

Review Article

Exploring the Relationship between Human Resource Structure and Operation Performance of Businesses

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Abstract

From the perspective of human resource structure, this paper examines the impacts of organizational characteristics within accounting firms (hereinafter referred to as "firms") on the overall operation performance and the performance of four businesses: financial attestation, tax, management consulting, and industrial and commercial registration. This paper finds that 1) a higher proportion of professional assistants correlates with better overall operation performance of firms, with a more pronounced effect in financial attestation and tax; 2) a higher proportion of employees who graduated from universities and colleges is associated with better overall operation performance of firms, particularly noticeable among university-level employees in financial attestation and tax; 3) a higher proportion of young-aged, prime-aged, and middle-aged people is linked to better overall operation performance of firms. In other words, employees between 25 and 54 years old significantly contribute to firms' overall operation performance, with young employees between 25 and 34 years old excelling in financial attestation, tax, and industrial and commercial registration. Meanwhile, prime-aged employees between 35 and 44 years old excel in tax, industrial, and commercial registration. 4) A higher proportion of female practitioners is associated with better overall operation performance of firms, particularly notable in financial attestation, tax, and industrial and commercial registration. Therefore, managers are advised to consider adjusting or reducing the proportion of partnership accountants and employees with master's degrees, hiring professionals in various fields, expanding management consulting operations actively, and enhancing firms' competitive advantages to improve the firms' operation performance. This paper aims to provide a valuable reference for firm managers when making decisions about human resource structure and operational strategies.

Keywords: Human resource structure; Operation performance of businesses; Overall operation performance; Accounting firm

Introduction

The 2017 survey report on accounting firms in the service industry, which was published by the Financial Supervisory Commission (2018), reported that the number of accounting firms (hereinafter referred to as "firms") increased from 1,034 in 2015 to 1,111 in 2017. Similarly, business offices increased from 1,196 to 1,271 during the same period. In addition, the number of sole practitioners also increased from 787 to 835, while the number of joint practitioners increased from 247 to 276. This data indicates a notable increase in the number of firms in the industry, leading to intensified competition.

By the end of 2017, 649 firms (or 58.4% of the total number of firms) reported annual sales of less than NT\$5 million. These

649 firms employed 10.6% of the industry's workforce but contributed only a collective market share of 4.2% in revenues. On the other hand, there were 240 large firms with annual sales of NT\$10 million, each accounting for 21.6% of the total number of firms. These firms employed 80.5% of the industry's workforce and had a collective market share of 90.6%. Although small firms constitute the largest portion of industry players, large firms dominate the market in terms of operation performance. For many small firms to continue business in the fierce competition, management must determine how to elevate their scale and promote stable revenue growth. This pivotal issue underpins the research motivation of this paper.

Wu and Chang (2003) asserted that the main drivers for enhancing firm values are creation, accumulation, sharing, and integration. Accounting firms, known for their extensive professional knowledge and experience accumulation [11,45] tend to benefit from their longer operating histories, which allow more human resources and clients to accumulate over time [11]. Pfeffer (1994) suggested that in the era of the knowledge economy, organizations transform the knowledge and competencies possessed by employees into tangible outputs human resource management. This is considered the most important competitive advantage of corporate activities. Chou and Tseng (2009) argued that employees can best utilize their strengths and reach their potential when placed in roles that suit their abilities. This has been a pertinent issue in the field of human resource management. Allocating human resource structure is pivotal in organizational operations. It directly impacts the quality of an organization's operation performance. Hence, allocating the human resource structure is one of the key characteristics of any organization. This paper aims to explore the influence of organizational characteristics of human resource structures in accounting firms on the overall operation performance of these firms within the context of human resource structures.

Sahoo and Mishra (2012) suggested that diversifying business models can assist companies in optimizing resource utilization and financial performance stability. Eukeria and Favourate (2014) indicated that diversification is a strategic option many managers seek to boost company performance. Among the studies on business diversification of accounting firms, Banker, Chang, and Natarajan (2005) categorized the services rendered by accounting firms into three areas: audits, tax services, and management consulting. Their research suggests that the productivity of management consulting services is higher than that of audits or tax services. Greenwood, Li, Prakash, and Deephouse (2005) argued that business diversification benefits the operational performance of accounting firms.

Chen and Lin (2007) categorized various services into audits, accounting, tax, management consulting, and industrial and commercial registration. Their findings suggest that business diversification improves the technical efficiency of accounting firms. Lee (2012) contends that increased business diversification correlates with employees having more extensive and comprehensive professional skills, resulting in higher productivity for accounting firms. Chen, Hsu, Huang, and Yang (2013) reported that accounting firms offer tax services and management consulting to expand their service offerings and enhance operating effectiveness.

Yang, Yang, and Lee (2015) argued that increased business diversification leads to better operation performance for accounting firms. Lee and Tung (2017) suggested that a higher reliance on financial attestation services increases the likelihood of accounting firms entering the Chinese market. The 2017 survey report on accounting firms in the service industry revealed that accounting firms generate revenues from four business lines: financial attestation, tax, management consulting, and industrial and commercial registration. This indicates that accounting firms operate with business diversification. In addition to investigating the impacts on the overall operation performance of accounting firms, this paper also explores how the benefits of the human resource structure characteristics differ significantly across business lines.

The 2017 survey report on accounting firms in the service industry outlines the human resource structure in the account-

ing firm industry, which can be categorized into four aspects:

- 1) Hierarchical structure in four levels, from the highest to the entry-level: partnership accountants, management-level supervisors, professional in-charge supervisors, and professional assistants
- 2) Education backgrounds in five levels: PhDs, master's degrees, university degrees, junior colleges, and senior high schools
- 3) Age profile of employees in six age groups: below 25 years old, 25~34 years old, 35~44 years old, 45~54 years old, 55~64 years old, and above 65 years old)
- 4) Gender distribution: males and females

Considering the prevalent and general human resource structure in accounting firms, questions arise about whether employees have adequate professional expertise to handle assigned tasks, whether they have extensive experience satisfying customers' needs in different business lines, and whether they can effectively deliver all the services offered. Moreover, concerns about how management can adjust the characteristics of the human resources structure to enable accounting firms to handle various business lines effectively and brace for challenges also surfaced. These are the issues this paper aims to investigate.

In summary, this paper constructs an empirical model that incorporates four characteristics of the human resource structure: hierarchical levels, educational backgrounds, age profiles, and gender distribution. The total revenues of accounting firms are utilized as an indicator of to assess their overall operation performance. Additionally, the revenues generated by the four business lines are used as indicators to evaluate the operation performance of each business line. This study aims to provide valuable insights to the management of accounting firms, assisting them in making informed decisions regarding recruitment, human structure allocation, operational management of different business lines, and ultimately, enhancing the overall operation performance.

Literature Review and Hypotheses Development

Considering the characteristics of the human resource structure, this paper examines the relation between the four characteristics (i.e., hierarchical levels, education backgrounds, age profile, and gender split) and the organizational operation performance by reviewing relevant literature and developing research hypotheses.

Literature on Hierarchical Levels of Employees

In studies focusing on the hierarchical levels of employees and their impact on operational performance, Wah (1999) emphasized the importance of recognizing the unique value of customer relations and customer knowledge in financial service, with much value tied to frontline employees. Chang and Chi (2006) suggested that at a higher hierarchical level, senior managers are better equipped to serve as business partners and manage various functions within human resource management. Chou and Tseng (2009) examined the employees' performance in the banking industry and discovered that supervisors tend to outperform non-supervisors. Wang, Tsui, and Xin (2011) explored the relationship between the leadership behavior of CEOs and the performance of companies and discovered that CEO leadership behavior affects the attitude of mid-to-high-

level managers. In addition, the results suggest that a more proactive attitude of mid-to-high-level managers contributes to improved company performance. Eisenhardt (2013) asserted that top management's behavior and decision-making benefit start-up businesses.

Cheng, Wang, and Weng (2000) pointed out that a higher percentage of partnership accountants in the total workforce significantly enhance the technical efficiency of accounting firms. Liang, Tsai, Wang, and Lin (2007) note that, among the competence dimensions of partnership accountants, total annual sales are ranked as the most important indicator for non-Big-Four firms and sole proprietary firms but only the third for Big Four firms. This is because total annual sales from a single accountant may not stand out significantly among a large number of accountants. Lin (2008) asserted that more experienced and high-caliber professional talents lead to improved technical efficiency for accounting firms. As shown by O'Callaghan, Elson, Walker, Rao, and Rechtman (2010), the strong competencies of the employees qualified as public accountants provide partnership accountants more time for business development and project services. This enables accounting firms to expand their customer base and enhance their competitive advantage. Ye, Yuan, and Cheng (2014) suggested that auditors' experiences help mitigate the degree of earnings managed by customers and improve the quality of audits.

Lee and Chen (2016) stated that accounting firms are organizations where partnership accountants lead work teams to serve customers. They proposed that partnership accountants can lead management-level supervisors, professional in-charge supervisors, and professional assistants using a professional division of labor mechanism to enhance the operation performance of accounting firms. Lee and Chen (2016) further advised partnership accountants and management-level supervisors to collaboratively develop potential clientele with varying business needs, promoting the operational diversification of accounting firms. Lee and Cheng (2018) demonstrated that a higher percentage of senior employees leads to greater business diversification of accounting firms. With their work experience and professional knowledge, senior employees are better equipped to provide comprehensive services to customers with various requirements, thus enhancing the business diversification of accounting firms [24]. Lee and Lin (2019) defined professional in-charge supervisors and professional assistants as the primary personnel working at client sites, a common practice in accounting firms. Their study revealed that a higher percentage of personnel working at client sites is associated with better operational performance of accounting firms.

