THE IMPACT OF AUDITOR SOCIAL CONNECTION ON THE PERSONAL PERFORMANCE

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Abstract

This study aims to explore whether individual auditors' participation in auditor associations and social groups has an impact on their business performance and integrates relevant domestic and foreign literature as a basis to discuss the development of this research hypotheses. This study explores the impact of auditor social connection on personal performance. This study explores whether the participation of individual auditor accountant associations and social organizations will affect the market share from 2016 to 2019 in Taiwan listed companies and the impact of auditor social connection on high-tech industries and auditor social connection on non-high-tech industries. The results show that auditor social connection can increase the market share, and the social network and market share of personal auditors in the high-tech industries are positive and significant, representing that auditors in high-tech industries can increase personal performance through social connection. The results show that participating in an accountant association can increase market share more than participating in a social organization. Auditors in the high-tech industries are also positive and significant, which can increase market share. Furthermore, the results find that the lead or coordinating audit partner can increase personal performance more than no lead or coordinating audit partner.

Keywords: Social Connection, Individual Auditors, Market Share

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1. INTRODUCTION

In this booming economic environment, auditors check the company's financial statements for investors and issue audit reports, and the ability of auditors to check financial statements comes from their own audit judgments. According to empirical research, it is found that the shorter the auditing experience of many auditors, the worse the audit quality (Geiger & Raghunandan, 2002; Myers et al., 2003). The possible reason is that the auditors have an early assessment of the industry knowledge related to lack of experience. Therefore, when auditors lack industry knowledge, they can improve their professional knowledge in related industries by participating in auditor associations or related alliances, thereby enhancing their competitiveness in this industry.

Craswell et al. (1996) believed that different industries will have different accounting methods,

customers' supply and demand for industrial knowledge may vary due to different industries, and the benefits generated by industrial knowledge may also be different. According to the literature, with the support of alliance and network theory, when auditors join the Certified Public Accountants (CPA) Association or related alliances, they can help auditors improve their learning effects through resource sharing and learning, and then have a significant impact on the growth of their firms (Bills et al., 2016). Since each industry has its own professional field, the judgments made by auditors when checking visa financial statements are all professional judgments shows that through re-education and training, auditors have the professional ability of the industry, and can detect the occurrence of missing and errors in financial statements. Therefore, when auditor associations or related alliances are regarded as important channels for individual auditors to obtain competitive advantages and professional knowledge, individual auditors can enhance their professional capabilities by joining multiple associations.

Auditors Law in Taiwan stipulates that those who have obtained an accountant certificate shall establish or join an audit firm, apply to the competent authority for practice registration, and join at least the provincial (city) accountant association where the main (or branch) accounting firm is located. The professional organization of the Auditors Association is used to standardize the quality of auditors' practice, and audit firms are a highly professional knowledge-intensive industry. The injection of external resources can help audit firms continue to learn and grow, especially for small audit firms. Thus, the alliance of accounting associations and social networks is often regarded as one of the important channels for audit firms to gain competitive advantages and continue to learn and grow. The CPA Association also provides education and training courses for all certified auditors in Taiwan and builds a network platform to promote communication among individual auditors. In addition, according to the information of various associations, many auditors will join more than one association. Therefore, this study uses alliance and network theory to explore whether participating in auditor associations and social groups can learn professional knowledge or expand interpersonal relationships, increase market share, and improve auditors' business performance.

In the auditing literature, several studies have found that audit firms' participation in accounting alliances has a positive impact on their audit quality (Bills et al., 2016).

Because external network resources are important to the overall internal development of audit firms, but individual auditors in the firm are still beneficiaries of core knowledge and an important element that promotes the company's professional knowledge. However, at present, there are not many relevant works of literature that discuss whether joining multiple auditor associations will have a significant impact on their business performance from the perspective of individual auditors. This study will explore whether auditors expand auditors' personal business performance through the spillover effect of participating in associations and social groups.

Due to the rapid changes in the high-tech industry, some auditors may easily cause audit misjudgments due to a lack of industry knowledge and experience, product life cycle or industry cycle. Enriching resources and strengthening the training of industry knowledge and auditing skills will have a significant impact on its business performance. Therefore, this study differentiates high-tech and non-high-tech industries to understand whether individual auditors in high-tech industries will participate in associations and society groups to expand auditors' individual business performance.

This study has the following research contributions. First, different from previous studies that mainly analyze the economic effects of audit firms, this study analyzes whether individual auditors expand their personal network by joining multiple associations and social groups from the perspective of individual auditors and then improve business performance for individual auditors. Second, the empirical results of this study can provide suggestions for individual auditors in the high-tech industry.

Individual auditors in the high-tech industry can interact, learn and communicate with other members by participating in multiple associations and social groups, and can participate in many different regions. Third, our empirical results also provide references for audit firms. Participating in multiple accounting associations and social groups can improve the audit performance and market share of individual auditors, audit firms can encourage their auditors to participate in associations and social groups, and strengthen the connection among members, through the professional re-education and training courses set up by the Auditors Association, assist and guide individual auditors to gain a competitive advantage, let the social network form more resource gathering places, and promote the development and growth of audit professional knowledge.

The remainder of this paper is as follows: Section 2 provides a review of the literature and develops hypotheses, Section 3 presents the research design, Section 4 proposes the research results and discussion, and finally, Section 5 concludes the paper.

2. LITERATURE REVIEW AND HYPOTHESES DEVELOPMENT

Whether the auditor's social relationship will affect individual performance is a topic of great concern to us. This study aims to explore whether individual auditors' participation in auditor associations and social groups has an impact on their business performance and integrates relevant domestic and foreign literature as a basis to discuss the development of this research hypotheses. This section is mainly divided into four subsections. The first subsection discusses social network resources; the second subsection discusses the Taiwan Institute of Certified Public Auditors; the third subsection discusses the social network and business performance of individual auditors; the fourth subsection is the development of the research hypotheses.

