Evaluation on GE's Core Competence

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Abstract

General Electric (GE), the only company which is still on the index list since the Dow Jones Industrial Index was established in 1896, is one of the few companies in the world with a fair market capitalization of more than USD 500 billion. The root cause of GE's success can be found in its powerful core competence. This paper classifies more than one hundred years' development history of GE into three distinct stages: the era of business diversification, the era of refocusing operation and the era of business globalization with reference to the conceptual model and structural equation model of our research. The core competence scores in each stage are calculated by using analytic hierarchy process for objective comparison and evaluation.

Keywords: GE, core competence, analytic hierarchy process

1. Foreword

Corporate core competence falls in the realm of competitiveness research which can be divided into three levels: national competitiveness, industrial competitiveness and corporate competitiveness. For national competitiveness, the competitiveness evaluation method and index system of WEF (World Economic Forum) and IMD (International Institute for Management Development in Lausanne, Switzerland) are rated as the most authoritative tools for evaluation; for industrial competitiveness, the most valued theory is *Competitive Advantage* proposed by Professor Porter of Harvard University, especially the *Five forces Model*, which fully interprets the essence of industrial competitiveness; for corporate competitiveness, the representative concept is *Core Competence* proposed by Prahalad and Hammer in 1990.

The concept of *Core Competence* put forward by Prahalad and Hammer is described as "the collective learning in the organization, especially how to coordinate diverse production skills and integrate multiple streams of technologies", They concluded the following three characteristics of core competence: to make it possible to enter various product markets; to increase the value of the final products to the customer; to make it difficult for the competitors to imitate. In view of this, although Prahalad and Hammer provided merely a descriptive concept instead of a precise definition of core competence, it indeed left ample space for later interpretation of core competence from different angles and various perspectives.

As corporate core competence is a comparative concept, it becomes necessary and effective to make a quantitative comparison and analysis of corporate core competence by establishing the evaluation index system before we can probe into the inner relationship of the components concerning core competence. This paper then establishes the AHP evaluation model about corporate core competence based on the empirical research results from *Four-Factor Structural Equation Model* made in our earlier research.

2. The Establishment of Core Competence Model

2.1. The Construction of Conceptual Model

In a relevant research on corporate core competence, we set up a conceptual model demonstrating four dimensions of core competence: i.e., governance structure, management style, innovation mechanism and business portfolio. The relationship between them is shown in the following figure.

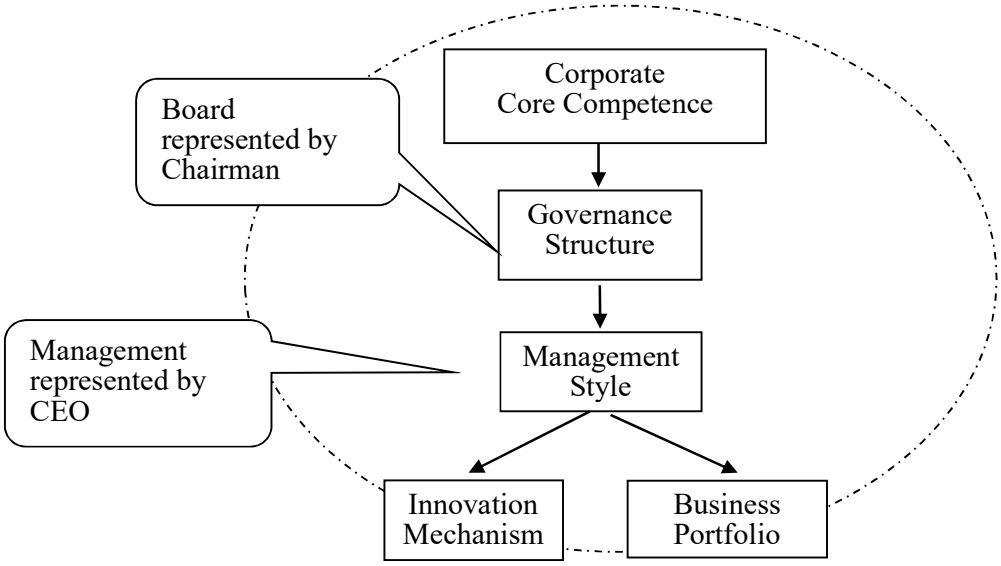

Figure 1. Conceptual model of corporate core competence

2.2. Construction of Structural Equation Model

An evaluation model involving 15 variables is constructed via questionnaire and empirical analysis with reference to the conceptual model of corporate core competence. The model is shown in Figure 2.

