



**PLANNING MALAYSIA:**  
*Journal of the Malaysian Institute of Planners*  
**VOLUME 22 ISSUE 3 (2024), Page 257 – 272**

## **DEVELOPMENT AND TREND ANALYSIS OF CHINA'S QUANTITY SURVEYING CONSULTING INDUSTRY**

**Dongmei Huangfu<sup>1</sup>, Yun Fah Chang<sup>2\*</sup>, Sok Li Lim<sup>3</sup>**

*<sup>1, 2, 3</sup> Faculty of Business & Law,*

*TAYLOR'S UNIVERSITI, MALAYSIA*

*<sup>1</sup> Faculty of Architectural Engineering Institute,*

*DIANCHI COLLEGE OF YUNNAN UNIVERSITI, CHINA*

### **Abstract**

The Chinese economy has experienced rapid growth since its reform in 1992. In 2010, China surpassed Japan and became the world's second-largest economy with a GDP of RMB 40.12 trillion and a per capita disposable income of RMB 19,109.44. With the promotion of the Belt and Road Initiative, China's infrastructure-related enterprises began to enter the international market in large numbers, directly driving the rapid development of China's construction industry as well as its quantity surveying (QS) consulting industry. Through literature review and the government public reports, the data of QS consulting industry status in China from 2011 to 2021 attained and summarised, including the number of enterprises, business revenue, QS consulting business composition, and the number of registered quantity surveyors. It turned out that the QS consulting industry maintained steady growth. Simultaneously, it also showed significant progress about the business income and number of professional personnel, especially after related policies for advancing the entire process of QS consulting launched. Additionally, with the methodology of time series model with ARIMA, the QS consulting industry development trends for the next five years was forecasted. Finally, in order to further promote the industry's development and deal with the challenges, this study presents three suggestions: pooling resources to improve the level of international business competition, expand business scope and innovating business growth points, strengthen the building of professional and technical personnel.

**Keywords:** China, Consulting Industry, Quantity Surveying, Trend Analysis

<sup>2</sup> Associate Professor at Taylor's University. Email: yunfah.chang@taylors.edu.my

## **INTRODUCTION**

After 30 years of reform and opening up, China has let the world witness the miracle of its all-round rapid economic, technological and social development. In 2010, China achieved the goal of surpassing Japan and becoming the world's second largest economy with the GDP of RMB 40.12 trillion and per capita disposable income of RMB19,109.44 (Wu & Li, 2020). Ten years later, China's GDP and per capita disposable income reached RMB101.60 trillion and RMB32,189, respectively in 2020 (Wu & Li, 2020).

Driven by the Belt and Road Initiative (BRI), China's construction enterprises, especially those related to infrastructure and property, began to enter the international market in large numbers. With the process of internationalization, China's construction industry has ushered in rapid development in the past few years. According to the "13th Five-Year Plan of Construction Industry Development" (2016-2020) released by the Ministry of Housing and Urban-Rural Development and statistics released by China Construction Industry Association, China's overall construction GDP growth hits RMB26.39 trillion in 2020 as compared to RMB19.36 trillion in 2016. As the downstream of the construction industry, the development of quantity surveying (QS) consulting industry also benefits from the value created by the construction industry (Wu & Li, 2020), which in turn has led to the increase in the demand for quantity surveyors. Therefore, China's higher education institutions and QS consulting firms are urgently needed to produce a sufficient pool of domestic quantity surveyors with international capabilities. Then more quantitative research is required, especially to understand the future trend of the QS industry. While, the current studies on China's QS consulting industry are mostly qualitative research lacking the latest statistical data support. According to the "13th Five-Year Plan for Construction Industry Development" released by the Ministry of Housing and Urban-Rural Development, PRC and the Statistical Analysis of "Construction Industry Development" released by CCIA from 2016 to 2021, the total output value of the construction industry completed by qualified general contracting and specialized contracting enterprises increased from 19 trillion RMB to 29 trillion RMB (MOHURD, 2021; CCIA, 2022). The number of construction enterprises increased from 83 thousand to 129 thousand (MOHURD, 2021; CCIA, 2022).

