

Effects of industry evolution on corporate executive: evidence from Chinese listed companies

Effects of
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Abstract

Purpose – The real estate industry has experienced frequent changes in corporate executives in recent years. A total of 147 A-share listed firms witnessed a total of 191 corporate executives' departure. This wave of corporate executive departures is significantly different from previous waves. This study aims to examine whether industry evolution influence the characteristics of corporate executives? If so, then how?

Design/methodology/approach – Drawing on upper echelons theory, this study analyzed the effects of industry life cycle on the characteristics of corporate executives. The data of A-share listed companies in the textile, real estate and computer industries in China from 1992 to 2014 were collected.

Findings – There are significant differences in the characteristics of corporate executives that match the life cycles of different industries. Companies at the growth stage in the life cycle of an industry were more likely to select and appoint younger corporate executives with political capital, peripheral functions and output functions, whereas companies at the maturity stage were more likely to select and appoint older corporate executives with throughput functions.

Originality/value – By using the upper echelons theory as a starting point, this study analyzed the effects of industry life cycle on corporate executive's characteristics. The research findings offer theoretical implications for the upper echelons theory and provide managerial implications.

Keywords Industry evolution, Corporate executive, Corporate executive's characteristics, Listed companies, Corporate governance

Paper type Research paper

1. Introduction

The real estate industry has experienced frequent changes in corporate executives in recent years. A total of 147 A-share listed firms witnessed a total of 191 corporate executives' departure from January 1, 2014 to March 31, 2015. Compared to previous waves of corporate executives' departures, this wave is significantly different in relation to not only the number of corporate executives involved, but also the subsequent destination of departed corporate executives and the sources of corporate executive departures. Despite many corporate executives opting to "leave their positions without leaving the industry" in this round of personnel change, more corporate executives chose to engage in cross-industry development and entrepreneurship in various fields, with an increasingly diverse sources of corporate executives making such moves at the same time. These changes raise the following questions: Does industry evolution influence the characteristics of corporate executives? If so, how?



However, existing studies have not been able to provide satisfactory answers to these questions.

Scholars focused on the effects of firm-specific factors on corporate executive's characteristics when studying the relationship between the internal and external environment of firms and corporate executive's characteristics (Koyuncu *et al.*, 2010; Jiang *et al.*, 2012). A few empirical studies have examined the relationships of social culture and institutions with characteristics of corporate executives when investigating the effects of industries on corporate executive's characteristics (Tereas and Iris, 2007; Li and Zhang, 2010).

Previous studies have laid the foundation for this study but are limited in particular ways. Firstly, previous studies lack systematisms. Secondly, previous studies ignored dynamicity. Thirdly, previous studies have not investigated or discussed the effects of industries on corporate executive's characteristics in the Chinese context. Hence, it is extremely important to expand the research scenario to enhance the generalizability of theories.

Including listed firms in different types of industries as examples, this study explores how industry life cycle influences corporate executive's characteristics, in an attempt to address the gaps in existing knowledge. A longitudinal comparison of life cycles across industries and latitudinal comparison across different types of industries are conducted in this study, and these issues are investigated in the Chinese context, which greatly enhances the generalizability of theories and promotes practical implications.

2. Theoretical development and hypotheses

Upper echelons theory emphasizes that the internal and external environments of a firm influence corporate executive's characteristics, while industry is a key environmental factor for a firm. The life cycle of an industry determines, largely, the average profitability of the industry, thus having a direct effect on the industry. Industry life cycle is generally divided into the growth stage and the maturity stage. At different stages in the development of an industry, the behaviors of manufacturers commonly go through periodic and regular changes. Empirical results have confirmed that an industry demonstrates different firm development strategies, production and sales of products, and technological research and development (R&D) and innovation focuses at the introduction, growth, maturity and decline stages.

Due to different factors of production, demand conditions, and levels of competition in the life cycles of different industries, firms have different actual perceptions of industry characteristics, thereby influencing their choice of response or behavior. Firm strategy and corporate executive adjustment are usually regarded as strategic behaviors of firms in response to environmental changes (Aragon-Corre and Sharmas, 2003). In China, it is of particular importance to empirically investigate the relationship between corporate executive's characteristics and the internal and external environments of firms. On the one hand, from the perspective of external environment, firms make up for the shortcomings of the market system by relying heavily on the personal role of corporate executives to protect their development. This is because China, which is currently undergoing economic transformation, has yet to put in place a sound market system and is plagued by a highly uncertain environment. On the other hand, firms relatively lack in internal organization as they demonstrate low levels of institutionalization. In some firms, senior management has the sole authority while firm behavior is influenced by corporate executive's characteristics in every respect (Li and Zhang, 2011).