According to the human resource structure shown in the 2017 survey report on accounting firms in the service industry, the hierarchical structure of employees from the top to the entry-level consists of partnership accountants, who may lead management-level supervisors, professional in-charge supervisors, and professional assistants. Typically, higher ranks correspond to more practical experience. In 2016-2017, these four levels represented an average of 30.7%, 7.7%, 9.8%, and 40.3%, respectively, of the total employees in accounting firms. These numbers highlight that partnership accountants and professional assistants constitute the largest groups in the hierarchy, accounting for nearly 80% of the workforce. Therefore, this paper refers to these two levels as a research variable to determine whether the higher percentage of partnership accountants and the percentage of professional assistants contributes

to improved overall operation performance and performance of different business lines. Hence, this paper introduces H1 and H1-1a to H1-5b as follows:

H1: All else being equal, employee hierarchy levels influence the operation performance of accounting firms.

H1-1a: All else being equal, a higher percentage of partnership accountants positively influences the total revenues of accounting firms.

H1-1b: All else being equal, a higher percentage of professional assistants positively influences the total revenues of accounting firms.

H1-2a: All else being equal, a higher percentage of partnership accountants positively influences the revenues from financial attestation services.

H1-2b: All else being equal, a higher percentage of professional assistants positively influences the revenues from financial attestation services.

H1-3a: All else being equal, a higher percentage of partnership accountants positively influences the revenues from tax services.

H1-3b: All else being equal, a higher percentage of professional assistants positively influences the revenues from tax services.

H1-4a: All else being equal, a higher percentage of partnership accountants positively influences the revenues from management consulting services.

H1-4b: All else being equal, a higher percentage of professional assistants positively influences the revenues from management consulting services.

H1-5a: All else being equal, a higher percentage of partnership accountants positively influences the revenues from industrial and commercial registration services.

H1-5b: All else being equal, a higher percentage of professional assistants positively influences the revenues from industrial and commercial registration services.

Literature on Education Levels of Employees

Regarding research on the educational backgrounds of employees and their impact on operation performance, Chow (2006) discovered that the presence of employees with college degrees or above significantly influences companies' profit-seeking ability. Chen, Chen, and Goan (2010) noted a significant and positive correlation between educational backgrounds and the operation performance of partnership account firms. Higher levels of operational performance and higher employee education are associated with accountants with master's degrees being more likely to become partners. Meanwhile, partnership firms with a high percentage of accountants with master's degrees also reported significantly higher revenues in financial attestation, tax, and management consulting businesses than partnership firms with a high percentage of accountants with bachelor's degrees [9]. Shih and Tsai (2014) suggested that recruiting highly educated employees and experienced professionals and offering on-the-job training help enhance the technical efficiency of firms.

Lee and Chen (2016) proposed that the concentration of educational backgrounds among employees significantly and

positively influences the total number of service projects, total revenues, net incomes, and employees' productivity. In other words, the higher the concentration of educational backgrounds among employees with similar academic qualifications, the better the operation performance of firms. Accounting firms rely on teamwork, and a greater consistency in the educational background of the workforce leads to more uniform thinking patterns and an increased ability to reach a consensus. This reinforces team solidarity and enhances the proactive provision of services [28].

The survey reports on accounting firms in the service industry revealed most employees hold university degrees. Higher education levels are generally associated with more solid professional knowledge in auditing, accounting, and tax codes. Therefore, a concentration of highly educated employees enhances the competitive advantage of accounting firms [28]. Lee and Tung (2017) argued that a higher percentage of highly educated employees increases the likelihood of accounting firms entering the Chinese market. Lee and Cheng (2018) suggested that a higher percentage of highly educated employees leads to greater operating profits for accounting firms. Higher education levels are linked to better training in professional knowledge and the ability to learn. These factors improve work efficiency, help achieve organizational goals, and ultimately boost the operating profits of accounting firms (Lee & Cheng, 2018). Lee and Lin (2019) emphasized the significant and positive correlation between the percentage of highly educated personnel (as a human resource dimension) and the revenues from non-services and management consulting. Their findings revealed that more employees with university degrees or above increase account firms' non-service and management consulting revenues.

In the context of human resource structure within accounting firms, the 2017 survey report on accounting firms in the service industry identified a total of five levels, from the highest to the lowest: PhDs, master's degrees, university degrees, junior colleges, and senior high schools. In 2016-2017, these five levels represented an average of 1%, 16%, 61.4%, 15.9% and 5%, respectively, of the total employees in accounting firms. These numbers indicate employees with master's degrees, university degrees, and junior college degrees constitute the three largest groups in terms of educational backgrounds. Notably, university graduates accounted for more than 60% of the total. Therefore, this paper utilized these three education levels as research variables to explore whether a higher percentage of employees with master's degrees, university degrees, and junior college degrees positively influences the overall operational performance and performance of different business lines in accounting firms. Hence, H2 and H2-1a to H2-5c are proposed as follows:

H2: All else being equal, employees' education levels influence the operation performance of accounting firms.

H2-1a: All else being equal, a higher percentage of employees with master's degrees positively influences the total revenues of accounting firms.

H2-1b: All else being equal, a higher percentage of employees with university degrees positively influences the total revenues of accounting firms.

H2-1c: All else being equal, a higher percentage of employees with junior college degrees positively influences the total revenues of accounting firms.

H2-2a: All else being equal, a higher percentage of employees with master's degrees positively influences the revenues from financial attestation services.

H2-2b: All else being equal, a higher percentage of employees with university degrees positively influences the revenues from financial attestation services.

H2-2c: All else being equal, a higher percentage of employees with junior college degrees positively influences the revenues from financial attestation services.

H2-3a: All else being equal, a higher percentage of employees with master's degrees positively influences the revenues from tax services.

H2-3b: All else being equal, a higher percentage of employees with university degrees positively influences the revenues from tax services.

H2-3c: All else being equal, a higher percentage of employees with junior college degrees positively influences the revenues from tax services.

H2-4a: All else being equal, a higher percentage of employees with master's degrees positively influences the revenues from management consulting services.

H2-4b: All else being equal, a higher percentage of employees with university degrees positively influences the revenues from management consulting services.

H2-4c: All else being equal, a higher percentage of employees with junior college degrees positively influences the revenues from management consulting services.

H2-5a: All else being equal, a higher percentage of employees with master's degrees positively influences the revenues from industrial and commercial registration services.

H2-5b: All else being equal, a higher percentage of employees with university degrees positively influences the revenues from industrial and commercial registration services.

H2-5c: All else being equal, a higher percentage of employees with junior college degrees positively influences the revenues from industrial and commercial registration services.

Literature on Age Profiles of Employees

Regarding employee's ages and their impact on operational performance, Chou and Tseng (2009) examined employees' performance in the banking industry and discovered that those aged 45 years and above scored the highest, followed by the 35-45 years old and 25-35 years old. The age group below 25 years old scored the lowest. Those with a tenure of 20 years reported the highest score, followed by the 10 (incl.) to 20 years, 5-10 years, and lastly, those below five years. Lallemand and Rycx (2009) explored the influence of employees' age profiles on companies' production efficiency and found that a better representation of young employees benefits productivity. Lee and Chen (2016) noted that the concentration of age groups significantly and negatively impacts the total number of service projects and total revenues. A more dispersed age profile of employees leads to improved operational performance. Employees of different age groups have somewhat different ways of thinking and methods of operation. Sharing professional knowledge, technicality, and experience at work helps employees learn from each other and grow by accumulating and apply-

ing knowledge. This, in turn, develops the service models beneficial for the firms' businesses and observes greater customer trust [28]. Lee and Tung (2017) argued that younger employees are more likely to drive accounting firms to enter the Chinese market. This is because young employees are innovative, eager for challenges, and less confined by family issues. As a result, they are more collaborative, adaptive, and willing to spend more time and effort to go to China for work. Therefore, the effective recruitment of young and prime-aged adults by accounting firms positively affects the provision of services in China. Lee and Cheng (2018) suggested that stronger organizational vitality leads to higher operating profits for firms. Young employees are crucial in driving innovations and boosting organizations' morale. Warm interactions among employees foster a cohesive team atmosphere, ensure comprehensive service quality, and boost operating profits for firms [28]. Lee and Lin (2019) proposed that most personnel working at client sites are either young or in their prime years. The effective recruitment of employees in these age groups can enhance the work efficiency of accounting firms. They also discovered that the closer the average age of employees is to the young and prime age range, the better the operation performance of firms. Notably, when the average age is closer to an older age range, the non-service revenues tend to be lower.

The 2017 survey report on accounting firms in the service industry categorized the employees into six age groups: below 25 years old, 25~34 years old, 35~44 years old, 45~54 years old, 55~64 years old, and 65 years or above. In 2016-2017, these six groups represented an average of 7.6%, 26.4%, 27.1%, 22.1%, 11.7% and 5%, respectively, of the total employees in accounting firms. These numbers suggest that 25~34, 35~44, and 45~54 constitute the three largest age groups in the workforce, with each group accounting for over 20% of the total employees. The largest group is between 35 and 44 years old. Therefore, this paper utilized these three largest age groups as research variables and labeled the age group 25~34 "young-aged employees," the age group 35~44 "prime-aged employees," and the age group 45~54 "middle-aged employees." This helps understand whether the higher percentage of young prime-aged and middle-aged employees leads to improved overall operational performance and the performance of different business lines in accounting firms. Hence, H3 and H3-1a to H3-5c are proposed as follows:

H3: All else being equal, employees' age profiles influence accounting firms' operation performance.