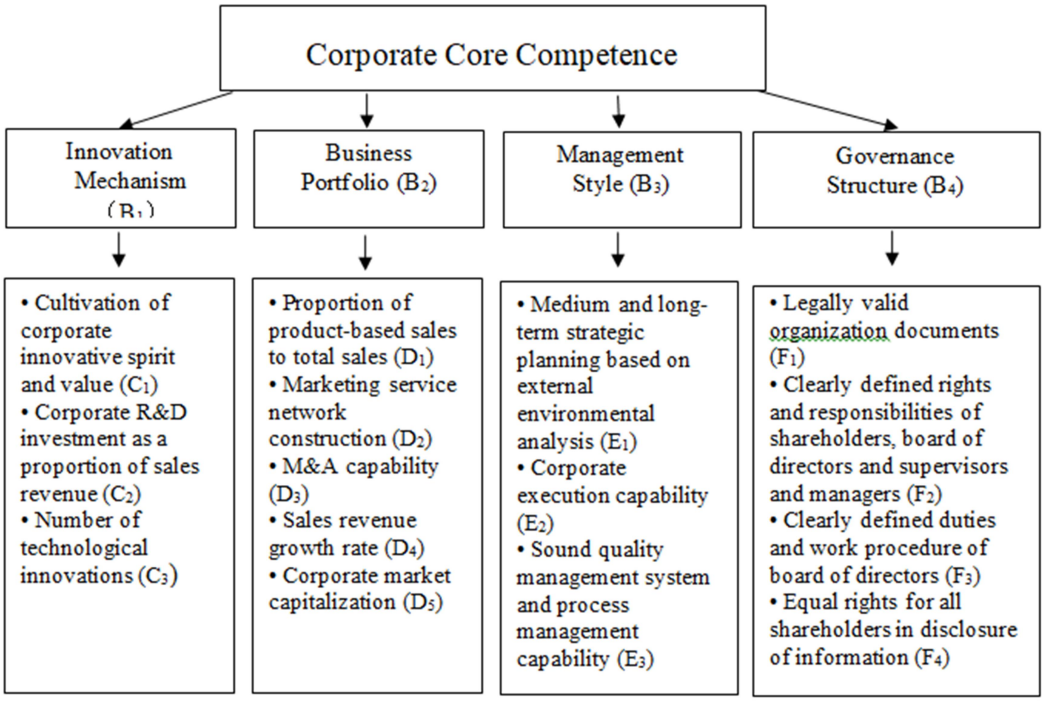

Figure 2. Evaluation model of corporate core competence

The weight of each index must be determined when using comprehensive evaluation model involving multiple indexes. Analytic hierarchy process is used to evaluate GE's core competence which can help acquire a more accurate weight of each index's weight with respect to a certain target.

2.3. The Construction of AHP Model

2.3.1 Using analytic hierarchy process to determine the weights of evaluation index

The problem should firstly be made hierarchical once analytic hierarchy process is used in conducting systematic analysis. The problem can be deconstructed into various components according to the nature of the problem and the overall goal to be achieved, and then a multi-level analytic structure model is formed by aggregating together the factors at different levels according to the interrelated influence of factors and the subordinate relationship.

The analytic hierarchy process can deconstruct the problem into different levels, each level contains different factors, then a multi-level analysis structure model is formed. In order to make the comparison judgment quantitative, the analytic hierarchy process introduces the 1-9 ratio scale method (as is shown in table 1) proposed by Saaty to establish the judgment matrix, after which we can calculate the weights of relative importance of each element at a certain level with respect to a corresponding element at the previous level by calculating the maximal characteristic root of the judgment matrix and its corresponding eigenvectors. The weights of relative importance of each element at a certain level can be figured out by weighting the original weights of factors at the previous level after calculating the single order weights of each factor at a certain level with respect

to the previous level, that is, the weights based on overall ranking. In this way, weights of relative importance or merit-demerit-related ranking value of the lowest-level factors with reference to the highest-level factors can be calculated through sequential analysis from the top to bottom.