Educational level is often utilized for measuring the professional knowledge and information processing capabilities of corporate executives. Higher degrees of product differentiation are associated with higher education levels of CEOs, firms that emphasize R&D will select people with high levels of formal education (Datta and Guthrie, 2010).

The degree of uncertainty faced by firms and the corresponding innovation requirements differ depending on the different stages in the life cycle of the industry. This results in the differential educational requirements for corporate executives among firms. At growth stage, a large number of new firms consider entering the industry since the industry is developing rapidly, and it is easier for firms to enter the industry, thereby, leading to great uncertainties in the competitive environment. Hence, firms need highly educated corporate executives at the growth stage. Meanwhile, with slow industry development, high barrier to entry, a sharp decline in the number of firms, and a relatively stable market and technology at the maturity stage, firms face a less complex environment, thus, objectively lowering the educational requirements for corporate executives. Hence, we propose the following:

H1. Compared to the growth stage in the life cycle of an industry, firms at the maturity stage are more likely to select and appoint corporate executives with higher educational level.

Age represents an individual's experience and risk propensity and influences an individual's preference for strategic choices. Young managers are more likely to have a risk appetite and tend to try new and unprecedented things and take risks; thus, they are more inclined to greatly improve firm performance by making big strategic moves. The faster an industry grows, the shorter the tenure of CEOs, and the younger the CEOs are. Older managers have a higher sense of commitment to organizations, rely more on experience when making decisions, and tend to avoid risks in order to maintain the stability of firm profits.

Rapid growth in demand is a sign that an industry is entering the growth stage, where such growth usually exceeds GDP growth. At the growth stage in the life cycle of an industry, strategic decisions made by firms should prompt them to strive for market share expansion. Therefore, firms place great emphasis on the enterprising spirit and learning abilities of corporate executive and, thus, favor young corporate executives. At the maturity stage, products from major competitors become highly homogeneous as growth in demand slows down, and technology in the industry becomes mature, intensifying competition in the process. At this juncture, firms compete for less or no mistakes and more resources; thus, firms place greater emphasis on stability, experience and relationship resources among corporate executives. As can be observed, firms attach great importance to older corporate executives at the maturity stage. Based on the analysis above, we propose the following:

H2. Compared to the maturity stage in the life cycle of an industry, firms at the growth stage are more likely to select and appoint younger corporate executives.

Political capital is a valuable resource that can bring various benefits, such as financing convenience and tax incentives to firms, thereby having a positive effect on firm performance. Corporate executives with political identities can not only influence government decision-making by participating in the administration and discussion of government affairs, but also enjoy more opportunities to form good relationships with government officials, to facilitate rent seeking and obtain various types of economic resources from the government.

At the growth stage, firms face greater operational risks due to high levels of uncertainty in customer demand and technological development. In order to reduce operational risks, firms have to lobby the government for preferential policies; thus, firms prefer to appoint corporate executives with political capital. After entering the maturity stage, the competitive environment in the industry becomes stable, and there is less intervention in government policies. At this stage, firms pay more attention to production operations and have less demand for corporate executives with political background. Hence, this study proposes that:

H3. Compared to the maturity stage in the life cycle of an industry, firms at the growth stage are more likely to select and appoint corporate executives with political capital.

Peripheral functions include activities that involve dealing with external stakeholders, such as financing and legal services. Corporate executives with a background in peripheral functions have extensive external social resources. They not only have a deep understanding of related industries and the macro environment, but also specialize in capital market operations and external resource integration, thereby, helping firms maintain a smooth capital chain and control legal risks (Wang *et al.*, 2013). The more important and scarcer the resources required by firms, the higher the firms' reliance on key resources in the external environment and the more important the peripheral functions assumed by corporate executives.

