior distribution of 1, under certain conditions, can achieve the corresponding maximum value in the space to which it belongs, denoted as 2. This value is also called the maximum posterior estimate.

Interval estimation

In classical statistics, finding confidence zones is not so easy, and even very difficult at times, because a statistic can be constructed during the solving process such that it contains no unknown parameters, which is usually difficult to achieve.

In contrast, the benefit of using Bayesian methods when solving interval estimates is the simplicity and convenience and clarity of meaning.

Because it only needs to use the posterior distribution, sampling samples in the posterior distribution, in the interval of the solved parameters, without deliberately looking for other distributions, making the process simple and easy, not in complicated. Therefore, it can be assumed that let function $p\left(\theta \mid X\right)$ be the posterior distribution of parameter θ. For a given sample X and probability $1-\alpha\left(0<\alpha<1\right)$, if two statistics exist, i.e., $\hat{\theta}_L = \hat{\theta}_L\left(X\right), \hat{\theta}_U = \hat{\theta}_U\left(X\right)$, then there will be:

$$P\left(\hat{\theta}_L \leq \theta \leq \hat{\theta}_U \mid X\right) = 1-\alpha \tag{18}$$

It follows that the interval $\left[\hat{\theta}_L, \hat{\theta}_U\right]$ is then said in this paper to be a confidence interval with a confidence level of $1-\alpha$ for parameter θ, or simply a $1-\alpha$ confidence interval for θ, thus satisfying:

$$P\left(\theta \geq \hat{\theta}_L \mid X\right) = 1-\alpha \tag{19}$$

where θ_L is called the $1-\alpha$ (unilateral) plausible lower limit of θ, satisfying :

$$P\left(\theta \geq \hat{\theta}_U \mid X\right) = 1-\alpha \tag{20}$$

The θ_U here is called the $1-\alpha$ (one-sided) confidence limit of θ. This is essentially different from the confidence level and confidence interval in classical statistics in an important way. The parameters in the former are random variables, whereas in the latter they represent only constants, so their meaning is different.

Hypothesis testing in Bayesian inference is more convenient because it does not rely on decisions such as statistics and sampling distributions. When three or more hypotheses exist, Bayesian methods select the one with the highest posterior probability.

A study on the integration mechanism of change leadership and corporate performance based on multiple linear regression

Change Leadership and Business Performance

Figure 2 shows the relationship of enterprise indicators. In the context of the Big Data era, the variety and complexity of data has put forward a higher level of requirements for corporate leadership, and its impact is becoming more and more significant, and the leadership style of corporate leaders is urgently needed to make changes to meet the changes of the times.

Change leadership is considered by many scholars to be one of the most effective management styles in the contemporary dramatically changing environment.

The most important thing is to adjust your leadership style according to the changes in the external environment and to pay attention to innovation and continuous learning, in order to play a leadership role with the best overall ability. It can also be said that change leadership is a multidimensional concept. Some scholars have proposed that change leadership includes vision-driven, culture-shaping, breakthrough creation and structural innovation, and the dimensions of change leadership selected in this paper are personalized care and intellectual stimulation related to employees at the individual level.

The impact of change leadership on corporate performance is also multifaceted, while the indicators for measuring corporate performance are also diverse. An indicator that most directly reflects the increase or decrease in corporate performance, i.e., corporate profitability, is selected as the dependent variable in this paper's research variables.

The main study of how change leadership affects corporate performance in the context of big data era in corporate profitability, mainly in two dimensions of change leadership at the employee level to develop the hypothesis, namely, the role of personalized care and intellectual stimulation on corporate performance.