H3-1a: All else being equal, a higher percentage of young-aged employees positively influences accounting firms' total revenues.

H3-1b: All else being equal, a higher percentage of prime-aged employees positively influences accounting firms' total revenues.

H3-1c: All else being equal, a higher percentage of middle-aged employees positively influences accounting firms' total revenues.

H3-2a: All else being equal, a higher percentage of young-aged employees positively influences the revenues from financial attestation services.

H3-2b: All else being equal, a higher percentage of prime-aged employees positively influences the revenues from financial attestation services.

H3-2c: All else being equal, a higher percentage of middle-aged employees positively influences the revenues from financial attestation services.

H3-3a: All else being equal, a higher percentage of young-aged employees positively influences the revenues from tax services.

H3-3b: All else being equal, a higher percentage of prime-aged employees positively influences the revenues from tax services.

H3-3c: All else being equal, a higher percentage of middle-aged employees positively influences the revenues from tax services.

H3-4a: All else being equal, a higher percentage of young-aged employees positively influences the revenues from management consulting services.

H3-4b: All else being equal, a higher percentage of prime-aged employees positively influences the revenues from management consulting services.

H3-4c: All else being equal, a higher percentage of middle-aged employees positively influences the revenues from management consulting services.

H3-5a: All else being equal, a higher percentage of young-aged employees positively influences the revenues from industrial and commercial registration services.

H3-5b: All else being equal, a higher percentage of prime-aged employees positively influences the revenues from industrial and commercial registration services.

H3-5c: All else being equal, a higher percentage of middle-aged employees positively influences the revenues from industrial and commercial registration services.

Literature on Employees' Gender Distribution

Numerous studies examined how gender distribution affects company performance [1,17,24,34]. Chou and Tseng (2009) suggested that females outperform males in the banking industry. Law (2009) discovered that males are more likely to be promoted to partnerships than females in accounting firms. Indartono and Chen (2010) examined how gender factors influence work performance and discovered that females report better performance than males. Hsu, Kuo, and Chang (2013) argued that in large firms, males have better operating performance than females because most female accountants provide services other than financial attestation.

Yang, Chen, and Yang (2013) compared the impact of professional training on the financial performance of accounting firms with workforces dominated by males versus females. The study divided the accounting firms into two groups: with professional training (no breaches) and without professional training (breaches). The results revealed that the financial performance of accounting firms without breaches was better than those with breaches. Perryman, Fernando, and Tripathy (2016) found that a greater gender divide in top management lowers company risks and improves performance. However, female senior executives receive lower remunerations than their male counterparts. Lee and Cheng (2018) argued that a higher percentage of males (vs. the percentage of females) is associated with greater operating profits for firms. Male employees demonstrate better implementation and judgment than female

employees. They are also more professional and stable in offering services and handling work, ultimately benefiting accounting firms' operating profits [24]. Lee and Cheng (2018) argued that a higher percentage of males vs. females promotes greater business diversification for accounting firms.

The 2017 survey report on accounting firms in the service industry divided the employees into males and females. In 2016-2017, the percentage of female employees averaged at 70.4%, males 29.6% in accounting firms. These numbers suggest that over 70% of the employees were females, making it a distinctive feature in the human resource structure of accounting firms. Therefore, this paper utilized gender divide (measured by the difference between the percentage of male employees and the percentage of female employees) as a research variable. The value of this variable ranges from -1 to 1, with values closer to 1 indicating a higher percentage of females and values closer to -1 indicating a higher percentage of males. This helps understand whether a greater gender divide (i.e., the higher percentage of female employees) positively influences the operational performance of different business lines in accounting firms. Hence, H4 and H4-1 to H4-5 are proposed as follows:

H4: All else being equal, gender divide influences the operation performance of accounting firms.

H4-1: All else being equal, the degrees of gender divide positively influence the total revenues of accounting firms.

H4-2: All else being equal, the degrees of gender divide positively influence the revenues from financial attestation services.

H4-3: All else being equal, the degrees of gender divide positively influence the revenues from tax services.

H4-4: All else being equal, the degrees of gender divide positively influence the revenues from business consulting services.

H4-5: All else being equal, the degrees of gender divide positively influence the revenues from industrial and commercial registration services.

Research Design

This section explains data sources and sample selection, provides the operational definitions of all variables, and develops the multiple regression model.

Data Sources

The accounting firm service survey report continued to adopt previous survey questions. In June 2017, the Financial Supervisory Commission initiated relevant surveys. The scope of the survey was limited to those engaged in accounting firm business in Taiwan and approved for registration. In September 2017, the survey was completed. Subsequently, the survey data underwent review, error detection, summary, and analysis. In addition, the survey report was edited, printed, and distributed to different people and institutions for reference and reading to expand the survey application. To maintain the consistency of the survey data from year to year, the relevant tables of the survey report remain consistent with those of the previous year. However, new questions for the industrial and service industry surveys are not listed separately.

In addition, this survey was organized into a database according to the Financial Supervisory Commission questionnaires. By the time the researchers received the data, it had already been organized into secondary data files for user convenience.

Researchers interested in this database can obtain it from the Financial Supervisory Commission to facilitate their research.

This paper sources data from 2016-2017 survey reports on accounting firms in the service industry compiled and printed by the Financial Supervisory Commission. The numbers of raw observations are 1,050 and 1,111 firms for 2016 and 2017, respectively. After removing 14 firms without employees, 22 firms without revenues, and seven firms with an operating history of over 90 years, the final number of effective observations is 1,031 for 2016 and 1,087 for 2017. This paper utilized a total of 2,118 observations for these two years in its empirical research.

Variable Definitions

Many studies have examined accounting firms, focusing on factors influencing factors the operation performance of accounting firms. Notable studies in this domain include Chen and Lee (2006), Lee (2012), Lee (2013), Lee (2014), Lee and Chen (2016), Lee and Tung (2017), Lee (2018), Lee and Cheng (2018) and Lee and Lin (2019). In both Lee and Lin (2019) and the 2017 survey report on accounting firms in the service industry, total revenues are categorized into four business lines: financial attestation, tax, management consulting, and industrial and commercial registrations. Specifically, financial attestation services encompass revenues from attestation for public offerings, financing, and other services. Meanwhile, revenues from tax services include income tax reporting and filing, tax planning, tax administrative remedies, and other services. This paper utilized the total revenues (Y1) as the proxy variable for assessing the overall operation performance of accounting firms. Additionally, it utilized revenues from financial attestation services (Y2), revenues from tax services (Y3), revenues from management consulting services (Y4), and revenues from industrial and commercial registration services (Y5) as the proxy variables to evaluate the operational performance of different business lines.

A total of nine independent variables were established while developing the hypotheses, derived from analyzing the four aspects of human resource structure. These variables include the percentage of partnership accountants (X1) and the percentage of professional assistants (X2) in terms of hierarchical levels, the percentage of master's degree holders (X3), the percentage of university degree holders (X4), the percentage of junior college degree holders in terms of education levels (X5), the percentage of young-aged employees (X6), the percentage of prime-aged employees (X7), the percentage of middle-aged employees (X8) in terms of age profiles, and the degrees of gender divide (X9) in terms of gender distribution.

Regarding control variables, Zettelmeyer (2000) argued that companies can enhance competitiveness in the marketplace by segmenting consumers and offering different levels of product information for different channels. Therefore, this paper employed the number of branch offices (C1) to measure the extensiveness of channels. Oster (1994) suggested that firms with a longer operating history can allocate resources more efficiently over time. Cheng, Wang, and Weng (2000) noted that there is a significant and positive correlation between the operating years and the technical efficiency of accounting firms. Lee (2013) discovered that a longer history of accounting firms improves operational performance. Chen and Chen (2014) mentioned that a longer operating history is associated with improved human capital and clientele sources that can be accumulated, positively impacting accounting firms' business performance. Lee and Chen (2016) emphasized that the operating history of ac-

Table 1: Summary of variable definitions.