At growth stage, market demand increases rapidly; thus, the primary problem facing firms is to expand market share. It is necessary to increase capital investment when engaging in R&D or expanding production capacity as it is often difficult to meet the cash needs of investing activities using cash flow generated from operating activities alone. Therefore, firms must further intensify efforts to raise capital. Meanwhile, firms at the growth stage face slowing growth in market demand, gradually maturing technology and products, a stable supply chain and adequate cash flow from operating activities, and can even feed other emerging industries. Hence, acquiring external resources and capitalizing at the macro environment do not seem to be very urgent and important to firms, thereby, reducing their demand for corporate executives with a background in peripheral functions. Hence, this study proposes the following:

- H4.* Compared to the maturity stage in the life cycle of an industry, firms at the growth stage are more likely to select and appoint corporate executives with a peripheral function background.

Throughput functions, such as production and finance, are mainly responsible for monitoring the entire production process, emphasizing cost reduction and quality control and carrying out partial improvements. Corporate executives with a background in throughput functions have an understanding of production processes and pay attention to social capital in firms. Moreover, they are more willing to enhance the production efficiency of firms through internal efficiency enhancement measures, such as process management, quality control and technology improvement. Further, they may be more interested in strategies such as enterprise automation, production equipment upgrading and process improvement (Wang *et al.*, 2013). Therefore, the higher a firm's tendency to enhance production efficiency while reducing production costs by improving production processes internally, the more the firm needs corporate executives with a background in throughput functions (Jensen and Zajac, 2004).

At maturity stage, production technology gradually becomes complete and mature while product design, structure and functions have become relatively solid. With small differences and few changes in the products of various firms, firm competition mainly revolves around price; thus, cost control becomes particularly important. Therefore, firms pay more attention to specific internal operation processes by emphasizing gradual improvement and continuous process innovation while demonstrating growing demand for corporate executives with a background in throughput functions. At growth stage, firms mainly achieve rapid enhancement of production efficiency through breakthrough technological innovations rather than gradual technological improvements. Focusing too keenly on social capital in firms may lead to inadequate attention to external customers, causing them to be incapable of adapting to the needs of market competition at the growth stage (Wang and Mao, 2010). As a result, firms at this stage show a lower preference for corporate executives with a background in throughput functions. Hence, this study proposes the following:

- H5.* Compared to the growth stage in the life cycle of an industry, firms at the maturity stage are more likely to select and appoint corporate executives with throughput-function background.

Output-function background refers to a background in departments such as marketing, R&D and design. Corporate executives with a background in output functions possess the advantage of dealing with fast-changing and uncertain environments (Hambrick and Mason, 1984). They are the most sensitive to the market and are most inspired by new elements while being more receptive to new ideas and innovations (Wang *et al.*, 2013), and more inclined to see investment opportunities, thereby, increasing R&D investments to develop new technologies and meet market needs (Tyler and Steensma, 2015). Hence, the faster the market changes faced by firms and more the market emphasis on innovation and R&D, the higher the firm requirement for corporate executives with a background in output functions.

At growth stage, there exists a wide variety of products, and products are frequently launched as demand grows rapidly and diversifies. At the same time, the industrial system absorbs large numbers of innovations since technology is yet to mature at the growth stage. Therefore, firms pay close attention to the external market environment and engage in frequent exchanges with customers, research institutes, channel vendors and other organizations to strengthen external learning (Li *et al.*, 2019), which objectively requires firms to select and appoint corporate executives with background and extensive experience in output functions. At maturity stage, there is a huge decline in market uncertainties as growth in market demand slows down while technology and products become mature and homogeneous. If firms place too much emphasis on innovative products rather than actively improving and promoting existing products, firms may pay a huge price due to business limitations arising from the maturity of the industry (Liu, 2010). Therefore, firms lower their demand for corporate executives with a background in output functions. Based on the analysis above, this study proposes that the following:

- H6.* Compared to the maturity stage in the life cycle of an industry, firms at the growth stage are more likely to select and appoint corporate executives with output-function background.

3. Methods

3.1 Sample selection

In accordance with the “Guidance on Industry Classification of Listed Companies (2001 Edition)” issued by China Securities Regulatory Commission, this study selects listed companies in the textile industry, real estate development and business operation industry (hereinafter referred to as the real estate industry), and computer and related equipment manufacturing industry (hereinafter referred to as the computer industry) from 1990 to 2014 as the research samples. After deleting unavailable data, this study eventually obtained 217 valid research objects and 1,590 valid samples.