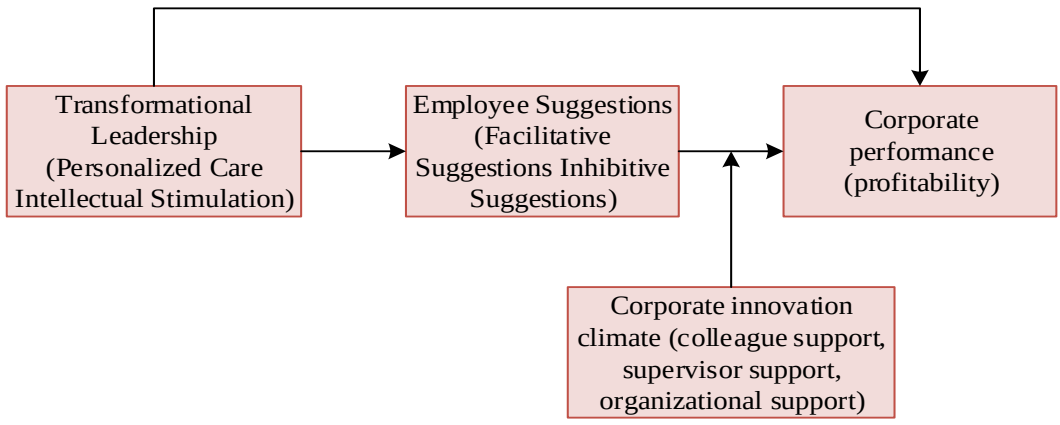

Figure 2. Business Indicator Relationship Chart

Sample selection

Table 1 shows the sample return statistics. First, a pre-survey was conducted before the formal research to test whether the questionnaire was set up reasonably, and a questionnaire was distributed to 20 EMBA students (managers of enterprises at different levels with certain leadership) in universities with the help of their teachers to investigate the relevant situation, and the questionnaire was appropriately adjusted and modified according to the feedback collected to finally get a usable and valid questionnaire, and to ensure that the data collected in the subsequent data analysis, the pre-survey data will not be applied to the results.

Next on the formal research, the authors issued questionnaires in three ways, namely, online questionnaire star research, e-mail sent (specific people) and issued paper version of the sample mainly from Beijing, Guangdong, Shaanxi, some companies, in the process of issuing questionnaires, if there are companies that meet the required standards will invite their relevant personnel to fill out the questionnaire, the survey issued a total of 200 questionnaires, the return of questionnaires 190 questionnaires were collected and analyzed, and the number of valid questionnaires was 168 after removing some invalid questionnaires and those with missing data.

Table 1. Sample recovery statistics table

Total number of questionnaires distributed: 200	Effective sample size	Number of invalid samples	Total
Number of samples recovered	167	23	190
Percentage of recall	84%	11%	95%

Change Leadership Indicators

Indicators of change leadership dimensions are shown in Table 2. The four dimensions of change leadership were divided into two categories, group-oriented (role model influence and morale

inspiration) and individual-oriented (personalized care and intellectual stimulation).

The individual-oriented measure items were selected to be set, i.e., intellectual stimulation and personalized care.

The scale was analyzed and translated using professional English translation software, and finally tested and modified to form the change leadership scale used in this study.

The scale consists of two sections of measurement, with eight questions for description.

Table 2. Change Leadership Dimension Indicators

Indicator dimensions	Indicator symbols	Title item
Personalised care	IC1	Leaders provide timely assistance to staff and answer questions
	IC2	Leaders are sensitive to the needs and abilities of their staff in terms of job development
	IC3	The leader is concerned with the development of the employee's strengths outside of work
	IC4	The leader is observant of the desired direction of the employee
Intellectual stimulation	IC5	The leader will repeatedly confirm the approach to a matter in order to converge with the standard
	IC6	The leader will have different perspectives on the same issue
	IC7	Leaders will propose multiple solutions to a problem
	IC8	Leaders tend to think in innovative ways and achieve goals

Enterprise performance indicators

As shown in Table 3, the indicators of corporate performance dimensions are shown. As the research on corporate performance has become more advanced, the measurement of corporate performance has also been developed.

Previous studies and the general perception of people believe that measuring corporate performance means measuring the financial capability of a company, that is, looking at financial indicators only.

In this study, corporate performance is evaluated in five areas: financial aspects, customer aspects, employee productivity, quality of products and services, and innovative products and services.

However, the most direct and clear manifestation of corporate performance is the financial aspect, i.e., the growth of profitability, in order to make the findings of the study simpler and clearer.