Variable type	Variable name	Operational definition
Dependent variables	Total revenues (Y1)	Natural logarithm of annual revenues generated by an accounting firm (original unit: NTD)
	Revenues from financial attestation services (Y2)	Natural logarithm of annual revenues from attestation for public offerings, attestation for financing and other attestation services (original unit: NTD)
	Revenues from tax services (Y3)	Natural logarithm of annual revenues from income tax reporting and filing, tax planning, tax administrative remedies, and other tax services. (original unit: NTD)
	Revenues from management consulting services (Y4)	Natural logarithm of annual revenues generated from management consulting services by an accounting firm. (original unit: NTD)
	Revenues from industrial and commercial registration services (Y5)	Natural logarithm of annual revenues generated from industrial and commercial registration services by an accounting firm. (original unit: NTD)
Independent variables	% of partnership accountants (X1)	No. of partnership accountants ÷ total number of employees (original unit: %)
	% of professional assistants (X2)	No. of professional assistants ÷ total number of employees (original unit: %)
	% of master's degree holders (X3)	No. of master's degree holders ÷ total number of employees (original unit: %)
	% of university degree holders (X4)	No. of university degree holders ÷ total number of employees (original unit: %)
	% of junior college degree holders (X5)	No. of junior college degree holders ÷ total number of employees (original unit: %)
	% of young-aged employees (X6)	No. of employees aged 25~34 ÷ total number of employees (original unit: %)
	% of prime-aged employees (X7)	No. of employees aged 35~44 ÷ total number of employees (original unit: %)
	% of middle-aged employees (X8)	No. of employees aged 45~54 ÷ total number of employees (original unit: %)
	Degrees of gender divide (X9)	1 if the difference between the percentage of females and the percentage of males is smaller than 0; 2 if the difference between the percentage of females and the percentage of males is equal to 0; 3 if the difference between the percentage of females and the percentage of males is greater than 0.
Control variables	No. of branch offices (C1)	Number of branch offices for an accounting firm (original unit: number of branch offices)
	No. of operating years (C2)	Survey year – establishment year+1 (original unit: years)
	Business structure (C3)	Dummy variable of 1 indicating partnerships and 0 indicating sole proprietorships
	Operating assets (C4)	Natural logarithm of the aggregate of buildings & affiliated facilities, computers, computer software & databases, income generating equipment and transportation equipment of an accounting firm (original unit: NTD)
	No. of management consulting companies (C5)	No. of management consulting companies established by each accounting firm (original unit: number of companies)
	Adoption of digitalization (C6)	A dummy variable of 1 indicating the adoption of digitalization and 0 indicating no adoption of digitalization

counting firms positively and significantly influences both the number of audit projects and non-audit projects. Lee and Tung (2017) also utilized the number of operating years as a proxy variable of the operating attributes of accounting firms. Lee and Cheng (2018) proposed that longer operating histories result in more client sources and better operating profits for firms. Lee and Lin (2019) discovered that a longer operating history leads to improved operation performance. Therefore, this paper measured the operating history of firms using the number of operating years (C2).

Chen and Huang (2011) used a dummy variable to indicate the business structure of accounting firms. Their research emphasized that partnerships have better business performance than sole proprietorships. Lee and Tung (2017) also deployed a dummy variable to indicate the organization types of accounting firms and referred to it as a proxy variable for business attributes of accounting firms. Hence, this paper also employed a dummy variable to determine whether accounting firms' business structure (C3) is a partnership or sole proprietorship. Large firms often find it easier to gain customers' trust than smaller ones due to their capacity to provide better service quality [14,41]. Cheng, Wang, and Weng (2000) identified a significant and positive correlation between firm sizes and technical efficiency. Lee (2013) emphasized that larger firm size leads to better operational performance. Lee and Chen (2016) suggested that greater firm size leads to higher total revenues. Lee and Tung (2017) examined the key factors for entering the Chinese

market for business and incorporated firm size as a control variable in their regression model. Lee and Lin (2019) evaluated the business performance of accounting firms in Taiwan using the intellectual capital theory. They referred to operating assets as the control variable and the measurement of the operating scale in the regression model. In reference to Lee and Tung (2017) and Lee and Lin (2019), this paper utilized operating assets (C4) as the measurement of accounting firm sizes.

In the context of resource-based views, Chen and Lee (2006) developed a multiple regression model to analyze the operational performance of accounting firms in Taiwan. The results revealed a positive correlation between non-audit service revenues and the operational performance of the firms with strategic alliances (i.e., with the formation of management consulting companies). Meanwhile, these firms also exhibited significantly superior operational performance than firms without strategic alliances. Chen and Chen (2014) noted that national, regional, or local firms that have established strategic alliances with management consulting companies report better operational performance than those that have not. Lee and Tung (2017) suggested that establishing management consulting companies increases the probability of accounting firms entering the Chinese market. Lee and Lin (2019) found that the higher the number of management consulting companies established, the better the operational performance of firms. Therefore, this paper employed the number of management consulting companies (C5) created by accounting firms as a measure of strategic

Table 2: Descriptive statistics.

Variable type	Variable name	Mean	Median	Minimum	Maximum	Standard deviation
Dependent variables	Y1	27,877,447	4,000,750	2,000	7,698,102,563	316,634,923
	Y2	13,587,397	685,000	0	4,897,265,586	192,869,653
	Y3	9,705,603	1,943,650	0	1,784,516,512	80,597,745
	Y4	1,137,705	0	0	530,928,060	17,426,179
	Y5	1,029,555	120,000	0	192,960,849	9,816,692
Hierarchical levels of employees	X1	0.30	0.20	0.00	1.00	0.28
	X2	0.41	0.46	0.00	1.00	0.27
Education levels of employees	X3	0.15	0.06	0.00	1.00	0.25
	X4	0.62	0.67	0.00	1.00	0.32
	X5	0.16	0.00	0.00	1.00	0.23
Age profiles of employees	X6	0.26	0.24	0.00	1.00	0.27
	X7	0.27	0.20	0.00	1.00	0.28
	X8	0.22	0.14	0.00	1.00	0.26
Gender distribution of employees	X9	0.41	0.50	-1.00	1.00	0.51
Control variables	C1	0.15	0.00	0.00	9.00	0.61
	C2	17.01	16.00	1.00	64.00	11.17
	C3	0.24	0.00	0.00	1.00	0.43
	C4	16,675,645	2,312,310	0	5,375,661,451	160,925,911
	C5	0.11	0.00	0.00	8.00	0.41
	C6	0.23	0.00	0.00	1.00	0.42

Note: 1. Y1: total revenues; Y2: Revenue from financial attestation services; Y3: Revenue from tax services; Y4: Revenue from management consulting services; Y5: revenues from industrial and commercial registration services; X1: percentage of partnership accountants; X2: percentage of professional assistants X3: percentage of master's degree holders; X4: percentage of university degree holders; X5: percentage of junior college degree holders; X6: percentage of young-aged employees; X7: percentage of prime-aged employees; X8: percentage of middle-aged employees; X9: the degrees of gender divide; C1: number of branch offices; C2: number of operating years; C3: business structure; C4: operating assets; C5: number of management consulting companies; C6: adoption of digitalization. 2. There are a total of 2,118 observation values of accounting firms. 3. The unit of dependent variables Y1, Y2, Y3, Y4 and Y5 and operating assets (C4) is NTD. The unit is percentage for all the independent variables X1, X2, X3, X4, X5, X6, X7, X8 and X9. The unit for the number of branch offices (C1) is the number of offices. The unit for the number of management consulting companies (C5) is the number of companies. The unit for the number of operating years (C2) is years.

Chaston, Badger, Mangles, and Sadler-Smith (2001) proposed that adopting e-commerce can reduce costs and boost efficiency for companies. Accounting firms primarily focus on providing business information and transferring electronic transactions through e-commerce. Lee and Tung (2017) used a dummy variable to determine whether accounting firms have incorporated e-commerce into their operations, which serves as a proxy variable for the operating attributes of these firms. Lee and Lin (2019) also employed a dummy variable to measure the adoption of e-commerce in accounting firms, considering it as a component of innovation capital within the intellectual capital framework. This paper refers to adopting digitalization (C6) as a measure of e-commerce business activities.

Drawing from the pertinent research on the operation performance of accounting firms and the characteristics of accounting firms as an industry, this paper established six control variables for the regression model: the number of branch offices (C1), number of operating years (C2), business structure (C3), operating assets (C4), number of management consulting companies (C5) and adoption of digitalization (C6). Table 1 summarizes the operational definitions of all variables (Table 1).

Multiple Regression Model

Based on the research hypotheses in Chapter 2, this paper developed two regression models: one on the overall operation performance and the other on the operation performance of different business lines. These models considered the four aspects of the human resource structure (i.e., hierarchical levels, education levels, age profiles, and gender distribution) and the characteristics of accounting firms as an industry. The overall operational performance was measured with total revenues, while the operational performance of different business lines

was measured with the revenues from financial attestation, tax, management consulting, and industrial and commercial registration services. A total of over multiple regression equations were established. The empirical analysis aims to identify the organizational characteristics that contribute to improved overall operational performance and the operations of different business lines for accounting firms. The research findings provide valuable insights for the management of accounting firms, helping them enhance the operational management and human resource structure. It underscores the importance of allocating appropriate personnel to offer comprehensive and professional services and adjusting personnel as needed for different business lines.

Hierarchical Levels of Employees

(1) Regression equation for overall operation performance of accounting firms

$$Y1 = \alpha_0 + \alpha_1 X1 + \alpha_2 X2 + \alpha_3 C1 + \alpha_4 C2 + \alpha_5 C3 + \alpha_6 C4 + \alpha_7 C5 + \alpha_8 C6 + \epsilon_1 \quad (1)$$

(2) Regression equations for operation performance of different business lines of accounting firms

$$Y2 = \alpha_0 + \alpha_1 X1 + \alpha_2 X2 + \alpha_3 C1 + \alpha_4 C2 + \alpha_5 C3 + \alpha_6 C4 + \alpha_7 C5 + \alpha_8 C6 + \epsilon_2 \quad (2)$$

$$Y3 = \alpha_0 + \alpha_1 X1 + \alpha_2 X2 + \alpha_3 C1 + \alpha_4 C2 + \alpha_5 C3 + \alpha_6 C4 + \alpha_7 C5 + \alpha_8 C6 + \epsilon_3 \quad (3)$$

$$Y4 = \alpha_0 + \alpha_1 X1 + \alpha_2 X2 + \alpha_3 C1 + \alpha_4 C2 + \alpha_5 C3 + \alpha_6 C4 + \alpha_7 C5 + \alpha_8 C6 + \epsilon_4 \quad (4)$$

$$Y5 = \alpha_0 + \alpha_1 X1 + \alpha_2 X2 + \alpha_3 C1 + \alpha_4 C2 + \alpha_5 C3 + \alpha_6 C4 + \alpha_7 C5 + \alpha_8 C6 + \epsilon_5 \quad (5)$$

In Equations (1)~(5), Y1 denotes the total revenues, Y2 de-

notes the revenues from financial attestation services, Y3 denotes the revenues from tax services, Y4 denotes the revenues from management consulting services, Y5 denotes the revenues from industrial and commercial registration services, X1 denotes the percentage of partnership accountants, X2 denotes the percentage of professional assistants, C1 denotes the number of branch offices, C2: number of operating years, C3 denotes the business structure, C4 denotes the operating assets, C5 denotes the number of management consulting companies, C6 denotes the adoption of digitalization, α_0 denotes the intercept, $\alpha_1, \alpha_2, \alpha_3, \alpha_4, \alpha_5, \alpha_6, \alpha_7,$ and α_8 as the parameters of the regression model, and $\varepsilon_1, \varepsilon_2, \varepsilon_3, \varepsilon_4,$ and ε_5 as the error terms.