The characteristics of corporate executive background, enterprise size, ownership and industry classification data of listed companies are from China Stock Market and Accounting Research Database. The number of manufacturers and other data used to judge the life cycle of an industry are obtained from “China Basic Statistic Units Yearbook” and “China Economic Census Yearbook”.

3.2 Econometric model

The following econometric models were conducted to testify the hypotheses:

- (1) For hypothesis 1-2, the dependent variable is a continuous variable. Hence, linear regression method was adopted to test hypotheses, and the econometric model is as follows:

$$\text{Characteristic} = \alpha_0 + \beta_1 \text{Lifecycle} + \beta_2 \text{State} + \beta_3 \text{Size} + \beta_4 \text{Techno} \log y + \beta_5 \text{Labor} + \varepsilon \quad (1)$$

Characteristic is dependent variable, Lifecycle is in dependent variable, and others are control variables.

- (2) For [hypothesis 3–6](#), the dependent variable is a 0/1 variable. Hence, logistic regression method was adopted to test hypotheses. Let the conditional probability be the probability of an event occurring, and the logistic regression model is as follows:

$$P(y_i = 1/X) = \frac{\exp(b_0 + b_1X)}{1 + \exp(b_0 + b_1X)} \quad (2)$$

3.3 Variable declaration

3.3.1 Dependent variable: characteristic of corporate executives. The corporate executive defined in this study is a narrow understanding, including only the president, general manager, or CEO of the enterprise.

- (1) *Age*: The difference between the year of the corporate executive in the sample and the year of the corporate executive's birth.
- (2) *Educational level*: Assigning based on corporate executive's educational background. High school and below is assigned as "1", junior college is assigned as "2", bachelor degree is assigned as "3", Master's degree is assigned as "4" and doctorate degree is assigned as "5".
- (3) *Political capital*: Drawing on previous researches ([Lei et al., 2009](#); [Liu et al., 2010](#)), this study judge whether the corporate executive has political capital according to whether he has served in the government or the military, whether he is a deputy to the National People's Congress or a member of the Chinese People's Political Consultative Conference. "If yes" is assigned as "1", "If not" is assigned as "0".
- (4) *Functional background*: Drawing on previous researches ([Jiang et al., 2012](#); [Li and Zhang, 2010](#)), this study judge whether the corporate executive has a peripheral-function background, a throughput-function background or an output-function background according to whether he has recently been in charge of and the name of the main management position in the past.

3.3.2 Independent variable: life cycle of an industry. Because of the strict market access system of Chinese capital market, companies at development stage rarely go public, companies at recession stage seek diversified transformation or it is reorganized by backdoor and lead to changes in industrial types. Therefore, the industry life cycle of listed companies is only divided into "growth stage" and "maturity stage". "Growth stage" is assigned as "1". "Maturity stage" is assigned as "0".

This study combines the actual situation of Chinese industrial development and the status of national data statistics, adopts the net entry rate method and major landmark events to evaluate the life cycle of the three industries. Specifically, the firm net entry rate method is used to preliminarily judge the starting time of each stage of the industry. Considering the rapid change of domestic industry life cycle, this study selects the three-year moving average

method to calculate the net entry rate of manufacturers. Meanwhile, major landmark events within the industry are used as an auxiliary method to judge the inflection point of industrial life cycle stage. Tables 1 and 2 illustrate the detailed analysis process and results of the life cycle of the three industries.

3.4 Control variables

According to the previous researches, this study controls at the socio-cultural, institutional, industrial and corporate levels. We control the social and cultural factors by selecting the sample companies as Chinese listed companies, and ownership and firm size are used as the control variables at the institutional and firm levels (Jiang et al., 2012; Li and Zhang, 2010).

- (1) *Ownership*: The category of the last controlling shareholder of the largest shareholder of an enterprise. “State-owned enterprise” is assigned as “0”, “Nonstate-owned enterprise” is assigned as “1”.
- (2) *Firm size*: The natural log of a firm’s total assets.