Table 3. Business Performance Dimensions Indicators

Indicator imensions	Indicator symbols	Title item
Corporate Performance	PE1	The company is above the industry average in terms of cost control and profitability as well as sales
	PE2	The company has a higher customer satisfaction rate than its peers in terms of service
	PE3	The company's product quality and service standards are higher than those of its peers
	PE4	The company's ability to innovate (new product development) is better than the industry
	PE5	The company's staff turnover stability is better than peers

Data Analysis

The analysis chart of change leadership indicators is shown in Figure 3. Based on the multiple linear regression model for change leadership indicators, in terms of reliability: the reliability value of each indicator of change leadership remained above 78.39%, and its average reliability value was 80.75%, which indicates that the multiple linear regression model has high credibility for the indicators. In terms of validity: the validity values of each indicator of change leadership remained above 67.21%, and the mean validity value was 78.95%, which means that the multiple linear regression model has a high validity for the indicators of change leadership. In terms of differentiation: the differentiation value of each indicator of change leadership remained above 72.11%, and the mean value of differentiation was 78.79%. Based on the multiple linear regression model, the change leadership indicators maintain high values of reliability, validity, and differentiation, which are more conducive to the improvement of corporate change leadership and have great significance for the construction of corporate culture.

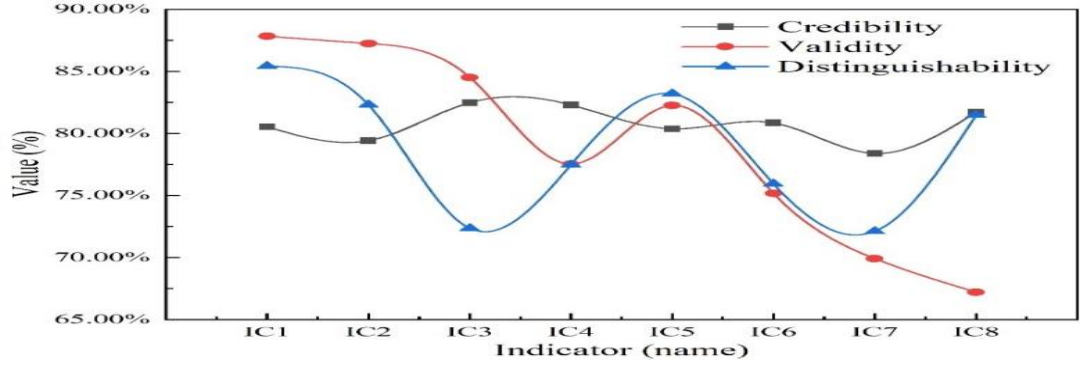

Figure 3: Change Leadership Indicator Analysis

Figure 4 shows the analysis chart of the indicators of corporate performance integration mechanism. Based on the multiple linear regression model, the data analysis of the indicators of corporate performance integration mechanism, in terms of reliability: The indicators of corporate performance integration mechanism are maintained in the range of 72.29%~76.58%, and the average reliability value of its corporate performance integration mechanism indicators is 74.94%, which indicates that the corporate performance integration mechanism has high credibility in the multiple linear regression model. In terms of validity: All the indicators of corporate performance integration mechanism are maintained in the range of 69.23%~80.53%, and the average validity value of its corporate performance integration mechanism indicators is 73.71%, which indicates that the validity and feasibility of corporate performance indicators are verified by multiple linear regression model. In terms of differentiation: Each indicator of corporate performance integration mechanism is maintained in the range of 68.55%~71.29%, and the average differentiation value of its corporate performance integration mechanism indicators is 70.16%, which indicates that corporate performance integration mechanism has good differentiation in the multiple linear regression model. Based on the multiple linear regression model, we analyze the data of corporate performance integration mechanism in three aspects of reliability, validity and differentiation, and comprehensively and accurately analyze the influencing factors of corporate performance integration mechanism, so as to improve the corporate performance mechanism and enhance the cohesiveness of corporate employees.