2. Education levels of employees

(1) Regression equation for overall operation performance of accounting firms

$$Y1 = \alpha_0 + \alpha_1 X3 + \alpha_2 X4 + \alpha_3 X5 + \alpha_4 C1 + \alpha_5 C2 + \alpha_6 C3 + \alpha_7 C4 + \alpha_8 C5 + \alpha_9 C6 + \varepsilon_6 \quad (6)$$

(2) Regression equations for operation performance of different business lines of accounting firms

$$Y2 = \alpha_0 + \alpha_1 X3 + \alpha_2 X4 + \alpha_3 X5 + \alpha_4 C1 + \alpha_5 C2 + \alpha_6 C3 + \alpha_7 C4 + \alpha_8 C5 + \alpha_9 C6 + \varepsilon_7 \quad (7)$$

$$Y3 = \alpha_0 + \alpha_1 X3 + \alpha_2 X4 + \alpha_3 X5 + \alpha_4 C1 + \alpha_5 C2 + \alpha_6 C3 + \alpha_7 C4 + \alpha_8 C5 + \alpha_9 C6 + \varepsilon_8 \quad (8)$$

$$Y4 = \alpha_0 + \alpha_1 X3 + \alpha_2 X4 + \alpha_3 X5 + \alpha_4 C1 + \alpha_5 C2 + \alpha_6 C3 + \alpha_7 C4 + \alpha_8 C5 + \alpha_9 C6 + \varepsilon_9 \quad (9)$$

$$Y5 = \alpha_0 + \alpha_1 X3 + \alpha_2 X4 + \alpha_3 X5 + \alpha_4 C1 + \alpha_5 C2 + \alpha_6 C3 + \alpha_7 C4 + \alpha_8 C5 + \alpha_9 C6 + \varepsilon_{10} \quad (10)$$

In Equations (6) ~ (10), Y1 denotes the total revenues, Y2 denotes the revenues from financial attestation services, Y3 denotes the revenue from tax services, Y4 denotes the revenue from management consulting services, Y5 denotes the revenues from industrial and commercial registration services, X3 denotes the percentage of master's degree holders, X4 denotes the percentage of university degree holders, X5 denotes the percentage of junior college degree holders, C1 denotes the number of branch offices, C2 denotes the number of operating years, C3 denotes the business structure, C4 denotes the operating assets, C5 denotes the number of management consulting companies, C6 denotes the adoption of digitalization, α_0 denotes the intercept, $\alpha_1, \alpha_2, \alpha_3, \alpha_4, \alpha_5, \alpha_6, \alpha_7, \alpha_8,$ and α_9 as the parameters of the regression model, and $\varepsilon_6, \varepsilon_7, \varepsilon_8, \varepsilon_9, \varepsilon_{10}$ as the error terms.

3. Age profiles of employees

(1) Regression equation for overall operation performance of accounting firms

$$Y1 = \alpha_0 + \alpha_1 X6 + \alpha_2 X7 + \alpha_3 X8 + \alpha_4 C1 + \alpha_5 C2 + \alpha_6 C3 + \alpha_7 C4 + \alpha_8 C5 + \alpha_9 C6 + \varepsilon_{11} \quad (11)$$

(2) Regression equations for operation performance of different business lines of accounting firms

$$Y2 = \alpha_0 + \alpha_1 X6 + \alpha_2 X7 + \alpha_3 X8 + \alpha_4 C1 + \alpha_5 C2 + \alpha_6 C3 + \alpha_7 C4 + \alpha_8 C5 + \alpha_9 C6 + \varepsilon_{12} \quad (12)$$

$$Y3 = \alpha_0 + \alpha_1 X6 + \alpha_2 X7 + \alpha_3 X8 + \alpha_4 C1 + \alpha_5 C2 + \alpha_6 C3 + \alpha_7 C4 + \alpha_8 C5 + \alpha_9 C6 + \varepsilon_{13} \quad (13)$$

$$Y4 = \alpha_0 + \alpha_1 X6 + \alpha_2 X7 + \alpha_3 X8 + \alpha_4 C1 + \alpha_5 C2 + \alpha_6 C3 + \alpha_7 C4 + \alpha_8 C5 + \alpha_9 C6$$

$$+ \varepsilon_{14} \quad (14)$$

$$Y5 = \alpha_0 + \alpha_1 X6 + \alpha_2 X7 + \alpha_3 X8 + \alpha_4 C1 + \alpha_5 C2 + \alpha_6 C3 + \alpha_7 C4 + \alpha_8 C5 + \alpha_9 C6 + \varepsilon_{15} \quad (15)$$

In Equations (11) ~ (15), Y1 denotes the total revenues, Y2 denotes the revenues from financial attestation services, Y3 denotes the revenues from tax services, Y4 denotes the revenue from management consulting services, Y5 denotes the revenues from industrial and commercial registration services, X6 denotes the percentage of young-aged employees, X7 denotes the percentage of prime-aged employees, X8 denotes the percentage of middle-aged employees, C1 denotes the number of branch offices, C2 denotes the number of operating years, C3 denotes the business structure, C4 denotes the operating assets, C5 denotes the number of management consulting companies, C6 denotes the adoption of digitalization, α_0 denotes the intercept, $\alpha_1, \alpha_2, \alpha_3, \alpha_4, \alpha_5, \alpha_6, \alpha_7, \alpha_8,$ and α_9 as the parameters of the regression model, and $\varepsilon_{11}, \varepsilon_{12}, \varepsilon_{13}, \varepsilon_{14}, \varepsilon_{15}$ as the error terms.

4. Gender distribution of employees

(1) Regression equation for overall operation performance of accounting firms

$$Y1 = \alpha_0 + \alpha_1 X9 + \alpha_2 C1 + \alpha_3 C2 + \alpha_4 C3 + \alpha_5 C4 + \alpha_6 C5 + \alpha_7 C6 + \varepsilon_{16} \quad (16)$$

(2) Regression equations for operation performance of different business lines of accounting firms

$$Y2 = \alpha_0 + \alpha_1 X9 + \alpha_2 C1 + \alpha_3 C2 + \alpha_4 C3 + \alpha_5 C4 + \alpha_6 C5 + \alpha_7 C6 + \varepsilon_{17} \quad (17)$$

$$Y3 = \alpha_0 + \alpha_1 X9 + \alpha_2 C1 + \alpha_3 C2 + \alpha_4 C3 + \alpha_5 C4 + \alpha_6 C5 + \alpha_7 C6 + \varepsilon_{18} \quad (18)$$

$$Y4 = \alpha_0 + \alpha_1 X9 + \alpha_2 C1 + \alpha_3 C2 + \alpha_4 C3 + \alpha_5 C4 + \alpha_6 C5 + \alpha_7 C6 + \varepsilon_{19} \quad (19)$$

$$Y5 = \alpha_0 + \alpha_1 X9 + \alpha_2 C1 + \alpha_3 C2 + \alpha_4 C3 + \alpha_5 C4 + \alpha_6 C5 + \alpha_7 C6 + \varepsilon_{20} \quad (20)$$

In Equations (16) ~ (20), Y1 denotes the total revenues, Y2 denotes the revenues from financial attestation services, Y3 denotes the revenue from tax services, Y4 denotes the revenue from management consulting services, Y5 denotes the revenues from industrial and commercial registration services, X9 denotes the degrees of gender divide, C1 denotes the number of branch offices, C2 denotes the number of operating years, C3 denotes the business structure, C4 denotes the operating assets, C5 denotes the number of management consulting companies, C6 denotes the adoption of digitalization, α_0 denotes the intercept, $\alpha_1, \alpha_2, \alpha_3, \alpha_4, \alpha_5, \alpha_6,$ and α_7 as the parameters of the regression model, and $\varepsilon_{16}, \varepsilon_{17}, \varepsilon_{18}, \varepsilon_{19},$ and ε_{20} as the error terms.

Empirical Results

Descriptive Statistics

Table 2 shows the descriptive statistics of the variables. Regarding dependent variables, the mean of the total revenues (Y1) is NTD 27,877,447 (i.e., the average annual revenues per accounting firm). The maximum value is NTD 7,698,102,563, indicating few firms enjoying very high revenues. In terms of operational performance, the mean revenue from financial attestation services (Y2) is NTD 13,587,397, while the mean revenue from tax services (Y3) is NTD 9,705,603. On the other hand, the mean revenue from management consulting services (Y4)

is NTD 1,137,705, while the mean revenue from industrial and commercial registration services (Y5) is NTD 1,029,555. Among the four business lines, financial attestation services and tax services generated the highest and second-highest revenues. The revenues from management consulting, industrial and commercial registration services are relatively lower. In summary, traditional audits and tax services remain the primary businesses for accounting firms.