2.1. Literature discussion on social network resources

Social network theory originates from the construction of interpersonal relationships and their relationships in anthropology and is especially used for the interaction among members of small groups, and the interaction among members of such small groups becomes the connection between people. Social networks are widely used in the global system. From the interaction between different countries, we can see the relationship between domination and dependence in the global system, as well as the discussion of relevant classes and status in the network and other political fields (Kochen, 1989; Snyder & Kick, 1979; Bonacich, 1987). There are also many studies applied to the discussion of class operations and models in government governance relations (Fliervoet et al., 2016; Lienert et al., 2013). Mitchell (1969) proposed three elements of a social network, including: 1) *Actors*: nodes, which can be individuals or organizational groups; 2) *Relationships*: relationships between actors, which may be communication, domination, or information transfer, and can have a relationship of directionality and strength; 3) *Connection*: When actors want to establish a relationship, they must establish a relationship with each other through some means.

A social network is constructed by actors and more than one group of relationships. Social networks are more influential and are more conducive to the acquisition of resources or the transmission of information. Because a social network is a collection of members through relationship links, members can be individuals, groups, organizations, or the entire society, and they are considered the product of social relations between individuals or groups (Bourdieu, 1986; Coleman, 1988; Lin, 2001). An important point of social network theory is that individuals can obtain more resources in their own specific network relationships, and these relationships and resources will disappear as actors withdraw from the network (Burt, 1995). Network relationships take time to build and maintain. Auditors can be regarded as a node in the social network, and the connection with surrounding nodes is like the relationship formed by auditors participating in multiple guild networks and social groups.

In the globalized environment, the competition among various industries is becoming increasingly fierce. Thus, the influence of external relations on firm performance has been increasingly concerning. Social networks are now the main point of view for economic sociologists to analyze market behavior.

Starting from the perspective of social network, and focusing on the relationship within the organization's internal network, the relationship between network members within the organization is relatively stable, and they share common goals and enjoy a common organizational culture. In addition, the foundation of mutual trust among members of the organization's internal network is relatively solid. The common language and trust among members facilitate the transfer and integration of knowledge and information. The cooperation among auditors in the CPA Association is similar to the network structure within the organization.

Because network members in an organization have common goals and share a common organizational culture, they will have a sense of social identification with the members of the organization. The social identity theory states that an individual's identity and personality are derived from one's own interests and abilities, and the other is the connection between oneself and society, which creates a certain sense of identity within the organization. Tajfel and Turner (1985) believed that individuals classify themselves into specific organizations according to their living environment, occupation, interest, or education level. From this organization and their own classification, they can better locate their own identity and character. Auditors choose CPA associations through professional factors and choose organizations to join through interest factors. With common goals and shared organizational culture, auditors will have a sense of social identity for members of the organization.

Nahapiet and Ghoshal (1998) mentioned that identification is the process by which members of an organization see themselves as part of a group. Individuals identify with the behaviors shown by other members of the organization, and then learn, imitate, and express the behaviors of other members, which makes individuals feel a sense of belonging when they participate in the organization (Li et al., 2001). Patchen (1970) believed that identification is to allow members of the organization to support and trust each other, and by sharing goals or experiences, they can create a sense of unity among members and feel that they are part of the organization. Social identity is mainly based on the mutual learning and interaction of members in the organization, coupled with the continuous participation of members so that there are more opportunities for interaction between members and a positive impact on the organization.

Previous studies have found that members' identification with the group is the main factor affecting knowledge-sharing, which means that members with a higher degree of group identification are more enthusiastic about knowledge-sharing. In addition to good interaction among members of the association, there will also be knowledge-sharing behaviors. Dixon (2000) believes that individuals transmit their knowledge or information to others, which is called knowledge-sharing. Knowledge-sharing is defined as the process in which knowledge owners share their knowledge and experience with knowledge demanders to help knowledge demanders develop new fields (Nahapiet & Ghoshal, 1998). It is pointed out that the ability of the organization to share knowledge is one of the advantages of the organization, and the internal social network conditions will affect the generation and sharing of organizational knowledge. Members have a sense of social identity in the group and are willing to share their knowledge, experience or information with other members. Auditors can learn a variety of new knowledge and experience and communicate with other members of the CPA association.

2.2. Literature review of Taiwan Institute of Certified Public Auditors

In the past, auditors in Taiwan were limited by Article 8 of the Auditors' Act, which required practicing auditors to join the CPA associations in each region where they practiced. In fact, many auditors did not participate in the interaction with the local CPA associations, thus forming a loose network.

However, since the Legislative Yuan passed the third-read amendment on April 1, 2015, Article 8, Item 1 of the Auditors Law presupposes that a person who holds an accountant certificate shall establish or join an accounting firm, apply to the competent authority for practice registration, and at least join the provincial (city) accountant association where the main (or branch) accounting firm is located as a practicing member before he/she can become an executive accountant nationwide business; the CPA Association shall not refuse its membership. That is, the restrictions on practice areas are relaxed, and the jurisdiction of CPA associations is not limited. It means that after the revision of the law, auditors can perform business in the whole of Taiwan as long as they join any of the four accounting associations in the country. For individual auditors in Taiwan, the change of this law can give auditors more flexibility in practicing without being restricted by regions. Although certified auditors only need to join any association, they can practice in other regions, but there are still many auditors who join not only one association, but some even join more than one accounting association.

Taiwan Institute of Certified Public Auditors is a non-profit professional organization established in accordance with the People's Organization Act and the Auditors Act. There are currently four CPA associations in total, namely the Taiwan Provincial Association, Taipei Association, Taichung Association and Kaohsiung Association. In the North, Central, and South regions, the four guilds are independent, and their affairs are managed by the councils of the guilds, as AICPA (American Institute of Certified Public Auditors). The Financial Supervisory Commission appointed the Taiwan Institute of Certified Public Auditors to provide advanced study courses for auditors every year, establish a system, and assist the government in promoting relevant policies and regulations. In addition, the Institute of Auditors is committed to developing its membership network and managing the behavior of auditors. The main goal is to establish the spirit of detachment and independence of auditors, improve the professional standards of auditors, and increase the market share of auditors.