Industrial sector	Year	Net entry rate		Major landmark events	Inflection point of industrial life cycle stage
		The year before	Current year		
Computer industry	2006	14.88%	9.41%	In 2006, the production of desktop computers in China had a negative growth year on year, the industry’s profit margin was the lowest since 2002	Maturity stage
Real estate industry	2011	9.85%	0.34%	In 2012, the number of people of working age fell in absolute terms for the first time	Maturity stage
Textile industry	1992	0.05%	−3.11%	In 1992, Chongqing Knitting Factory was officially declared bankrupt	Recession stage
	2000	−21.84%	6.75%	In 2001, China officially joined the WTO, which greatly benefited the export of textile and garment	Growth stage
	2008	7.81%	4.05%	When the Labor Contract Law of the People’s Republic of China took effect in 2008, labor costs in China more than doubled in five years	Maturity stage

Note(s): This table is organized according to the national data statistics and calculation results

Table 1. Net entry rate and industry life cycle stage inflection point of three industries

	Introductory stage	Growth stage	Maturity stage	Recession stage
Textile industry	/	2000–2007	2008–2014	1992–1999
Real estate industry	1978–1991	1992–2010	2011–2014	/
Computer industry	1958–1992	1993–2005	2006–2014	/

Note(s): This table is organized according to the national data statistics calculation results

Table 2. The industrial life cycle of the three industries

- (3) *Industry Type*: Based on the results of Lu and Dang (2014), textile industry, real estate industry and computer industry belong to labor-intensive industry, capital-intensive industry and technology-intensive industry, respectively. The 0–1 code is carried out for the three industries respectively. “If yes” is assigned as “1”, “If not” is assigned as “0”.

4. Results

Table 3 shows the mean, standard deviation and correlation of variables. It can be found that industry life cycle has a direct impact on corporate executive’s characteristics, which supports the previous hypothesis. Furthermore, the correlation coefficients among independent variables are all lower than 0.40 and variance inflation factor (VIF) of all variables is less than 10, which indicate that there is not obvious multicollinearity problem among the independent variables in this study.

Table 4 illustrates the empirical regression results of the study. Model 1 shows that the regression coefficient between industry life cycle and age of corporate executives is -1.045 , and the significance level is 0.5%. Which suggests that companies at the growth stage of the industry’s life cycle have younger corporate executives. Hence, hypothesis 1 was supported.

Model 2 shows that companies at the growth stage of the industry’s life cycle have significantly lower levels of education among their corporate executives, which is opposite to hypothesis 2. Hence, hypothesis 2 was not supported. The possible reason is the expansion of university enrollment.

Model 3 shows that the regression coefficient of industry life cycle is 0.310, and is significantly positive at the level of 5%, which means corporate executives at the growth stage of the industry’s life cycle are more likely to have political capital. Hence, hypothesis 3 was supported.

Model 4 shows that the regression coefficient of industrial life cycle is 0.291 and the significance level is 5% when the dependent variable is peripheral-function background. Which suggests that corporate executives at the growth stage of the industry’s life cycle are more likely to have peripheral-function background. Hypothesis 4 was supported.

Model 5 shows that the regression coefficient of industrial life cycle is -0.267 and the significance level is 5% when the dependent variable is throughput-function background. Which suggests that corporate executives at the maturity stage of the industry’s life cycle are more likely to have throughput-function background. Hypothesis 5 was supported.

Model 6 shows that the regression coefficient of industrial life cycle is 0.314 and the significance level is 1% when the dependent variable is output-function background. Which suggests that corporate executives at the growth stage of the industry’s life cycle are more likely to have output-function background. Hence, hypothesis 6 was supported.

5. Discussion

By using the upper echelons theory as a starting point, this study analyzed the effects of industry life cycle on corporate executive’s characteristics. The data of A-share listed companies in the textile, real estate, and computer industries in China from 1992 to 2014 confirmed that there are significant differences in corporate executive’s characteristics that match the life cycles of different industries. Companies at the growth stage in the life cycle of an industry were more likely to select and appoint younger corporate executives with political capital, peripheral functions and output functions, whereas companies at the maturity stage were more likely to select and appoint older corporate executives with throughput functions.