Concerning independent variables, the mean percentage of partnership accountants (X1) is 0.30, and the mean percentage of professional assistants (X2) is 0.41. These two hierarchical levels collectively constitute 70% of the workforce in accounting firms and are the primary source of human resources. The percentage of master's degree holders (X3), the percentage of university degree holders (X4), and the percentage of junior college degree holders (X5) reported a mean of 0.15, 0.62, and 0.16, respectively. These numbers suggest that university degree holders constitute the largest group in terms of education levels. The mean percentage of young-aged employees (X6) is 0.26, while the mean of the percentage of prime-aged employees (X7) is 0.27. On the other hand, the mean of the percentage of middle-aged employees (X8) is 0.22. These numbers suggest that those aged 35 ~44 (prime-aged) constitute the largest group, followed by those 25~34 (young-aged), and lastly, those aged 45~54 (middle-aged). This indicates that the difference among these three age groups is relatively small. Finally, the mean degree of gender divide (X9) is 0.41, indicating that the percentage of females is higher than that of males. A median of 0.5 suggests that the workforce in more than half of firms primarily consists of females. This highlights that females constitute the majority of employees, while males make up the minority in accounting firms.

In terms of control variables, the mean number of branch offices (C1) is 0.15, with the highest value being nine branch offices. The mean number of operating years (C2) is 17.01, with the longest history being 64 years and the shortest being new firms established one year ago. The mean business structure (C3) is 0.24, indicating that 24% of the accounting firms are in partnerships. The mean operating assets (C4) is NTD 16,675,645, with the highest value being NTD 5,375,661,451. The mean number of management consulting companies (C5) is 0.11, indicating

that most accounting firms have not established management consulting companies. However, the highest number is eight management consulting companies. The mean adoption of digitalization (C6) stands at 0.23, implying that only 23% of the accounting firms have integrated electronic operations (Table 2).

Regression and Empirical Results

Following the recommendations of Neter, Wasserman, and Kutner (1990), this paper employed the Variance Inflation Factor (VIF) to test for collinearity. A VIF value less than 10 indicates the absence of serious collinearity between independent and control variables. Based on the empirical results, the VIF values of all the independent and control variables in all the regression models are below 10, suggesting no significant collinearity between the variables. In addition, this study utilized Durbin-Watson (D-W) to test for error terms in the regression models. D-W statistics falling between 1.5 and 2.5 indicate no autocorrelation among error terms. In all the D-W statistics in the regression models run in this paper, the D-W statistics fall within the acceptable range of 1.5 and 2.5, indicating no autocorrelation between the error terms.

Influence of hierarchical levels of employees on operation performance: Table 3 presents the regression result on the total revenues. The adjusted R² is 0.641, while the F value is 473.338, reaching a 1% significance level. This suggests a good model fit. Among the independent variables, the percentage of partnership accountants (X1) and the percentage of professional assistants (X2) exhibited a significantly negative and significantly positive influence on the total revenues (Y1), respectively. This suggests that a higher percentage of partnership accountants results in lower total revenues for accounting firms. Meanwhile, a lower percentage of professional assistants leads to lower total revenues. This means that professional assistants significantly contribute to the operational performance of accounting firms and are also a primary human resource. The influence of the percentage of partnership accountants (X1) on operation performance is significant, although the direction is not as anticipated. Hence, only H1-1b is accepted.

In terms of the control variables, only the adoption of digitalization (C6) did not significantly influence the total revenues (Y1). However, all other variables, such as the number of branch

Table 3: Regression results about influence of hierarchical levels of employees on total revenues.

Variable type	Variable name	Expected sign	Coefficient	Standard error	t value	p value (one tail)	VIF	Hypothesis No.	Acceptance of the hypothesis
	Intercept		6.258	0.043	145.144	<0.000***			
Independent variables	X1	+	-1.104	0.043	-25.417	<0.000***	1.761	H1-1a	No
	X2	+	0.164	0.042	3.919	<0.000***	1.593	H1-1b	Yes
Control variables	C1	+	0.224	0.016	13.658	<0.000***	1.224		
	C2	+	0.008	0.001	8.686	<0.000***	1.267		
	C3	+	0.464	0.023	19.870	<0.000***	1.215		
	C4	+	0.042	0.005	8.533	<0.000***	1.115		
	C5	+	0.124	0.023	5.401	<0.000***	1.068		
	C6	+	0.018	0.022	0.818	0.207	1.056		
	R ²					0.642			
	Adjusted R ²				0.641				
	F value				473.338	<0.000***			
	D-W				2.024				

Notes: 1. Y1: total revenues; X1: percentage of partnership accountants; X2: percentage of professional assistants; C1: number of branch offices; C2: number of operating years; C3: business structure; C4: operating assets; C5: number of management consulting companies; C6: adoption of digitalization. 2. Based on one-tail tests. The symbols ***, ** and * denote the 1%, 5%, and 10% significance levels, respectively. 3. Yes" indicates the hypothesis is accepted, "No" the hypothesis rejected. 4. p-value <0.000 indicates an extremely small value. 5. A total of 2,118 observation values of accounting firms.

offices (C1), number of operating years (C2), business structure (C3), operating assets (C4), and number of management consulting companies (C5), exhibited a significant and positive influence on the total revenues (Y1). This indicates that a higher number of branch officers, a longer operating history, incorporation as partnerships, greater operating assets, and a large number of management consulting companies all contribute to the better overall operational performance of accounting firms (Table 3).

Continuing the analysis with the four business lines, namely financial attestation, tax, management consulting, and industrial and commercial registration, the regression results summarized in Table 4 for variables related to the hierarchical levels of employees and the percentage of professional assistants (X2) demonstrated a significant and positive influence on the revenues from financial attestation services (Y2) and revenue from tax services (Y3). Therefore, H1-2b and H1-3b are accepted. This paper also discovered that the percentage of partnership accountants (X1) significantly and negatively influenced the revenues from financial attestation services (Y2), revenues from tax services (Y3), revenues from management consulting services (Y4), and revenues from industrial and commercial registration services (Y5). Surprisingly, the percentage of professional assistants (X2) also significantly and negatively influenced the revenues from management consulting services (Y4). These results are contrary to the initial expectations. Therefore, the management of accounting firms is advised to thoroughly investigate and understand the possible reasons behind these special phenomena (Table 4).

Influence of education levels of employees on operation performance: Table 5 presents the regression results for the total revenues. The adjusted R^2 is 0.485, while the F value is 222.887, reaching a 1% significance level. This suggests a good model fit. In terms of the independent variables, the percentage of university degree holders (X4) and the percentage of junior college degree holders (X5) significantly and positively influenced the total revenues (Y1). This indicates that a greater percentage of university degree holders and a higher percentage of junior college holders contribute to higher total revenues. Accounting firms aiming to enhance operational perfor-

mance may recruit more employees with university degrees or junior college degrees equipped with professional knowledge and trained skills for assigned tasks. Although the percentage of master's degree holders (X3) reported a significant influence on operation performance, the direction is not as expected. Hence, only H2-1b and H2-1c are accepted.

In terms of control variables, the number of branch offices (C1), number of operating years (C2), business structure (C3), operating assets (C4), number of management consulting companies (C5), and adoption of digitalization (C6) all have significant and positive effects on total revenues (Y1). This means that a larger number of branch officers, longer operating history, incorporation as partnerships, higher operating assets, greater number of management consulting companies, and adoption of digitalization contribute to better overall operational performance of accounting firms (Table 5).

Following a similar approach as in Table 4, further analysis was conducted on the four business lines: financial attestation, tax, management consulting, and industrial and commercial registration. The regression results presented in Table 6, focusing on the variables regarding employee education levels, reveal noteworthy findings. The percentage of university degree holders (X4) significantly and positively influenced the revenues from financial attestation services (Y2) and the revenues from tax services (Y3). The percentage of junior college degree holders (X5) also significantly and positively influences the revenues from tax services (Y3). Hence, H2-2b, H2-3b, and H2-3c are accepted. This paper also discovered that the percentage of master's degree holders (X3) exhibits a significantly negative influence on the revenues from financial attestation services (Y2), revenues from tax services (Y3), and revenues from industrial and commercial registration services (Y5). This does not support the initial expectations. Therefore, a high percentage of master's degree holders do not influence the operational performance of accounting firms. This research finding contradicts most management's belief in hiring well-educated employees. In reality, highly educated employees do not necessarily enhance the operational performance of accounting firms. Hence, management is advised not to prioritize high education levels in recruitment and employment (Table 6).

Table 4: Regression results about influence of hierarchical levels of employees on operation performance of business lines.