In recent years, the Financial Supervisory Commission has promoted continuing professional development for auditors and suggested that the Taiwan Institute of Certified Public Auditors conduct continuous professional development for auditors, learn relevant courses related to accountant practice, and adopt the method of training hours, which requires a certain number of hours of professional development courses every year, which does not meet the regulations. For auditors with the minimum training hours, the national association shall notify them individually before the end of March of the following year to complete the supplementary training within three months. Those who do not complete the supplementary training within the time limit shall report to the competent authority to stop their business operations; since the cessation of practice. Because of the impetus of this law, auditors must participate in a certain number of hours of professional development courses every year. Through the education and training courses of the Taiwan Institute of Certified Public Auditors, they can discuss and communicate with different auditors, and discuss how to check the new bulletin.

Previous studies pointed out that accounting alliances mainly shorten the market position gap between large and small audit firms through the blessing of the alliance's own brand, and use collaborative cooperation or provide consulting to meet the different needs of customers (Bill et al., 2016). Bills et al. (2018) also used qualitative research to conduct interviews with 37 partner auditors. Their research found that accounting alliances can help members solve barriers to entering large customers and international markets, and through the international brand certification of accounting alliances, it helps small audit firms establish trust in audit quality in the audit market. There is a significant positive relationship with audit public fees, showing that participation in accounting unions can improve the visibility of small firms. The difference between the above-mentioned American and Chinese accounting alliances lies in the framework of the rule of law. The goal of the accounting association in Taiwan is to regard the association as a learning network. Continuous learning, in the context of learning, through the coordination mechanism and norms of the auditor association, can promote interaction and learning among auditors.

2.3. Personal accountant social network and business performance

Many companies use market share as an indicator of business performance. Venkatraman and Ramanujam (1986) proposed the following classifications for performance measurement:

1. Financial performance: financial performance refers to the company's economic goals, such as operating income, profitability, sales growth rate, after-tax profit, etc. These are traditional and commonly used measurement methods.

2. Business performance: including non-financial indicators such as market share, marketing effectiveness, product quality, introduction of new products, and creation of added value.

3. Organizational performance: in addition to the two indicators of financial performance and business performance, there are many conflicting goals among organizations and goals of various stakeholders, such as employee morale. In the past, there were also many works of literature that regarded market share, sales growth rate and profit rate as corporate performance (Boulding & Staelin, 1990; Kaplan & Norton, 1992; Slater & Narver, 1994; Pelham 1997). In this study, the market share of individual auditors is used as a measure of individual accountant business performance.

Due to the implementation of the double-signature system in Taiwan, auditors apply for public issuance of the company's financial report review and approval standards. According to the provisions of Article 15 of the Auditors Law, two or more certified public auditors of the joint or legal person accounting firm shall jointly review and issue the company's financial report. It indicates that when an auditor conducts joint visa business with other auditors, the social network of two people is the accountant's personal visa network. Additionally, auditors will consider their reputation and the risk of audit failure. Auditors in the network supervise each other's governance mechanisms so that auditors with high network connections have better audit quality; however, the information obtained through social networks may be misled. It even led to a reduction in the audit quality of auditors and the quality of financial reports. It is found from the above literature that no matter whether the network strength is measured by the firm or the individual accountant, it is found that the firm or accountant with the stronger network connection has an advantage in audit quality.

The professional ability of an accountant is intangible and cannot be identified in real time. Therefore, auditors will gain the trust of customers and obtain rich resources by participating in different network relationships. The type of firm and the area where the firm is located will affect the construction of social networks. In order to focus on the performance of professional ability, auditors will join social groups to obtain customers. As for the interaction between auditors and social networks, the exchange of organizational experience and personal connections will promote auditors to understand social network relationships and build the interaction between investors and auditors to increase the market share of auditors. Burt (1995) believes that individuals can have the advantage of information through different network relationships, and get important information more preferentially than others.

Therefore, for individual auditors, participating in multiple associations can obtain a wide range of information sources, access different information, and have more choices for problem-solving solutions.

Auditing by auditors is a process that focuses on audit quality rather than financial performance. Auditors' judgment must be used in the entire audit process, and all audit tasks must be correctly completed under time pressure, and accurate judgments and decisions must be made. In addition, when raising doubts about continuing operations or non-unqualified opinions, it takes more time to identify and confirm. Auditors with more audit experience were found to have a better understanding of internal controls, a more complete knowledge of financial statements and the occurrence of errors, and a more accurate understanding of the causes of errors than auditors with less experience auditing.

In fact, in audit firms, individual auditors mainly acquire audit expertise through audit communication and peer interaction. The higher the accountant's market share in a certain industry, the more experience they can accumulate in the industry, and the more they can detect errors and fraud in financial statements. Therefore, a lot of professional auditing knowledge depends on auditors' auditing training. Auditing experience takes time to accumulate. Therefore, when auditors cannot obtain the required professional knowledge to deal with complex audit issues within the accounting firm, they will look for information from outside. Therefore, auditors in Taiwan only need to join any of the four associations of auditors in the country. Therefore, the members of the four associations include all auditors in Taiwan. Therefore, new audit information and regulatory information will exist in different associations at the same time. When individual auditors participate in multiple associations and social groups, they can accumulate more network resources (Bourdieu, 1986) and strengthen information interaction with other related parties (Borgatti & Cross, 2003) by using an enlarged network scale.

2.4. Hypotheses development

Prior studies suggest that audit firms have a wealth of industry knowledge, and in terms of knowledge management, it is found that the higher the network connection degree of the firm, the more opportunities for the auditors in the firm to exchange knowledge with auditors of other branches, thereby improving the audit quality and auditing skills, and helping to deal with. When auditors make audit misjudgments during the audit process, part of the reason is that there are few opportunities for auditors to be trained within the firm, or the internal network connection of the firm is low, which cannot provide opportunities for auditors to exchange knowledge, and is not easy to occur. For knowledge transfer, auditors will seek external resources. Therefore, by participating in the education and training courses of auditor associations or seminars, auditors can reduce errors in the auditing process. In addition, auditors can conduct business in Taiwan as long as they join any of the four accounting associations in the country.