Table 1 *Saaty 1-9 scale method*

Relative Importance	**Implication (the comparison between factor I and J)**
1	equally important
3	the former is slightly more important than the latter
5	the former is obviously more important than the latter
7	the former is much more important than the latter
9	the former is absolutely more important than the latter
2、4、6、8	between two judgment scales

The main steps of modeling with method of analytic hierarchy process are: （1）to construct the judgment matrix, $A=(a_{ij})n\times n$ according to the scale method; （2）to normalize the matrix by columns , $w_{ij}=a_{ij}/\sum_{i=1}^{n}a_{ij}$; （3）to calculate the product of the factors in each line of the judgment matrix: $M_i=\prod_{j=1}^{n}a_{ij}$; （4）to calculate the N-square root of M_i: $\overline{w}=M_i^{1/n}$; （5）to normalize; （6）to calculate the approximate value of $\lambda=\frac{1}{n}\sum_{i=1}^{n}\frac{(AW)_i}{w_i}$ as the maximal characteristic root; （7）to check on consistency.

2.3.2 The concrete steps of determining the weights of evaluation index

To determine the weights of GE's core competence, a total of ten specialists ranging from managers of multinational corporations and experts from colleges and universities were invited to grade each item concerning GE's core competence and then a judgment matrix is established. The first step is to determine the evaluation index weights of the criterion level and next the weights of innovation mechanism level. In this way, the evaluation indexes weights of business portfolio, management style and governance structure can be obtained respectively.

2.3.3 Overall sequencing of each level

This step is to calculate the sequencing weights of relative importance of all the factors at the same level with the highest level or the general goal as reference. Given all these figures, the weights of GE's core competence evaluation indexes are obtained as follows:

Table 2 *GE's core competence evaluation system*

Target Level	Criterion Level	Index Level	Weight	Integrated Weight
Core Competence	Innovation Mechanism（0.1736）	Cultivation of corporate innovative spirit and value	0.3614	0.0627
		Corporate R&D investment as a proportion of sales revenue	0.0650	0.0113
		Number of technological innovations	0.5736	0.0996
	Business Portfolio（0.5806）	Proportion of product-based sales to total sales	0.0879	0.0510
		Marketing service network construction	0.2796	0.1623
		M&A capability	0.2154	0.1251
		Sales revenue growth rate	0.2637	0.1531
		Corporate market capitalization	0.1534	0.0891
	Management Style（0.1139）	Medium and long-term strategic planning based on external environmental analysis	0.4167	0.0475
		Corporate execution capability	0.4661	0.0531
		Sound quality management system and process management capability	0.1172	0.0133
	Governance Structure（0.1319）	Legally valid organization documents	0.3735	0.0493
		Clearly defined rights and responsibilities of shareholders, board of directors and supervisors and managers	0.1625	0.0214
		Clearly defined duties and work procedure of board of directors	0.2806	0.0370
		Equal rights for all shareholders in disclosure of information	0.1834	0.0242

3. Evaluation of Core Competence

3.1. Division of GE's Three Historical Stages

As previously stated, GE's development history of over a hundred years is classified into three strategic development stages in order to facilitate analysis and research. With reference to GE's business formation and evolution process development, we define the following three historical stages spanning three centuries from 1892 to 2017: the era of business diversification (1892-1980), the era of refocusing operation (1981-2000) and the era of business globalization (2001-2017).

3.1.1 The era of business diversification (1892-1980)

Prior to the founding of GE in 1892, there was a brief period of specialized operation. GE began to enrich its business portfolio in areas such as transportation, healthcare, media, consumer goods and financial services after 1892, and gradually

evolved into the world's largest diversified company in 1980. GE's diversification is a typically unrelated one with its businesses extending across a number of manufacturing sectors and even financial service sector. There is no doubt that GE is regarded as the outstanding example of the best combination of industrial and financial capital, and half of its income and profit now come from its financial businesses. Many companies are emulating GE's business model, while of course, the combination of production and financing is inevitably restricted by a certain institutional environment during a specific historical period. Therefore, GE's involvement in financial industry is more a result of strategic adjustment of its own operation strategy in the face of the changing external market environment than a mere self-reflection or adjustment in response to the restrictions of external environment. It is safe to say this adaptive ability precisely highlights GE's market competitiveness.