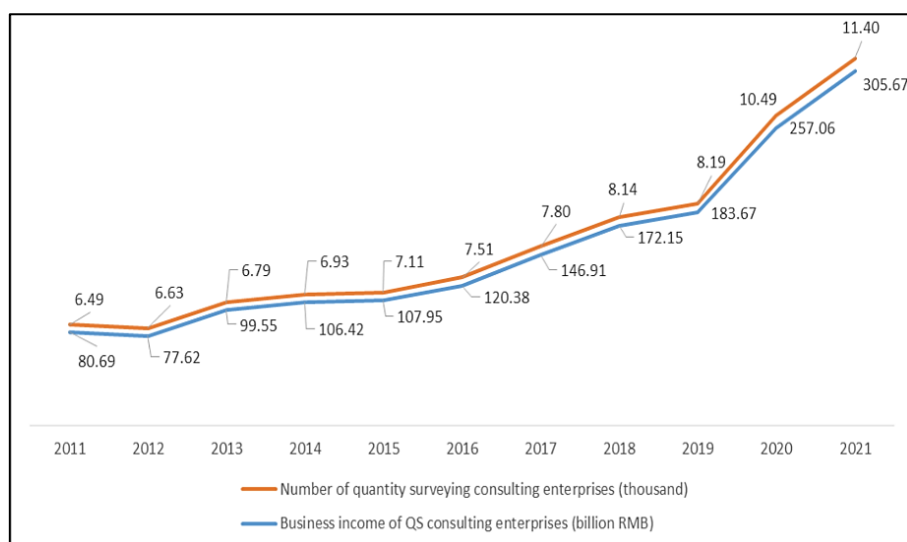
This study aims to understand the current development of China's QS consulting industry through the analysis of data obtained from various sources, and then forecast the development trend of the industry in the next five years. This will provide better insights of the industry and set an important reference for the training of QS talents for the domestic and international markets. Finally, some challenges faced by the China's QS consulting industry will be highlighted before concluding remarks.

## DEVELOPMENT STATUS OF CHINA'S QUANTITY SURVEYING CONSULTING INDUSTRY

Through analyzing the government public reports and literature review, the data of QS consulting industry status in China from 2011 to 2021 was attained and summarized, including the number of enterprises, business revenue, QS consulting business composition, and the number of registered quantity surveyors.

### Number and Business Income of Quantity Surveying Consulting Enterprises

This section mainly combs and analyses the number and business income of QS consulting enterprises. The number of enterprises, during 2011-2021, increased from 6,490 to 11,400 (Figure 1), an increase of nearly 0.62 times. Generally speaking, the growth rate is stable but not large (Liu & Wu, 2020). While in 2019, the growth rate of enterprise numbers declined obviously. Mainly because of the Covid-19 outbreak, it has a great impact on China's economic development, also on the QS consulting industry (Zhang, 2020). However, in 2020, the number of QS consulting enterprises increased significantly. The development of QS consulting enterprises are showing a new vitality (Wu & Li, 2020). For the business income of QS consulting enterprises during 2011 to 2021, rising from 80.69 billion RMB to 305.67 billion RMB (Figure 1), which showed an upward trend, an increase of about 4 times, realizing a long-span development (Si, 2014).



**Figure 1:** Number and business income of quantity surveying consulting enterprises  
Source: (MOHURD, 2012- 2022)

### Quantity Surveying Consulting Business Composition

As Table 1 shows, from the income composition of QS consulting business, during the period from 2011 to 2021, the revenue increased from 30.55 billion RMB to 114.30 billion RMB (Liu & Wu, 2020). Among them, the income amount and proportion of housing construction projects, municipal projects, highway projects, thermal power projects, water conservancy projects and other professional projects also showed different trends.

**Table 1:** Income composition of quantity surveying consulting business (billion RMB)

Year	Total	Income of housing construction project	Proportion	Income of municipal project	Proportion	Income of highway project	Proportion
2011	30.55	17.74	58.08%	3.91	12.80%	1.29	4.21%
2012	35.16	20.75	59.02%	4.57	13.01%	1.50	4.27%
2013	41.97	24.98	59.51%	5.76	13.73%	1.82	4.34%
2014	47.93	28.55	59.57%	6.80	14.20%	2.03	4.23%
2015	51.64	30.21	58.50%	7.74	14.98%	2.24	4.34%
2016	59.57	34.89	58.57%	9.37	15.72%	2.77	4.65%
2017	66.12	37.98	57.44%	11.13	16.83%	3.22	4.87%
2018	77.25	44.96	58.20%	12.82	16.59%	3.80	4.92%
2019	89.25	52.44	58.75%	14.95	16.75%	4.36	4.89%
2020	100.27	59.79	59.62%	17.01	16.97%	5.02	5.01%
2021	114.30	67.75	59.28%	19.79	17.32%	5.61	4.91%
2011	30.55	1.08	3.54%	N/A	N/A	6.53	21.37%
2012	35.16	1.11	3.17%	0.67	1.91%	6.59	18.73%
2013	41.97	1.24	2.95%	0.83	1.97%	7.33	17.48%
2014	47.93	1.17	2.44%	0.97	2.02%	8.41	17.54%
2015	51.64	1.37	2.65%	1.13	2.19%	8.96	17.35%
2016	59.57	1.52	2.54%	1.29	2.17%	9.73	16.34%
2017	66.12	1.48	2.23%	1.50	2.27%	10.82	16.36%
2018	89.25	2.13	2.39%	1.77	2.28%	12.20	15.80%
2019	100.27	2.56	2.56%	2.15	2.40%	13.22	14.82%
2020	114.30	2.62	2.29%	2.46	2.45%	13.43	13.39%
2021	30.55	1.08	3.54%	2.83	2.48%	15.69	13.73%