Because individual auditors who participate in multiple associations can choose contacts from different associations and establish more frequent contacts and interactions with them. In the process of exchange and learning, professional knowledge can be exchanged with other auditors, and transmitted through formal and informal activities, through group learning, observation, and imitation to increase the efficiency and effectiveness of individual auditors in auditing. Furthermore, individual auditors can understand the needs of specific industries through the interaction and resource sharing of auditor associations, and then expand their business scope, improve industry expertise, and increase business performance. Based on the above inferences, this study expects that when individual auditors participate in multiple accountant associations and social groups, they can collect regional customer information from them, thereby increasing their market share. This study proposes the following hypothesis:

H1: Individual auditors who participate in more accounting associations and social organizations, will have a larger market share.

In this ever-changing era, high-tech industries are different from traditional industries. The main difference is that high-tech industries are capital-intensive or technology-intensive industries, which are different from traditional industries that are labor-intensive. In addition, the high-tech industry also has the characteristics of a complicated product manufacturing process, short product life cycle, high research and development ratio, high added value of products, and high knowledge intensity. The most important thing for the high-tech industry is technological innovation in order to keep up with the short life cycle of products.

There are also studies that show that auditors with more specialized knowledge about information technology can combine this knowledge with their own audit knowledge to provide higher-quality audit services, and can also increase the on-the-job training of auditors and gain a solid understanding of the industry, and provide a good working environment for auditors to accurately implement the verification procedures. When individual auditors face complex industrial characteristics, such as high-tech industry, they will find it difficult to check. Thus, through the interaction, learning and resource sharing between auditor associations and social groups, they can learn more about the industry. Based on the above inference, this study expects that when individual auditors participate in more CPA associations and social groups, they can quickly accumulate professional knowledge and a network of contacts in the high-tech industry, thereby increasing their market share. Therefore, the second hypothesis proposed in this study is as follows:

H2: Personal auditors in the high-tech industry participate in more accounting associations and social groups, which has a greater positive impact on their business performance.

3. RESEARCH DESIGN

3.1. Research method

In order to verify whether participating in more auditor associations and social groups can improve the business performance of individual auditors, the variable of this study is the market share of the number of customers checked by individual auditors as the proxy variable of business performance, and the independent variable is the individual accountant. The number of auditors participating in social networks serves as a proxy variable for individual auditors' network connectivity. In order to test *H1*, this research uses a simple least squares regression model and controls the year and industry effects. The empirical model is as follows:

$$MARKET_{it} = \beta_0 + \beta_1 ACCENT_{it} + \beta_2 SIZE_{it} + \beta_3 LEV_{it} + \beta_4 LNAGE_{it} + \beta_5 TENURE_{it} + \beta_6 ROA_{it} + \beta_7 LOSS_{it} + \beta_8 MBK_{it} + \beta_9 BDSIZE_{it} + \beta_{10} BIG_{it} + \beta_{11} INDUSTRY_{it} + \beta_{12} YEAR_{it} + \varepsilon_{it} \quad (1)$$

Table 1. Variables description

Variables	*Description*
$MARKET_{it}$	the market share of individual accountant *i*'s number of audited clients in year *t*;
ACCENT_{it}	the number of social networks (auditors associations and social groups) that individual accountant *i* joins in year *t*, which is a continuous variable;
SIZE_{it}	personal accountant *i* checks the client's total assets at the end of the period in year *t* and takes the natural logarithm;
LEV_{it}	personal accountant *i* checks the client debt ratio in year *t*;
$LNAGE_{it}$	personal accountant *i* checks the number of years the client has been established in year *t*;
$TENURE_{it}$	accountant *i*'s tenure as accountant in year *t*, since 1983;
ROA_{it}	personal accountant *i* checks the client's profitability in year *t*, which is net profit before tax divided by total assets;
$LOSS_{it}$	personal accountant *i* checks the client's previous losses in year *t*;
MBK_{it}	personal accountant *i* checks the ratio of the average market value of customers divided by the book value in year *t*;
$BDSIZE_{it}$	personal accountant *i* checks the size of the client's board of directors in year *t*;
BIG_{it}	individual accountant *i* in the Big Four audit firms in year *t*;
$INDUSTRY_{it}$	industry dummy variable;
$YEAR_{it}$	annual dummy variable.

3.2. Variable measure

3.2.1. Measurement of the dependent variable

The market share of the number of customers checked in this empirical model is mainly based on studies such as Casterella et al. (2004). First of all, the number of audited clients is used to calculate the market share of the individual accountant based on the number of audited clients, which is used as a proxy variable for business performance.

3.2.2. Measurement of the independent variables

Due to the implementation of the double-signature system in Taiwan, there are two auditors' signatures in the accountant's audit report, and there are two auditors in charge of checking and reviewing auditors in practice. This variable can observe the relationship and strength between personal auditors and social networks. If the total number of links is more, it means that the accountant is actively participating in the social network, and the relationship with the social network is stronger. Since this study intends to explore the correlation of individual auditors' participation in multiple social network market share, if individual auditors participating in multiple associations and social groups can improve their personal business performance, this study expects the direction of the coefficient to be positive.

3.3. Research period, data sources and sample selection

This study takes the listed *over the counter* (OTC) companies from 2016 to 2019 as the main research object. The data of the sample companies in this study are all obtained from the database of the *Taiwan Economics Journal* (TEJ). Accounting association information is collected manually by auditors who have actually participated in the membership of each accounting association and recorded and checked in detail; the actual participation information of the accounting association is obtained from the internal information of each accounting association in Taiwan, including the name of the accounting firm affiliated to the accounting firm, membership number. The date of joining each branch respectively, so the information of the relevant auditors participating in each accounting association is recorded one by one through the above method. Social organization information is also collected manually by auditors who have actually participated in various social organization membership records.