GE's market competitiveness is a kind of core competence that emphasizes resource integration capability and organizational learning capability which can serve as the support of the expansion of diversified businesses and make the unrelated diversification viable. GE's core competence also embodies its synthetic capability of activating organization structure levels and stimulating organization innovation, which helps integrate business operation system with transformation thoughts, thus guarantees the continuous support impetus behind the diversification.

3.1.2 The era of refocusing operation (1981-2000)

This is an era of Welch. Welch joined GE Plastics Division in 1960 and became the general manager of GE's Chemical and Metallurgy Division at the end of 1971 and later vice chairman of GE in August 1979. The 45-year-old gentleman then became the youngest chairman and CEO in GE's history in April 1981.

In the early 1980s, GE's diversification developed to an extremely high level with a total of 350 different business divisions and 43 strategic business Units (SBUs). Diversified businesses increased the irrationality of resource allocation and created a bloated bureaucratic system. Faced with the trend of economic globalization, Welch initiated a series of revolutionary changes not long after he took office: a business unit would be closed or sold out if it couldn't rank the first or second in the global marketplace. In addition, the company also consolidated its world-leading businesses through about USD19 billion worth of mergers and acquisitions, and invested in the construction of new R&D centers and engineering centers. Welch took advantage of strategic plans to make GE become not only a big company, but a strong one with competitive advantages.

In terms of strategic planning, GE chose to enter industries through the famous business screening model, GE Matrix, whose aim is to make it possible for each of GE's business divisions to occupy the first or second place in every industry. That's why GE shrank 350 different business units and 43 strategic operations (SBUs) in the early 1980s into 25 business groups in the 1990s, namely 4 long-cycle business units, 6 short-cycle units and 15 financial service units. When Welch was just at the beginning of his helm, there were only three divisions of GE, lighting, engine and power divisions, which could maintain a leading position in the market. While in 2001 when he retired, the number of business divisions which were among the best in their respective markets amounted to 12,

and if ranked separately, as many as 9 of them could be listed on Fortune Global 500 companies.

In 1981, when Welch became the chairman and CEO, GE's sales revenue was USD25 billion with a profit of USD1.5 billion and its market value was only USD14 billion, which ranked the tenth in the U.S. listed companies. In 2000, when Welch was about to retire, GE's sales revenue amounted to amazing USD129.9 billion with a profit of $12.7 billion, and GE's market value was more than USD 500 billion.

3.1.3 The era of business globalization (2001-2017)

GE shifted from a multinational company to a global corporation and began to operate globally in the context of economic globalization.

In 2001, Immelt took over GE's chairman and CEO from Welch as the 12th Chairman and chief executive in GE's history. After taking office, Immelt proposed six major strategies for realizing economic growth， i.e., Customers, Innovation, Technology, Commercial Excellence, Globalization, and Growth Leaders.

Immediately after his inauguration, Immelt experienced challenges caused by the 911 terrorist attacks and the grim global economic environment. At the critical juncture, GE's business model played its role and stood the rigid test. In 2001, the sales revenue was USD125.9 billion, 3% lower than that in 2000, but the profit rose by 11% and reached a record high of USD14.1 billion.

Although GE's profits continued to grow from 2001 to 2007, 2008 was a turning point. GE's profit fell significantly in 2008 from USD22.2 billion a year ago to USD17.4 billion, and people began to question Immelt's management capability. Immelt has indeed made some mistakes. One mistake is to acquire Baker Hughes, the other is to buy Alstom. Due to the fact that GE's performance went from bad to worse, Immelt was forced to resign in 2017.

3.2. The Evaluation on Core Competence in Three Stages

First of all, the indexes are graded by the experts; the score of each index is based on a total of 100 points. The average score of each index can then be obtained after statistical calculation of scores on the questionnaire. The last step is to do summation after multiplying the weights before obtaining the score of core competence.

3.2.1 The era of business diversification (1892-1980)

In the era of business diversification, the total score of GE's core competence is 87.7, a very competitive score, and in the column of innovation mechanism, business portfolio, management style and governance structure, the scores are respectively 16.3, 49.6, 9.4 and 12.4, among which business portfolio wins the highest score, innovation mechanism follows closely and management style scores the fewest points. It shows GE's outstanding core competence is featured by business portfolio, and the contribution of management style to its competence is comparatively less than others.