Variable	Mean	SD	1	2	3	4	5	6	7	8	9	10	11
Age	45.99	6.34	1										
Educational level	3.27	0.92	-0.273 ^{***}	1									
Political capital	0.27	0.44	0.119 ^{***}	-0.028	1								
Output-function	0.30	0.46	-0.017	-0.001	-0.033	1							
Throughput-function	0.46	0.50	0.119 ^{***}	-0.148 ^{***}	-0.216 ^{***}	-0.331 ^{***}	1						
Peripheral-function	0.42	0.49	-0.098 ^{***}	0.153 ^{***}	0.327 ^{***}	-0.309 ^{***}	-0.545 ^{***}	1					
Life cycle of an industry	0.56	0.50	-0.158 ^{***}	-0.048 [*]	0.066 ^{***}	-0.014	-0.125 ^{***}	0.154 ^{***}	1				
Ownership	0.49	0.50	-0.051 ^{**}	-0.169 ^{***}	-0.036	-0.057 ^{**}	0.082 ^{***}	-0.01	-0.130 ^{***}	1			
Firm size	21.76	1.63	0.124 ^{***}	0.198 ^{***}	-0.023	0	0.078 ^{***}	-0.072 ^{***}	-0.329 ^{***}	-0.093 ^{***}	1		
Labor-intensive industry	0.24	0.43	0.113 ^{***}	-0.318 ^{***}	0.052 ^{**}	0.033	0.172 ^{***}	-0.119 ^{***}	-0.110 ^{***}	0.024	-0.285 ^{***}	1	
Technology-intensive industry	0.09	0.29	0.048 [*]	-0.004	-0.127 ^{***}	0.327 ^{***}	-0.119 ^{***}	-0.183 ^{***}	-0.104 ^{***}	-0.126 ^{***}	-0.096 ^{***}	-0.181 ^{***}	1

Note(s): ^{*} $p < 0.1$; ^{**} $p < 0.05$; ^{***} $p < 0.01$

Table 3.
Results of descriptive statistical analysis

Table 4.
Regression results of
life cycle of industry
and corporate
executive's
characteristics

	(1) Age	(2) Educational level	(3) Political capital	(4) Peripheral-function	(5) Throughput-function	(6) Output-function
Constant	30.871*** (9.40)	3.485*** (7.73)	-1.557 (1.212)	-4.231*** (1.278)	-4.702*** (1.11)	3.744*** (1.12)
Life cycle of industry	-1.045*** (-2.94)	-0.186*** (-3.80)	0.310* (0.132)	0.291*** (0.136)	-0.267** (0.118)	0.314*** (0.121)
Labor-intensive industry	2.332 (5.84)	-0.746*** (-13.59)	0.210 (0.142)	0.681*** (0.147)	0.883*** (0.135)	-0.881 (0.138)
Technology-intensive industry	1.907*** (3.35)	-0.256*** (-3.27)	-1.210*** (0.296)	2.590*** (0.221)	-0.568** (0.206)	-1.942*** (0.257)
Ownership	-0.534* (-1.67)	-0.338*** (-7.64)	0.138 (0.118)	-0.005 (0.121)	0.308*** (0.108)	-0.151* (0.109)
Firm size	0.700*** (4.91)	0.012 (0.61)	0.016 (0.053)	0.127** (0.055)	0.200*** (0.048)	-0.176*** (0.049)
Adjusted R^2	0.051	0.149	-	-	-	-
Pseudo R^2	-	-	0.035	0.149	0.086	0.110
F	18.217 (0.000)	56.571 (0.000)	-	-	-	-
Chi-square value	-	-	38.926 (0.000)	176.270 (0.000)	105.900 (0.000)	135.897 (0.000)
Sample size	1,590	1,590	1,590	1,590	1,590	1,590

Note(s): * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$. Values in square brackets under the coefficients of columns (1) and (2); T value; Values in brackets under the coefficients of columns (3) through (6); standard errors

This study contributes significantly to the upper echelons theory. We expanded the antecedents and dependent variables in related research. As far as antecedents are concerned, this study specifically considered the effects of industry life cycle, which is a pioneering initiative in related research. Although other studies paid attention to the effects of industries on corporate executive's characteristics, they mainly used industry environment as a background variable and seldom made direct generalizations and summaries of industry characteristics. The direct effects of industry life cycle on corporate executive's characteristics appointed by firms, as proposed in this study, are rarely seen in both Chinese and English literature. Exploring how industries specifically influence firm behavior is particularly useful for us to understand industry-related theories. With regard to dependent variables, we included both the human capital and political capital of corporate executives in this study, thus, enriching corporate executive's characteristics and making them more complete. In addition, this study contributes to the methods for measuring industry life cycle. Existing studies in China mostly adopt the growth rate classification method, which can only roughly determine the different stages of life cycle that each industry is at, but is unable to calculate the start and end time of each stage in detail. Moreover, dividing the stages in this manner is often different from the actual situation. This study divides industry life cycle, performs forecasting analysis using both the net entry rate of manufacturers and major industry events, and draws conclusions that are closer to the actual situation.