Variable type	Variable name	Expected sign	Revenues from financial attestation services(Y2)	Revenues from tax services(Y3)	Revenues from management consulting services(Y4)	Revenues from industrial and commercial registration services(Y5)	VIF
	Intercept		4.207***	5.469***	0.247	3.421***	
Independent variables	X1	+	-2.160***	-2.250***	-0.443**	-1.987***	1.761
	X2	+	0.405**	0.397***	-0.503**	0.185	1.593
Control variables	C1	+	0.317***	0.149***	0.264***	0.262***	1.224
	C2	+	0.026***	0.014***	0.041***	0.004	1.267
	C3	+	0.656***	0.603***	0.941***	1.165***	1.215
	C4	+	0.117***	0.078***	0.093***	0.123***	1.115
	C5	+	-0.007	0.046	0.220**	0.221**	1.068
	C6	+	0.188**	0.097	-0.005	0.335***	1.056
	R ²		0.243	0.290	0.114	0.207	
	Adjusted R ²		0.240	0.288	0.111	0.204	
	F value		84.396***	107.838***	34.031***	69.004***	
	D-W		2.074	1.953	2.001	2.050	

Notes: X1: percentage of partnership accountants; X2: percentage of professional assistants; C1: number of branch offices; C2: number of operating years; C3: business structure; C4: operating assets; C5: number of management consulting companies; C6: adoption of digitalization. 2. Based on one-tail tests. The symbols ***, ** and * denote the 1%, 5%, and 10% significance levels, respectively. 3. p-value <0.000 indicates an extremely small value.

Table 5: Regression results about influence of education levels of employees on total revenues.

Variable type	Variable name	Expected sign	Coefficient	Standard error	t value	p value (one tail)	VIF	Hypothesis No.	Acceptance of the hypothesis
	Intercept		5.668	0.076	74.270	<0.000***			
Independent variables	X3	+	-0.393	0.081	-4.851	<0.000***	3.354	H2-1a	No
	X4	+	0.213	0.073	2.908	0.002***	4.569	H2-1b	Yes
	X5	+	0.116	0.084	1.386	0.083*	3.164	H2-1c	Yes
Control variables	C1	+	0.244	0.020	12.417	<0.000***	1.226		
	C2	+	0.015	0.001	14.026	<0.000***	1.224		
	C3	+	0.498	0.028	17.630	<0.000***	1.237		
	C4	+	0.058	0.006	9.808	<0.000***	1.104		
	C5	+	0.165	0.027	6.016	<0.000***	1.065		
	C6	+	0.051	0.027	1.906	0.028**	1.057		
	R ²					0.488			
Adjusted R ²					0.485				
F value					222.887	<0.000***			
D-W					1.990				

Notes: 1. Y1: total revenues; X3: percentage of master's degree holders; X4: percentage of university degree holders; X5: percentage of junior college degree holders; C1: number of branch offices; C2: number of operating years; C3: business structure; C4: operating assets; C5: number of management consulting companies; C6: adoption of digitalization. 2. Based on one-tail tests. The symbols ***, ** and * denote the 1%, 5%, and 10% significance levels, respectively. 3. "Yes" indicates the hypothesis is accepted, "No" the hypothesis rejected. 4. p-value <0.000 indicates an extremely small value. 5. A total of 2,118 observation values of accounting firms.

Table 6: Regression results about influence of education levels of employees on operation performance of business lines.

Variable type	Variable name	Expected sign	Revenues from financial attestation services(Y2)	Revenues from tax services(Y3)	Revenues from management consulting services(Y4)	Revenues from industrial and commercial registration services(Y5)	VIF
	Intercept		3.038***	3.969***	-0.291	2.671***	
Independent variables	X3	+	-0.684**	-0.738***	0.473	-1.181***	3.354
	X4	+	0.450*	0.869***	0.187	0.134	4.569
	X5	+	0.178	0.708***	-0.381	-0.444	3.164
Control variables	C1	+	0.356***	0.189***	0.247***	0.290***	1.226
	C2	+	0.041***	0.028***	0.045***	0.016***	1.224
	C3	+	0.720***	0.650***	0.910***	1.206***	1.237
	C4	+	0.149***	0.107***	0.094***	0.150***	1.104
	C5	+	0.071	0.129*	0.220**	0.285***	1.065
	C6	+	0.252***	0.171**	-0.022	0.394***	1.057
	R ²			0.178	0.204	0.116	0.171
Adjusted R ²			0.174	0.201	0.113	0.168	
F value			50.685***	60.106***	30.826***	48.420***	
D-W			2.053	1.951	1.999	2.049	

Notes: X3: percentage of master's degree holders; X4: percentage of university degree holders; X5: percentage of junior college degree holders; C1: number of branch offices; C2: number of operating years; C3: business structure; C4: operating assets; C5: number of management consulting companies; C6: adoption of digitalization. 2. Based on one-tail tests. The symbols ***, ** and * denote the 1%, 5%, and 10% significance levels, respectively. 3. p-value <0.000 indicates an extremely small value.

Influence of age profiles of employees on operation performance: Table 7 shows the regression result on total revenues. The adjusted R² is 0.502, while the F value is 238.090, reaching a 1% significance level. This suggests a good model fit. Concerning independent variables, the percentage of young-aged employees (X6), the percentage of prime-aged employees (X7), and the percentage of middle-aged employees (X8) all have significant and positive influence on the total revenues (Y1). This means that the higher percentage of young-aged employees leads to a higher percentage of prime-aged or middle-aged employees and higher total revenues of accounting firms. Therefore, the employees aged 25 to 45 help boost firms' operating performance. Hence, H3-1a, H3-1b, and H3-1c are accepted.

Among the control variables, only the adoption of digitalization (C6) demonstrated an insignificant influence on total revenues

(Y1). All other variables, such as the number of branch offices (C1), the number of operating years (C2), business structure (C3), the operating assets (C4), and the number of management consulting companies (C5), have significant and positive effects on total revenues (Y1). Therefore, a larger number of branch officers, a longer operating history and incorporation as partnerships, higher operating assets, and a greater number of management consulting companies contribute to improved overall operation performance of accounting firms (Table 7).

Following a similar approach as in Table 4, further analysis was performed on the four business lines: financial attestation, tax, management consulting, and industrial and commercial registration. Based on the regression results in Table 8, focusing on the variables related to the age profiles of employees, several significant findings emerged. The percentage of young-

Table 7: Regression results about influence of age profiles of employees on total revenues.

Variable type	Variable name	Expected sign	Coefficient	Standard error	t value	p value (one tail)	VIF	Hypothesis No.	Acceptance of the hypothesis
	Intercept		5.417	0.051	106.046	<0.000***			
Independent variables	X6	+	0.737	0.052	14.115	<0.000***	1.670	H3-1a	Yes
	X7	+	0.247	0.049	5.002	<0.000***	1.680	H3-1b	Yes
	X8	+	0.072	0.051	1.411	0.079*	1.572	H3-1c	Yes
Control variables	C1	+	0.222	0.019	11.435	<0.000***	1.230		
	C2	+	0.019	0.001	17.618	<0.000***	1.242		
	C3	+	0.448	0.028	16.045	<0.000***	1.250		
	C4	+	0.063	0.006	10.887	<0.000***	1.105		
	C5	+	0.148	0.027	5.485	<0.000***	1.066		
	C6	+	-0.012	0.027	-0.435	0.332	1.075		
	R ²					0.504			
Adjusted R ²					0.502				
F value					238.090	<0.000***			
D-W					2.020				

Notes: 1. Y1: total revenues; X6: percentage of young-aged employees; X7: percentage of prime-aged employees; X8: percentage of middle-aged employees; C1: number of branch offices; C2: number of operating years; C3: business structure; C4: operating assets; C5: number of management consulting companies; C6: adoption of digitalization. 2. Based on one-tail tests. The symbols ***, ** and * denote the 1%, 5%, and 10% significance levels, respectively. 3. Yes" indicates the hypothesis is accepted, "No" the hypothesis rejected. 4. p-value <0.000 indicates an extremely small value. 5. A total of 2,118 observation values of accounting firms.

Table 8: Regression results about influence of age profiles of employees on operation performance of business lines.

Variable type	Variable name	Expected sign	Revenues from financial attestation services(Y2)	Revenues from tax services(Y3)	Revenues from management consulting services(Y4)	Revenues from industrial and commercial registration services(Y5)	VIF
	Intercept		2.849***	3.752***	0.063	1.611***	
Independent variables	X6	+	1.387***	1.377***	0.081	1.616***	1.670
	X7	+	-0.050	0.598***	-0.345*	0.618***	1.680
	X8	+	-0.046	0.173	-0.241	0.690***	1.572
Control variables	C1	+	0.310***	0.150***	0.252***	0.255***	1.230
	C2	+	0.045***	0.037***	0.040***	0.024***	1.242
	C3	+	0.642***	0.582***	0.930***	1.129***	1.250
	C4	+	0.154***	0.123***	0.090***	0.160***	1.105
	C5	+	0.035	0.100	0.226**	0.271***	1.066
	C6	+	0.146*	0.043	-0.010	0.271***	1.075
	R ²		0.191	0.187	0.114	0.174	
Adjusted R ²		0.187	0.183	0.110	0.170		
F value		55.209***	53.860***	30.153***	49.246***		
D-W		2.059	1.972	1.993	2.061		

Notes: X6: percentage of young-aged employees; X7: percentage of prime-aged employees; X8: percentage of middle-aged employees; C1: number of branch offices; C2: number of operating years; C3: business structure; C4: operating assets; C5: number of management consulting companies; C6: adoption of digitalization. 2. Based on one-tail tests. The symbols ***, ** and * denote the 1%, 5%, and 10% significance levels, respectively. 3. p-value <0.000 indicates an extremely small value.

aged employees (X6) exhibited a significant and positive influence on the revenues from financial attestation services (Y2), revenues from tax services (Y3), and revenues from industrial and commercial registration services (Y5). The percentage of prime-aged employees (X7) significantly and positively influenced the revenues from tax services (Y3) and revenues from industrial and commercial registration services (Y5). The percentage of middle-aged employees (X8) only significantly and positively influenced the revenues from industrial and commercial registration services (Y5). Therefore, H3-2a, H3-3a, H3-3b, H3-5a, H3-5b and H3-5c are accepted. Meanwhile, this paper discovered that the percentage of prime-aged employees (X7) demonstrated a significantly negative influence on the revenue from management consulting services (Y4), inconsistent with the expected direction. Hence, accounting firm management should understand this phenomenon and actively explore strat-

egies to create positive effects (Table 8).