Table 3 *GE's core competence score in diversification era*

Target Level	Criterion Level	Index Level	Weights	Score	Total
Core Competence	Innovation Mechanism（0.1736）	Cultivation of corporate innovative spirit and value	0.0627	92	5.8
		Corporate R&D investment as a proportion of sales revenue	0.0113	96	1.1
		Number of technological innovations	0.0996	95	9.5
		Total score			**16.3**
	Business Portfolio（0.5806）	Proportion of product-based sales to total sales	0.0510	90	4.6
		Marketing service network construction	0.1623	88	14.3
		M&A capability	0.1251	85	10.6
		Sales revenue growth rate	0.1531	86	13.2
		Corporate market capitalization	0.0891	78	6.9
		Total score			**49.6**
	Management Style（0.1139）	Medium and long-term strategic planning based on external environment analysis	0.0475	80	3.8
		Corporate execution capability	0.0531	85	4.5
		Sound quality management system and process management capability	0.0133	80	1.1
		Total score			**9.4**
	Governance Structure（0.1319）	Legally valid organization documents	0.0493	95	4.7
		Clearly defined rights and responsibilities of shareholders, board of directors and supervisors and managers	0.0214	94	2.0
		Clearly defined duties and work procedure of board of directors	0.0370	95	3.5
		Equal rights for all shareholders in disclosure of information	0.0242	92	2.2
		Total score			**12.4**
Aggregate score					**87.7**

3.2.2 The era of refocusing operation (1981-2000)

In the era of refocusing operation, the total score is 95.8 which shows an excellent level of core competence. The score of innovation mechanism, business portfolio, management style

and governance structure are respectively 15.9, 56.4, 11.2 and 12.3, among which business portfolio has the highest score, and management style scores the fewest points, but the gap among management style, innovation mechanism and governance structure is narrower compared with those in the era of business diversification.

Table 4 *GE's core competence score in refocusing operation era*

Target Level	Criterion Level	Index Level	Weights	Score	Total
Core Competence	Innovation Mechanism（0.1736）	Cultivation of corporate innovative spirit and value	0.0627	93	5.8
		Corporate R&D investment as a proportion of sales revenue	0.0113	95	1.1
		Number of technological innovations	0.0996	90	9.0
		Total score			**15.9**
	Business Portfolio（0.5806）	Proportion of product-based sales to total sales	0.0510	95	4.8
		Marketing service network construction	0.1623	96	15.6
		M&A capability	0.1251	98	12.3
		Sales revenue growth rate	0.1531	98	15.0
		Corporate market capitalization	0.0891	98	8.7
		Total score			**56.4**
	Management Style（0.1139）	Medium and long-term strategic planning based on external environment analysis	0.0475	98	4.7
		Corporate execution capability	0.0531	98	5.2
		Sound quality management system and process management capability	0.0133	98	1.3
		Total score			**11.2**
	Governance Structure（0.1319）	Legally valid organization documents	0.0493	95	4.7
		Clearly defined rights and responsibilities of shareholders, board of directors and supervisors and managers	0.0214	94	2.0
		Clearly defined duties and work procedure of board of directors	0.0370	92	3.4
		Equal rights for all shareholders in disclosure of information	0.0242	90	2.2
		Total score			**12.3**
Aggregate score					**95.8**

The era of refocusing operation was the days of Welch. In the early 1980s, GE's diversification developed to an extremely high level with a total of 350 different business units and more than 400,000 employees. Welch firstly dismissed nearly 35% of the employees while in the meantime implementing the internal reform of management mechanism to improve efficiency; he then closed or sold out businesses which were not competitive in the global marketplace, In addition, Welch consolidated its world-leading businesses through mergers and acquisitions, and also invested in the construction of new R&D centers and engineering centers.

In the mid-1980s, Welch invented a tool called *change acceleration* to eliminate red tape; he also advocated *speed*, *simplicity* as well as *self-confidence* to improve the GE's work efficiency. In the early 1990s, Welch sparkplugged the management concept of *borderless organization* and *WorkOut* to eliminate the hierarchy limit to the utmost extent and seek new ideas from employees to mobilize their work enthusiasm. In the late 1990s, he still vigorously implemented the Six Sigma management and mobilized the entire company to go all out to achieve new breakthroughs in the GE's development strategy. It is safe to say that Welch had been implementing management innovation for GE during those 20 years, making it the most competitive company in the world.