The samples of this research are listed counter companies in Taiwan, which disclose financial and related audit information in the annual report. The selection period is four years from 2016 to 2019. The sample selection process refers to Panel A of Table 2. This research initially obtained 6,796 original samples. Due to the special nature of the industry and the large difference in accounting treatment from other general companies, 188 samples from the financial, insurance and securities industries were excluded, and the audit information and accounting association-related information required for this research were not available or were incomplete. None of the 443 samples of value sample companies were included in the sample of this study, and finally a total of 6,165 final samples were obtained. Panel B of Table 2 is the distribution of OTC-listed companies in classified industries based on the industries in the *Taiwan Economics Journal* (TEJ) as a whole. Panel C of Table 2 shows the distribution of samples during the four years of research.

Table 2. Sample selection process and industry/annual distribution of sample

Panel A: Sample selection process					
Number of original samples from 2016 to 2019					6,796
Minus: Sample of financial, insurance and securities companies					(188)
Minus: Missing sample of relevant data					(443)
Final sample size					6,165
Panel B: Industry distribution of sample companies					
Industry code	***Industry name***		***Number of samples***		***% of total sample***
11	Cement industry		48		0.78%
12	Food industry		111		1.80%
13	Plastic industry		140		2.27%
14	Textile industry		248		4.02%
15	Electrical machinery		451		7.32%
16	Electrical cable		35		0.57%
17	Chemical science technology medical		589		9.55%
18	Glass ceramics		24		0.39%
19	Paper industry		24		0.39%
20	Iron industry		227		3.68%
21	Rubber industry		50		0.81%
22	Auto industry		57		0.92%
23	Electronics industry		3,140		50.93%
25	Building materials		337		5.47%
26	Shipping		117		1.90%
27	Go sightseeing		133		2.16%
29	Trade department Store		104		1.69%
99	Other		330		5.35%
Total			6,165		100.00%
Panel C: Sample year distribution					
Year	***2016***	***2017***	***2018***	***2019***	Total
Number of samples	1,437	1,507	1,588	1,633	6,165

4. EMPIRICAL RESULTS AND DISCUSSION

This section uses the empirical model designed in the third section of the research design to describe the relevant empirical results and analysis. It is divided into four subsections, the first subsection is descriptive statistics, the second subsection is correlation analysis, the third subsection is regression analysis, and the fourth subsection is sensitivity analysis.

4.1. Descriptive statistics

This paper intends to explore the relevance of individual auditors' social network to their business performance. Table 3 Panel A lists the descriptive statistics of each variable, and there are 6,165 entries in all samples. The variable market share (*MARKET*) in the table has an average of 2.814, a median of 2.020, a minimum of 0.480, and a maximum of 13.640, indicating that the average market share of auditors in the entire sample is 2.814%. The independent variable is the number of

social networks of auditors (*ACCENT*), the average is 2.786, the median is 2.000, the minimum value is 2.000, and the maximum value is 9.000. Article 8 of the Accounting Law requires that you apply for practice registration with the competent authority and at least join the main (or branch) accounting firm. The province (city) where the accountant association is a practicing member can only perform accountant business nationwide. Hence, auditors must join at least one association and Taiwan implements a double-signature system, so the minimum value is at least 2.000.

In terms of control variables, the average company size (*SIZE*) is 15.346, and the median is 15.163; the average debt ratio (*LEV*) is 41.061%, and the median is 41.400%; the average number of years of establishment (*LNAGE*) is 3.299, with a median of 3.367; the average number of tenure years of auditors (*TENURE*) is 11.138, with a median of 10.000; the average of profitability (*ROA*) is 7.810%, and the median is 7.610%. The average value of (*LOSS*) is 0.209, indicating that about 21% of the companies in the entire sample had a loss in the previous period; the average value of the market-to-book value ratio (*MKB*) is 1.875%, and the median is 1.410%; the size of the board of directors (*BDSIZE*) was 7.725, with a median of 7.000; the average of the Big Four audit firms (*BIG*) was 0.883, and the median was 1.000, indicating that 88.3% of the companies in the sample were audited by the Big Four.

Panel B in Table 3 divides the samples into two groups of high-tech industry and non-high-tech industry, and conducts the mean test difference and median test difference respectively to observe whether there are differences in the variables after grouping. In terms of variables, the market share of high-tech industries (*MARKET*) has an average of 2.390 and a median of 1.820, which is smaller than that of non-high-tech industries (*MARKET*), with an average of 3.253, a median of 2.300, and a difference test t-value of 13.912, z-value 11.078, all reaching 1% significant level; in terms of independent variables, the social network number of high-tech industry auditors (*ACCENT*), the average is 2.780, the median is 2.000, which does not exceed the social network number of non-high-tech industry auditors (*ACCENT*), mean 2.791, median 2.000, difference test t-value 0.407, z-value -0.699, all of which did not reach a significant level.

Table 3. Descriptive statistics

Panel A: Whole sample (N = 6,165)					
Variables	***Average***	***Median***	***Standard difference***	***Minimum value***	***Maximum value***
MARKET	2.814	2.020	2.473	0.480	13.640
ACCENT	2.786	2.000	1.043	2.000	9.000
SIZE	15.346	15.163	1.427	12.472	19.821
LEV	41.061	41.400	18.209	5.000	83.140
LNAGE	3.299	3.367	0.531	1.792	4.159
TENURE	11.138	10.000	5.756	3.000	27.000
ROA	7.810	7.610	9.102	-24.190	31.150
LOSS	0.209	0.000	0.4066	0.000	1.000
MKB	1.875	1.410	1.494	0.470	9.300
BDSIZE	7.725	7.000	1.699	6.000	14.000
BIG	0.883	1.000	0.322	0.000	1.000