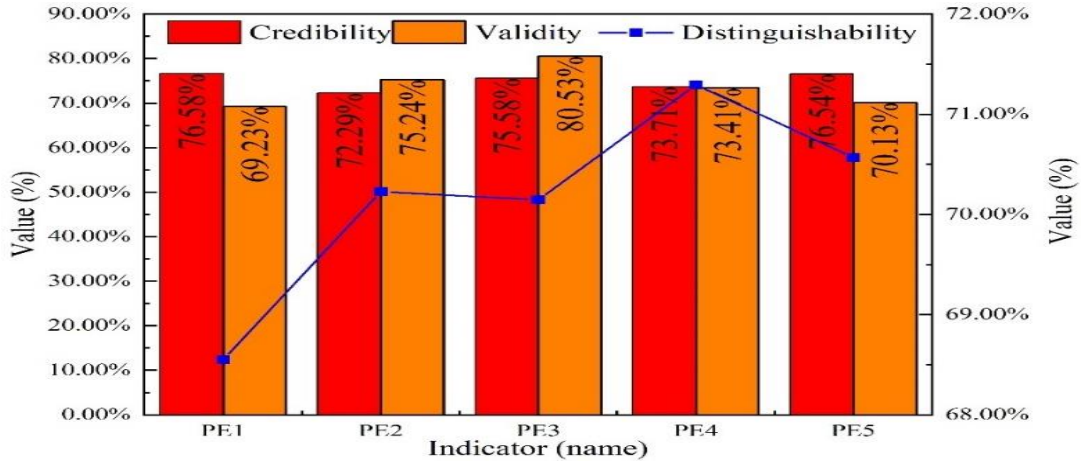

Figure 4. Analysis of corporate performance integration mechanism indicators

Table 4 shows the results of the multiple linear regression of change leadership and firm performance. The F-value is 5.344, the R-squared value is 0.062, and the SIG value is 0.000. It shows that the variable model of change leadership and firm performance is theoretically valid. Secondly, because change leadership is a two-dimensional variable, multiple regression analysis is conducted, and a two-step test is performed to determine whether the variables of different dimensions will have an impact on the dependent variable. First, we have to determine whether

there is a possibility of covariance between the variables of different dimensions, because covariance will affect the accuracy of the study of the relationship between variables, and for the determination of covariance we use the calculation of the variance inflation coefficient. Generally speaking, if the coefficient of variance is below 10, it means that there is no co-linearity and the closer it is to 1, the better the state is. 0.01, which passed the significance test, indicating that there is a significant positive linear correlation between intellectual stimulation in change leadership and corporate performance, while on the contrary, the regression coefficient of personalized care in change leadership on corporate performance is -0.085, indicating that there is no significant positive relationship between personalized care on corporate performance. Therefore, it shows that the subdivision hypothesis H1a of hypothesis H1 is not valid and hypothesis H1b is valid.

Table 4. Multiple linear regression results for change leadership and firm performance

Independent variable	SIG	T Value	Non-standard factors		Standard factor
			B	Standard error	Beta Value
Constants	0	9.388	3.132	0.333	
IC	0.257	-1.135	-0.066	0.057	-0.085
IS	0.001	3.124	0.219	0.069	0.235

Conclusion

Firstly, this paper is based on previous researchers' research on the relationship between big data technology, change leadership and corporate performance, and then the research variables are selected, researched, organized, analyzed and evaluation indexes are constructed through multiple linear regression models. Finally, data analysis of the evaluation indexes was conducted to achieve relatively satisfactory conclusions. The main performance is in the following aspects:

(1) Based on the multiple linear regression model to analyze change leadership indicators and corporate performance in terms of reliability, validity, and discrimination, the results can be obtained as follows: The average reliability, average validity, and average discrimination of change leadership indicators are 80.75%, 78.95%, and 78.79%, respectively, and the average reliability, average validity, and average discrimination of corporate performance indicators are 74.94%, 73.71%, and 70.16%, respectively. 73.71%, and 70.16%, respectively. The comprehensive analysis of leadership indicators and corporate performance through multiple linear regression model, and the influence factors of the indicators are derived, which are more conducive to the improvement of corporate change leadership and have important significance for the construction of corporate culture.