The managerial implications of this study are twofold: (1) Firms are not powerless in the face of pressure arising from industry evolution. Firms can analyze the effects of industry evolution to select, appoint, and nurture CEOs in a more conscious manner, as well as utilize the human capital and political capital of corporate executives effectively to alleviate environmental pressure, thereby, creating a conducive environment for firm development. (2) For managers who want to become corporate executives in firms, understanding the needs of firms in different industries, the life cycles of different industries, making good industry choices and engaging in good career planning, and focusing on accumulating and developing personal resources at work will undoubtedly be helpful to career development.

References

- Aragon-Corre, J.A. and Sharmas, A. (2003), "Contingent resource-based view of proactive corporate environmental strategy", *Academy of Management Review*, Vol. 28 No. 1, pp. 71-88.
- Datta, D.K. and Guthrie, J.P. (2010), "Executive succession: organizational antecedents of CEO characteristics", *Strategic Management Journal*, Vol. 15 No. 7, pp. 569-577.
- Hambrick, D.C. and Mason, P.A. (1984), "Upper echelons: the organization as a reflection of its top managers", *Academy of Management Review*, Vol. 9 No. 2, pp. 193-206.
- Jensen, M. and Zajac, E.J. (2004), "Corporate elites and corporate strategy: how demographic preferences and structural position shape the scope of the firm", *Strategic Management Journal*, Vol. 25 No. 6, pp. 507-524.
- Jiang, F.X., Huang, J.C. and Li, F.Y. (2012), "Who chose the CEO with financial experience?", *Management World*, Vol. 2, pp. 96-104.
- Koyuncu, B., Firfiray, S., Vlaes, B. and Hamori, M. (2010), "CEOs with a functional background in operations: reviewing their performance and prevalence in the top post", *Human Resource Management*, Vol. 49, pp. 869-882.
- Lei, G.Y., Li, S.F. and Wang, X.J. (2009), "Political connections, auditor selection and firm value", *Management World*, Vol. 7, pp. 145-155.

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- Li, X. and Zhang, J.J. (2010), "Institutional antecedents and executive characteristics: an empirical study", *Management World*, Vol. 10, pp. 110-121.
- Li, X. and Zhang, J.J. (2011), "Top executives' characteristics, firms' ownership and firms' actions", *Research on Economics and Management*, Vol. 6, pp. 86-100.
- Li, S.W., Luo, J.L. and Liang, F. (2019), "The contingency influence of internal, external learning on organizational innovation", *Studies in Science of Science*, Vol. 11, pp. 2092-2101.
- Liu, J.G. (2010), "Industrial market environment characteristic and enterprise strategy risk", *Journal of Technical Economics and Management*, Vol. 6, pp. 79-82.
- Liu, H.L., Zhang, M., Wang, Y.P. and Wu, L.S. (2010), "Political connections, compensation incentive, and employee allocation efficiency", *Economic Research Journal*, Vol. 9, pp. 109-121.
- Lu, T. and Dang, Y. (2014), "Corporate governance and innovation: differences among industry categories", *Economic Research Journal*, Vol. 6, pp. 115-128.
- Tereas, P. and Iris, V.A. (2007), "Comparison of the international diversity on top management teams of multinational firms based in the United States, Europe, and Asia: status and implications", *Singapore Management Review*, Vol. 29 No. 1, p. 1.
- Tyler, B.B. and Steensma, H.K. (2015), "The effects of executives' experiences and perceptions on their assessment of potential technological alliances", *Strategic Management Journal*, Vol. 19 No. 10, pp. 939-965.
- Wang, F.M. and Mao, J.Q. (2010), "Study on the co-evolution mechanism of industrial technology based on the technological progress", *Science Research Management*, Vol. 6, pp. 41-48.
- Wang, X.L., Ma, L. and Wang, Y.L. (2013), "The impact of TMT functional background on firm performance: evidence from IT public listed companies in China", *Nankai Business Review*, Vol. 4, pp. 80-93.

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