Panel B: Mean and median test for distinguishing high-tech industries from non-high-tech industries						
Variable	***High-tech industry (N = 3,140)***		***Non-high-tech industries (N = 3,025)***		***Difference test***	
	Average	***Median***	***Average***	***Median***	***Average t- statistics***	***Median z- statistics***
MARKET	2.390	1.820	3.253	2.300	13.912***	11.078***
ACCENT	2.780	2.000	2.791	2.000	0.407	-0.699
SIZE	15.209	15.018	15.488	15.359	7.709***	8.436***
LEV	39.637	39.300	42.539	43.370	6.276***	6.402***
LNAGE	3.195	3.258	3.407	3.555	15.971***	22.172***
TENURE	11.239	11.000	11.033	10.000	-1.399	-1.764*
ROA	8.030	8.010	7.581	7.280	-1.937*	-2.666***
LOSS	0.228	0.000	0.189	0.000	-3.700***	-3.696***
MKB	1.905	1.450	1.844	1.380	-1.599	-2.839***
BDSIZE	7.485	7.000	7.973	7.000	11.396***	9.133***
BIG	0.902	1.000	0.862	1.000	-4.895***	-4.886***

Note: 1. Variable description: MARKET = accountant market share; ACCENT = mumber of social networks of accountants (accountants associations and social groups); SIZE = the total assets at the end of the period take the natural logarithm; LEV = total liabilities at the end of the period divided by total assets at the end of the period; LNAGE = the year of establishment is taken as the natural logarithm; TENURE = accountant tenure years, since 1983; ROA = net income before tax divided by total assets; LOSS = it is 1 if the previous net profit is negative, otherwise, it is 0; MKB = average market capitalization divided by book value; BDSIZE = the size of the company's board of directors; BIG = 1 for Big Four accounting firms, 0 otherwise.

*2. The mean difference between the two groups was tested by t-test; the median difference was measured by Wilcoxon rank-sum test. ***, **, * Respectively represent the significance level of 1%, 5% and 10%.*

4.2. Regression analysis

4.2.1. The influence of individual auditors participating in auditor associations and social groups on personal performance

This study discusses the impact of personal auditors participating in multiple accountant associations and social groups on their business performance. The empirical results are shown in Table 4. It can be found that in terms of model fit, the F-value is 2335.25 and the model fit has reached a significant level. In terms of explanatory power, the adjusted R^2 is 0.4655, so the model has good explanatory power.

In terms of independent variables, the coefficient of market share (*MARKET*) and accountant social network number (*ACCENT*) is 0.075, and the p-value is 0.000, which is positive and reaches a significant level of 1%. When auditors have multiple social networks, they can expand personal relationships and increase different knowledge by participating in different organizations and communicating with different groups, thereby increasing market share. They can also get to know more by participating in associations.

Many auditors from different firms participate in the education and training courses set up by the association, accumulate more contacts and professional knowledge, improve their own audit quality, and have a positive and significant impact on business performance. The above empirical results are consistent with *H1*.

The coefficient of market share (*MARKET*) and market price-to-book value ratio (*MKB*) is 0.098, and the p-value is 0.000, which is positive and reaches a significant level of 1%. It means that the higher the growth of the company, the more high-quality auditors are needed; the market share (*MARKET*). The coefficient of *BDSIZE* and board size (*BDSIZE*) is -0.046, p-value is 0.003, which is negative and reaches a significant level of 1%. The larger the size of the company's board of directors, the less willing it is to hire high-quality auditors; The *BIG* coefficient is 1.184, and the p-value is 0.000, which is positive and reaches a significant level of 1%, indicating that the companies audited by the four major firms have better audit quality.

Therefore, *H2* of this study is unable to prove whether individual auditors in high-tech industries participate in more accounting associations and social groups, whether there is a greater positive impact on their business performance.

Table 4. The influence of auditors in CPA associations and social groups on personal performance

Variables	*Expected direction*	*Coefficient*	*t-statistic*	*p-value*
Intercept		6.095	11.1	0.000***
ACCENT	+	0.075	3.51	0.000***
SIZE	+	0.19	6.76	0.000***
LEV	?	-0.005	-3.73	0.000***
LNAGE	–	-0.145	-3.03	0.002***
TENURE	?	0.022	5.13	0.000***
ROA	+	-0.020	-5.58	0.000***
LOSS	?	0.109	1.68	0.093*
MKB	+	0.098	5.87	0.000***
BDSIZE	?	-0.046	-3.02	0.003***
BIG		1.184	19.97	0.000***
INDUSTRY		omit		
YEAR		omit		
N		6,165		
Adjusted R^2		0.4655		
F-value		2335.25***		

Note: 1. Variable description: MARKET = accountant market share; ACCENT = mumber of social networks of accountants (accountants associations and social groups); SIZE = the total assets at the end of the period take the natural logarithm; LEV = total liabilities at the end of the period divided by total assets at the end of the period; LNAGE = the year of establishment is taken as the natural logarithm; TENURE = accountant tenure years, since 1983; ROA = net income before tax divided by total assets; LOSS = it is 1 if the previous net profit is negative, otherwise, it is 0; MKB = average market capitalization divided by book value; BDSIZE = the size of the company's board of directors; BIG = 1 for Big Four accounting firms, 0 otherwise.
*2. ***, **, * Respectively represent the significance level of 1%, 5% and 10%.*

4.2.2. The impact of individual auditors in high-tech industries participating in multiple accounting associations and social groups on business performance

Table 5 shows the empirical results of individual auditors in the high-tech industry participating in multiple accounting associations and social groups on business performance. From Table 5, it can be found that in the high-tech industry, the number of independent accountant social networks (*ACCENT*) and market share (*MARKET*) coefficient 0.097, p-value 0.001, positive and reached a significant level of 1%. In non-high-tech industries, the coefficient of social network number of auditors (*ACCENT*) and market share (*MARKET*) was 0.046, p-value 0.133, which did not reach a significant level, indicating the number of social networks of auditors in high-tech industries is more significant than that of auditors in non-high-tech industries. When auditors have multiple social networks, they can expand different horizons, discuss and communicate with other experts, and obtain new information from them. In the high-tech industry that is rapidly evolving, reducing audit misjudgments caused by unfamiliarity with the industry, accumulating depth of knowledge, expanding the breadth of contacts, improving its own audit quality, increasing market share, and positive business performance. The above empirical results are in line with the expectations of *H2*.