(2) There is a certain influence of change leadership on corporate performance. According to the results of the regression analysis of this paper, it can be seen that the personalized special care of the leader for the employees will only improve the employees' passion for work, and there is a significant positive linear correlation between the intellectual stimulation of change leadership and corporate performance, while the regression coefficient of personalized care in change leadership

for corporate performance is -0.085, which means that there is no significant positive influence of personalized care on corporate performance. The positive effect of intellectual stimulation of employees by leaders on annual corporate performance is significant while the effect of personalized care on corporate performance is not significant.

References

Abdulqader, A., & Al Marri, K. (2020). *The Influence of Transformational Leadership Style on Innovation Behaviours: The Case of the Government Sector of the UAE*. Paper presented at the Proceedings of the II International Triple Helix Summit 2.

Al-Dmour, A. H., & Al-Dmour, R. H. (2018). Applying multiple linear regression and neural network to predict business performance using the reliability of accounting information system. *International Journal of Corporate Finance and Accounting (IJCFA), 5*(2), 12-26.

Alrowwad, A. a., Obeidat, B. Y., Tarhini, A., & Aqqad, N. (2017). The impact of transformational leadership on organizational performance via the mediating role of corporate social responsibility: A structural equation modeling approach. *International Business Research, 10*(1), 199-221.

Donkor, F. (2022). Do Transformational Leaders Affect Employee Performance and Normative Commitment Through General Self-Efficacy? Analysis in Ghanaian Public Sector Organizations. *Public Organization Review, 22*(3), 707-723.

Ekaningsih, A. S. (2014). The effect of transformational leadership on the employees' performance through intervening variables of empowerment, trust, and satisfaction (a study on coal companies in East Kalimantan). *European Journal of Business and Management, 6*(22), 111-117.

Guan, F., Cao, J., Ren, J., & Song, W. (2022). The teaching of sports science of track and field-based on nonlinear mathematical equations. *Applied Mathematics and Nonlinear Sciences, 7*(1), 191-198.

Hui, Z., & Gengui, Z. (2016). Is Transformational Leadership Beneficial?——A Meta-analysis on the Relationship between Transformational Leadership and Organizational Performance. *Management Review, 28*(7), 179.

Ng, T. W. (2017). Transformational leadership and performance outcomes: Analyses of multiple mediation pathways. *The leadership quarterly, 28*(3), 385-417.

Normeza, A. A. A. A. W., & Mohammad, W. J. Investigating the Impact of Transformational Leadership Behaviours on Organizational Performance through Psychological Ownership in Gold Industry in Saudi Arabia. *Korea, 104*, 1.

Ogbonnaya, C. N., & Nielsen, K. (2016). *Transformational leadership, high performance work practices, and an effective organization*. Paper presented at the 76th Annual Meeting of the Academy of Management.

Ramadhanti, T., Singh, J. S. K., & Kularajasingham, J. (2021). Transactional and transformational leadership styles as predictors of employee performance during the Covid-19 crisis and the mediating role of organisational culture. *Business, Management and Economics Research, 7*(2), 39-51.

Rizki, M., Parashakti, R. D., & Saragih, L. (2019). The effect of transformational leadership and organizational culture towards employees' innovative behaviour and performance.

Samad, S., & Abdullah, Z. (2012). The influence of leadership styles on organizational performance of logistics companies. *International Business Management, 6*(3), 374-383.

Shi R , S. P., Graduate School, et al. (2015). A Study on the Relationship between CEO Turnover and the Corporate Performance: Based on the Date from State-owned Listed Companies. *Journal of Nanjing Audit University*.

Wang, F., & Chen, J. (2011). The influence of transformational leadership on explorative innovation and organizational performance under dynamic environment. *Nankai Business Review, 14*(1), 4-16.

Yanney, J. P. (2014). Business strategy and leadership style: Impact on organizational performance in the manufacturing sector of Ghana. *American Journal of Industrial and Business Management, 4*(12), 767.

Zehir, C., Karaboğa, T., & Başar, D. (2020). The transformation of human resource management and its impact on overall business performance: Big Data analytics and ai technologies in strategic HRM. *Digital Business Strategies in Blockchain Ecosystems: Transformational Design and Future of Global Business*, 265-279.