Influence of gender distribution of employees on operation performance: Table 9 summarizes the regression result on total revenues. The adjusted R² is 0.484, while the F value is 284.322, reaching a 1% significance level. This suggests a good model fit. The degrees of gender divide (X9) as an independent variable significantly and positively influenced total revenues (Y1). This means the larger the difference between the percentage of females and the percentage of males in the workforce, the higher the total revenues. Therefore, a higher percentage of female employees is associated with greater operational performance of accounting firms. Hence, H4-1 is accepted.

Adopting digitalization (C6) is the only control variable that did not significantly influence total revenues (Y1). All other variables, such as the number of branch offices (C1), number of

operating years (C2), business structure (C3), operating assets (C4), and number of management consulting companies (C5), exhibited significant and positive influence on the total revenues (Y1). Therefore, a higher number of branch officers, a longer operating history and incorporation as partnerships, larger operating assets, and a greater number of management consulting companies contribute to improved overall operational performance of accounting firms (Table 9).

Following a similar approach as in Table 4, further analysis was performed on the four business lines: financial attestation, tax, management consulting, and industrial and commercial registration. According to the regression results in Table 10, focusing on the variables concerning the gender distribution of employees, the degrees of gender divide (X9) reported significant and positive effects on the revenues from financial attestation services (Y2), revenues from tax services (Y3) and revenues from industrial and commercial registration services (Y5). Hence, H4-2, H4-3 and H4-5 are accepted (Table 10).

Conclusion and Managerial Implications

This paper examined the influence of organizational charac-

teristics of accounting firms, from the perspectives of the human resource structure, on the overall operation performance and the operation performance of four business lines, namely financial attestation, tax, management consulting, and industrial and commercial registration. The objective is to identify the key variables contributing to these performance outcomes. The research findings provide valuable insights for the management of accounting firms in structuring their human resources and employment policies.

The research results concerning the hierarchical levels of employees reveal that a higher percentage of professional assistants is associated with increased total revenues for accounting firms. The effect is particularly prominent in revenues from financial attestation and tax services, underscoring the critical role of professional assistants as vital human resources for accounting firms. Professional assistants are typically the most important frontline personnel responsible for client-site work. Therefore, management should provide more training and regular education programs for professional assistants. Enhancing the professional knowledge and skills of professional assistants will benefit the operation performance of accounting firms. In

Table 9: Regression results about gender distribution of employees on total revenues.

Variable type	Variable name	Expected sign	Coefficient	Standard error	t value	p value (one tail)	VIF	Hypothesis No.	Acceptance of the hypothesis
	Intercept		5.614	0.037	151.218	<0.000***			
Independent variables	X9	+	0.271	0.021	12.685	<0.000***	1.007	H4-1	Yes
Control variables	C1	+	0.248	0.020	12.577	<0.000***	1.222		
	C2	+	0.016	0.001	15.534	<0.000***	1.161		
	C3	+	0.511	0.028	18.279	<0.000***	1.210		
	C4	+	0.060	0.006	10.140	<0.000***	1.100		
	C5	+	0.170	0.027	6.219	<0.000***	1.063		
	C6	+	0.029	0.027	1.069	0.143	1.056		
	R ²				0.485				
	Adjusted R ²				0.484				
	F value				284.322	<0.000***			
	D-W				1.983				

Notes: 1. Y1: total revenues; X9: the degrees of gender divide; C1: number of branch offices; C2: number of operating years; C3: business structure; C4: operating assets; C5: number of management consulting companies; C6: adoption of digitalization. 2. Based on one-tail tests. The symbols ***, ** and * denote the 1%, 5%, and 10% significance levels, respectively. 3. Yes" indicates the hypothesis is accepted, "No" the hypothesis rejected. 4. p-value <0.000 indicates an extremely small value. 5. A total of 2,118 observation values of accounting firms.

Table 10: Regression results about influence of gender distribution of employees on operation performance of business lines.

Variable type	Variable name	Expected sign	Revenues from financial attestation services(Y2)	Revenues from tax services(Y3)	Revenues from management consulting services(Y4)	Revenues from industrial and commercial registration services(Y5)	VIF
	Intercept		2.937***	4.141***	-0.135	2.179***	
Independent variables	X9	+	0.631***	0.653***	0.068	0.674***	1.007
Control variables	C1	+	0.364***	0.198***	0.261***	0.302***	1.222
	C2	+	0.043***	0.031***	0.042***	0.018***	1.161
	C3	+	0.746***	0.696***	0.936***	1.235***	1.210
	C4	+	0.152***	0.114***	0.092***	0.152***	1.100
	C5	+	0.086	0.142**	0.237**	0.307***	1.063
	C6	+	0.206**	0.115*	-0.012	0.343***	1.056
	R ²		0.185	0.192	0.112	0.175	
	Adjusted R ²		0.182	0.189	0.109	0.172	
	F value		68.207***	71.500***	38.168***	63.822***	
	D-W		2.065	1.963	1.998	2.059	

Notes: X9: the degrees of gender divide; C1: number of branch offices; C2: number of operating years; C3: business structure; C4: operating assets; C5: number of management consulting companies; C6: adoption of digitalization. 2. Based on one-tail tests. The symbols ***, ** and * denote the 1%, 5%, and 10% significance levels, respectively. 3. p-value <0.000 indicates an extremely small value.

addition, this paper discovered that a high percentage of partnership accountants significantly and negatively influenced the overall operation performance and the performance of the four business lines: financial attestation, tax, management consulting, and industrial and commercial registration. This suggests that management should carefully assess the operational status of accounting firms and be prepared to make timely adjustments in the percentage of partnership accountants. This will benefit the operational performance of accounting firms.

In terms of employee educational levels, a greater percentage of university degree holders and junior college degree holders is associated with higher total revenues for accounting firms. This effect is particularly noticeable among employees with university degrees, especially in their performance of financial attestation services and tax services. Employees with junior college degrees also excel in tax business. Colleges and universities typically offer comprehensive curricula in accounting, audit, tax, and information technology, complemented by hands-on programs for students majoring in accounting and finance. Some educational institutions even collaborate with companies, enabling college and university students to intern with or visit these organizations. This facilitates the integration of acquired professional knowledge into extensive practical experience, particularly for accounting-related students. Industry practitioners are often invited to campus for lectures, seminars, and workshops where students can stay well-informed about the industry's status and emerging trends. In summary, the collaboration between academic institutions and industries is well implemented. Therefore, graduates are well-prepared with professional knowledge in accounting, audit, and tax, allowing them to perform well in financial attestation and tax services. In contrast, a higher percentage of master's degree holders is associated with poor operational performance of accounting firms. Therefore, management is encouraged to deviate from common belief and the tradition of exclusively recruiting highly educated employees. What accounting firms truly need to deliver their services are employees effectively with adequate professional knowledge and skills, not higher education qualifications. Academic degrees do not necessarily equate to competencies to get jobs done. The key lies in accumulating practical experience. Hence, management should adjust the recruitment criteria for education levels to find suitable talents.

In terms of employees' age profiles, a greater percentage of young-aged, prime-aged, and middle-aged employees is associated with higher total revenues for accounting firms. This means the employees aged 25~54 years old positively influence the overall operational performance, particularly with young employees aged 25~34 years old excelling in financial attestation, tax, and industrial and commercial registration services. Prime-aged employees between 35 and 44 years old also perform well with tax and industrial and commercial registration services, while middle-aged employees who are 45~54 years old only primarily benefit from industrial and commercial registration services. Therefore, management is advised to recruit more young employees to foster a dynamic work environment and increase workforce enthusiasm. This approach encourages employees to embrace new and challenging opportunities. Compared to older employees, younger employees have better stamina and fewer family responsibilities. Therefore, they can be deployed internationally to assist in Taiwanese companies' auditing and consulting services, significantly enhancing accounting firms' operational performance and business development.

With regard to gender distribution, a greater gender divide is linked to increased total revenues for accounting firms. Therefore, a higher percentage of female employees correlates with stronger overall operational performance, particularly in financial attestation, tax, and industrial and commercial registration services.

Regarding the control variables, a higher number of branch officers, a longer operating history, incorporation as partnerships, larger operating assets, and a greater number of management consulting companies all contribute to the enhanced overall operational performance of accounting firms.

This paper discovered that none of the four aspects of the human resource structure significantly benefits the management consulting business of accounting firms. Variables related to the hierarchical levels of employees even exhibit negative effects. Therefore, management should broaden their talent pool by recruiting talents outside accounting, audit, and tax. To develop the management consulting business. This approach is essential for accounting firms to enter the management consulting market and establish a new foothold within the highly competitive audit market.

The accounting firm service survey report published by the Financial Supervisory Commission focused exclusively on accounting firms (the supply side) and has no information about customers of accounting firms (the demand side). Therefore, this study is limited in its inability to research this topic from the perspective of the demand side. Future researchers are advised to employ questionnaires to collect customer data related to accounting firms, thereby assessing the performance of accounting firms from the demand side. This approach will expand and enhance the research scope, making it more rigorous and comprehensive.

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