Table 5. The impact of auditors in high-tech industries participating in CPA associations and social groups on personal performance

Variables	*Expected direction*	*High-tech*			*Non-high-tech*		
		Coefficient	*t-value*	*p-value*	*Coefficient*	*t-value*	*p-value*
Intercept		-2.398	-3.27	0.000***	7.717	12.56	0.000***
ACCENT	+	0.097	3.23	0.001***	0.046	1.5	0.133
SIZE	+	0.245	6.01	0.000***	0.102	2.88	0.004***
LEV	?	-0.005	-2.88	0.004***	-0.005	-2.49	0.013**
LNAGE	–	0.058	0.76	0.446	-0.245	-3.99	0.000***
TENURE	?	0.008	1.19	0.234	0.040	6.52	0.000***
ROA	+	-0.014	-2.84	0.005***	-0.028	-5.43	0.000***
LOSS	?	0.125	1.41	0.159	0.060	0.62	0.535
MKB	+	0.096	4.25***	0.000***	0.102	4.18	0.000***
BDSIZE	?	-0.029	-1.08	0.279	-0.041	-2.22	0.027**
BIG	+	0.988	10.06	0.000***	1.353	17.84	0.000***
INDUSTRY		omit			omit		
YEAR		omit			omit		
N		3,140			3,025		
Adjusted R^2		0.0553			0.6268		
F-value		14.35***			1351.67***		

Note: 1. Variable description: MARKET = accountant market share; ACCENT = mumber of social networks of accountants (accountants associations and social groups); SIZE = the total assets at the end of the period take the natural logarithm; LEV = total liabilities at the end of the period divided by total assets at the end of the period; LNAGE = the year of establishment is taken as the natural logarithm; TENURE = accountant tenure years, since 1983; ROA = net income before tax divided by total assets; LOSS = it is 1 if the previous net profit is negative, otherwise, it is 0; MKB = average market capitalization divided by book value; BDSIZE = the size of the company's board of directors; BIG = 1 for Big Four accounting firms, 0 otherwise.
*2. ***, **, * Respectively represent the significance level of 1%, 5% and 10%; the significance is a two-tailed test.*

4.3. Sensitivity analysis

4.3.1. Division of the number of auditors' social networks into the number of auditor associations and the number of social groups

In this study, individual auditors participate in multiple accountant associations and social groups to explore the impact on their business performance. Since the accountant social network number (*ACCENT*) is the number of auditors participating in accountant associations and the number of auditors participating in social groups, the above *H1* can only find that the number of auditors participating in associations of auditors and the number of auditors participating in social groups have a positive and significant impact on their business performance. In order to further explore the impact of the number of auditors participating in auditors associations and the number of auditors participating in social groups on their business performance, the number of auditors' social networks (*ACCENT*) is divided into the number of auditors and auditors associations (*ACCENT_A*) and the number of auditors' social groups (*ACCENT_S*) for regression analysis.

From the empirical results in Table 6, it is found that the coefficient of the independent variable auditors participating in auditors associations (*ACCENT_A*) and market share (*MARKET*) is 0.082, and the p-value is 0.002, which is positive and reaches a significant level of 1%, while the number of auditors participating in a social group (coefficient 0.065, p-value 0.077), positive and at a significant level of 10%, which means that compared with auditors participating in social groups, auditors participating in auditors associations can improve audit quality and increase their own market share. This study infers that the education and training courses provided also provide a variety of professional knowledge so that auditors can not only learn professional knowledge but also accumulate more contacts when studying courses, so as to improve their own audit quality. Auditors can also participate in social organizations. Group communication can expand personal interpersonal relationships and increase different knowledge, but there is a lack of accounting-related professional knowledge. Therefore, for social groups, auditors participating in the Auditors Association can improve the professional qualities of auditors and increase market share.

Table 6. Division of the number of auditor social networks in CPA associations and social groups

Variables	*Expected direction*	*Coefficient*	*t-statistic*	*p-value*
Intercept		6.079	11.19	0.000***
ACCENT_A	+	0.082	3.10	0.002***
ACCENT_S	+	0.065	1.77	0.077*
SIZE	+	0.190	6.73	0.000***
LEV	?	-0.005	-3.71	0.000***
LNAGE	–	-0.145	-3.02	0.003***
TENURE	?	0.022	5.12	0.000***
ROA	+	-0.020	-5.58	0.000***
LOSS	?	0.109	1.68	0.094*
MKB	+	0.098	5.89	0.000***
BDSIZE	?	-0.046	-3.04	0.002***
BIG	+	1.193	19.70	0.000***
INDUSTRY		omit		
YEAR		omit		
N		6,165		
Adjusted R^2		0.4656		
F-value		2,264.94***		

Note: 1. Variable description: MARKET = accountant market share; ACCENT_A = Accountants Association of Accountants; ACCENT_S = number of social groups of accountants;SIZE = the total assets at the end of the period take the natural logarithm; LEV = total liabilities at the end of the period divided by total assets at the end of the period; LNAGE = the year of establishment is taken as the natural logarithm; TENURE = accountant tenure years, since 1983; ROA = net income before tax divided by total assets; LOSS = it is 1 if the previous net profit is negative, otherwise, it is 0; MKB = average market capitalization divided by book value; BDSIZE = the size of the company's board of directors; BIG = 1 for Big Four accounting firms, 0 otherwise.
*2. ***, **, * Respectively represent the significance level of 1%, 5% and 10%; the significance is a two-tailed test.*

4.3.2. The influence of individual auditors in the high-tech industries participating in accountant associations and social groups on business performance

H2 of this study discusses the impact of high-tech individual auditors participating in multiple accounting associations and social groups on business performance. The above can only find that the number of high-tech individual auditors participating in multiple accounting associations and social groups has a greater impact on business performance than non-auditors in the high-tech industry have a significant impact, and we further explore the impact of the number of auditors participating in auditors' associations and the number of auditors participating in social groups on their business performance and divide the number of auditors' social networks (*ACCENT*) into the number of auditors' associations (*ACCENT_A*) and the number of social groups (*ACCENT_S*) for regression analysis.