Under Welch's magical art of leadership, GE stood out. He successfully transformed a bureaucracy-filled company into a vibrant and creative business giant. In the era of refocusing operation, business portfolio and innovation mechanism promoted by the management style were precisely GE's core competence to maintain its development momentum and stand among the top 10 companies in Fortune Global 500 companies.

3.2.3 The era of business globalization (2001-2017)

In the era of business globalization, the total score of core competence is 91.9 which shows an excellent GE's core competence, and the scores of innovation mechanism, business portfolio, management style and governance structure are respectively 15.8, 53.2, 10.4 and 12.5, among which business portfolio wins the highest score, and the scores of other three factors are about the same. It shows that GE's core competence featured by business portfolio is still prominent, and is becoming more stable and perfect.

Table 5 *GE's core competence score in business globalization era*

Target Level	Criterion Level	Index Level	Weights	Score	Total
Core Competence	Innovation Mechanism（0.1736）	Cultivation of corporate innovative spirit and value	0.0627	93	5.8
		Corporate R&D investment as a proportion of sales revenue	0.0113	95	1.1
		Number of technological innovations	0.0996	90	9.0
		Total score			**15.9**
	Business Portfolio（0.5806）	Proportion of product-based sales to total sales	0.0510	95	4.8
		Marketing service network construction	0.1623	96	15.6
		M&A capability	0.1251	98	12.3
		Sales revenue growth rate	0.1531	98	15.0
		Corporate market capitalization	0.0891	98	8.7
		Total score			**56.4**
	Management Style（0.1139）	Medium and long-term strategic planning based on external environment analysis	0.0475	98	4.7
		Corporate execution capability	0.0531	98	5.2
		Sound quality management system and process management capability	0.0133	98	1.3
		Total score			**11.2**
	Governance Structure（0.1319）	Legally valid organization documents	0.0493	95	4.7
		Clearly defined rights and responsibilities of shareholders, board of directors and supervisors and managers	0.0214	94	2.0
		Clearly defined duties and work procedure of board of directors	0.0370	92	3.4
		Equal rights for all shareholders in disclosure of information	0.0242	90	2.2
		Total score			**12.3**
Aggregate score					**91.9**

It was not a smooth start for GE, though.

The first thing was the replacement of the top leader inside the company. Immelt succeeded Welch in 2001 and became 12th Chairman and CEO in GE's history. Another is the change of the external environment both in economy and politics related to 911 terrorist attacks and the expectation of a recession. Then the question is how GE could keep growing in such an unpredictable world.

In the post-Welch era, Immelt proposed his six strategies as mentioned earlier. GE continued to increase investment in technology. It was new energy technology and nanotechnology that helped GE establish its world-leading competitive edge. In 2003, GE's fourth R&D center was set up and opened in Shanghai, China. In addition, GE managed to associate the internal value chain with the customer value chain based on leading technology and innovative ideas to better serve the customers, and the quality of the service was not judged by GE, but relied on NPS (net promoter score) by customers. GE's philosophy has always been ensuring its high growth through helping the customers achieve success. In short, Immelt aimed to further consolidate GE's core competence and maintain its growth depending on his six strategies.

4. Summary

The score of GE's core competence at three different stages is shown in the following table.

Table 6 *Score summary of GE's three eras*

	Diversification	**Refocusing**	**Globalization**
Innovation Mechanism	**16.3**	15.9	15.8
Business Portfolio	49.6	**56.4**	53.2
Management Style	9.4	**11.2**	10.4
Governance Structure	12.4	12.3	**12.5**

It can be seen that the score of innovation mechanism wins the highest point in the era of business diversification, indicating GE's innovation mechanism was outstanding in this period, including product innovation and technology innovation. This precisely helped establish GE's core competence and facilitate its rapid development during this period. In the meantime, GE set up three R&D centers in the homeland, India and Germany, in which two scientists won the Nobel Prizes.

In the era of refocusing business, the scores of portfolio business and management style are the highest, which shows that GE's management style has been greatly improved under the leadership of Welch through business reorganization, following the *top-notch* principle, and introduction of advanced management methods like Six Sigma, lean manufacturing, etc. It is in the era of refocusing business that GE really started to become stronger if GE became bigger in the era of diversification.

While in the era of business globalization, governance structure gains the highest score which indicates that GE's governance structure becomes more perfect in the environment of better corporate governance in American companies. The level of GE's corporate governance achieves the fourth level, which is the highest level of corporate governance of International Financial Corporation.

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