Table 7 shows the empirical results. From the results, it can be found that among the auditors in the high-tech industry, the coefficient of the independent variable auditors' participation in auditor associations (*ACCENT_A*) and market share (*MARKET*) is 0.106, and the p-value is 0.005, which is positive and reaches 1% significant level, while the coefficient of the number of auditors participating in social groups (*ACCENT_S*) is 0.086, and the p-value is 0.082, which is positive and reaches a significant level of 10%, indicating that auditors in high-tech industries participate in auditors associations than auditors in high-tech industries participate in social groups. Significantly, it can better cope with the rapid changes in the high-tech industry, accept more new knowledge, improve professional knowledge about high-tech, and increase its own market share. Among auditors in non-high-tech industries, the number of auditor associations (*ACCENT_A*), the number of auditors participating in social groups (*ACCENT_S*) and market share (*MARKET*) showed no significant results.

Taken together, whether it is the number of auditors' associations or the number of social groups, auditors in high-tech industries are more significant than auditors in non-high-tech industries. The activities allow auditors to quickly learn new knowledge and be able to adapt to the rapidly changing high-tech industry. In addition, participating in social groups can also acquire various new knowledge, which can also increase our competitiveness and adapt to the rapidly changing economic environment. Non-high-tech industries are less like high-tech industries because knowledge needs to be updated quickly, so the number of individuals in non-high-tech industries participating in auditors' associations and social organizations is less significant.

Table 7. Division of the CPA social networks into CPA associations and social groups

Variables	*Expected direction*	*High-tech*			*Non-high-tech*		
		Coefficient	*t-value*	*p-value*	*Coefficient*	*t-value*	*p-value*
Intercept		-2.415	-3.80	0.000***	7.688	12.72	0.000***
ACCENT_A	+	0.106	2.81	0.005***	0.057	1.48	0.139
ACCENT_S	+	0.086	1.74	0.082*	0.031	0.55	0.583
SIZE	+	0.245	5.95	0.000***	0.102	2.88	0.004***
LEV	?	-0.005	-2.88	0.004***	-0.005	-2.48	0.013**
LNAGE	–	0.059	0.77	0.443	-0.245	-3.99	0.000***
TENURE	?	0.008	1.19	0.234	0.040	6.51	0.000***
ROA	+	-0.014	-2.83	0.005***	-0.028	-5.44	0.000***
LOSS	?	0.124	1.39	0.164	0.061	0.63	0.528
MKB	+	0.096	4.26	0.000***	0.102	4.18	0.000***
BDSIZE	?	-0.029	-1.10	0.273	-0.041	-2.24	0.025**
BIG	+	0.998	10.29	0.000***	1.367	16.82	0.000***
INDUSTRY		omit			omit		
YEAR		omit			omit		
N		3,140			3,025		
Adjusted R^2		0.0553			0.6268		
F-value		14.60***			1302.32***		

Note: 1. Variable description: MARKET = accountant market share; ACCENT_A = Accountants Association of Accountants; ACCENT_S = number of social groups of accountants;SIZE = the total assets at the end of the period take the natural logarithm; LEV = total liabilities at the end of the period divided by total assets at the end of the period; LNAGE = the year of establishment is taken as the natural logarithm; TENURE = accountant tenure years, since 1983; ROA = net income before tax divided by total assets; LOSS = it is 1 if the previous net profit is negative, otherwise, it is 0; MKB = average market capitalization divided by book value; BDSIZE = the size of the company's board of directors; BIG = 1 for Big Four accounting firms, 0 otherwise.
*2. ***, **, * Respectively represent the significance level of 1%, 5% and 10%; the significance is a two-tailed test.*

5. CONCLUSION

This study examines the impact of an individual accountant's social network on their business performance. The main research objects are OTC companies listed in Taiwan, and the research period is from 2016 to 2019. The empirical results show that individual auditors can increase their market share by participating in multiple accounting associations and social groups. In order to compare high-tech and non-high-tech industries, individual auditors in high-tech industries are distinguished from individual auditors in non-high-tech industries. Social groups can increase market share.

This paper intends to explore the relevance of individual auditors' social network to their business performance. in this study, individual auditors participate in multiple accountant associations and social groups to explore the impact on their business performance. When individual auditors face complex industrial characteristics, such as high-tech industry, they will find it difficult to check. Thus, through the interaction, learning and resource sharing between auditor associations and social groups, they can learn more about the industry.

This study further divides the social network into auditor associations and social groups. The results show that compared with auditors participating in social groups, auditors participating in auditor associations can increase market share; auditors in high-tech industries participate in auditor associations more than auditors in high-tech industries. The results of social groups are more significant, increasing their own market share, while the results of non-high-tech industry auditors participating in auditor associations and social groups are not significant. This study further divides the number of auditors' social networks into the number of chief inspectors' social network and the number of re-examined auditors' social network. It is found that compared with the number of re-examined auditors' social network, the number of chief inspectors' social network has a greater impact on market share in high-tech.

The limitations of this study are as follows. Because the information disclosed on the websites of accountant associations and social organizations is not complete, it is hardly to know the precise number of accountants' social networks. It is also impossible to know the changes in the number of participants every year, and there may be people with the same name and surname, which could lead to bias in the research results.

Additionally, it is suggested that future research can explore individual auditors in the high-tech industry impact on firm performance, or future research can use different indicators to measure individual auditor performance.

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