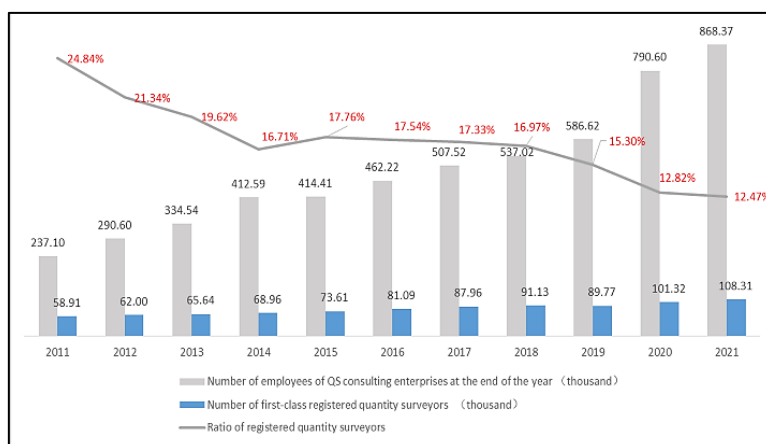
Source: (MOHURD, 2012- 2022)

From 2010 to 2012, the income of housing construction projects and municipal projects accounted for 68.58%, 70.9% and 72.03% of the income of

QS consulting business respectively, and the income of these two majors took an absolute advantage. Highway, thermal power, metallurgy and other professional projects accounted for about 10% of the total (Si, 2014). Although from 2011 to 2021, the income of housing construction project and municipal project showed a slightly increasing trend, while among them, the income of housing construction project basically maintained at about 58%, and the municipal project increased slightly. Moreover, the income proportion of highway project and water conservancy project is on the rise, but the increase is not large. The proportion of municipal project professional income showed an obvious upward trend, while the proportion of thermal power project and other professional income showed an overall downward trend. The municipal projects businesses expanding is mainly subject to the industry threshold and barriers, as well as lack of professional and technical personnel (Si, 2014).

### Employees and Registered Quantity Surveyors

In China, since 1997, the implementation of quantity surveyors qualification system, engaging in the construction of the engineering construction activities, design, construction, QS consulting, project cost management, and other units and departments, must be in valuation, evaluation, review control and management, and other supporting jobs with quantity surveyors qualification of professional and technical personnel (Wu & Li, 2020). Quantity surveyors are senior personnel engaged in QS professional work in China. Their current situation can reflect the general level of QS industry development in China (Liu & Wu, 2020). Therefore, this section mainly analyses the number of employees and first-class registered quantity surveyors of QS consulting enterprises from 2011 to 2021.



**Figure 2:** Number and growth rate of employees and quantity surveyors of quantity surveying consulting enterprises

Source: (MOHURD, 2012- 2022)

From the perspective of QS consulting enterprises' employees, during 2011 to 2021, the number increased from 237.10 thousand to 868.37 thousand. While the number of first-class registered quantity surveyors in QS consulting enterprises increased from 58.91 thousand to 108.31 thousand, with ups and downs in the past 11 years. Except for 2019, the decline was large, while the overall trend was on the rise (Figure. 2). But the proportion of registered quantity surveyors in the workforce fell from 24.8% to 12.47%. This shows that the personnel without professional qualifications in QS consulting enterprises should account for a considerable proportion, and the situation of existing professional and technical personnel is not consistent with the intellectual service characteristics of QS consulting (Si, 2014).

### TIME SERIES TREND PREDICTION

Based on the above statistical data attained from 2011 to 2021 through government public reports and literature review, then a time series model with ARIMA is used to forecast and analyse the development trend of the QS consulting industry in the next five years (2022-2026). Because this article deals with time series data, and most time series data are non-stationary, in order to avoid the problem of spurious regression in the regression equation, it is necessary to conduct a unit root test before further analysis to select stationary variables for regression (Wang, 2005). Therefore, for the collected non-stationary data, it is necessary to first conduct a stationary test and apply a transformation to make it stationary. After that, you can proceed with model identification, order determination, optimization, and finally select an ARIMA model for forecasting.

#### Data stationary test

By examining the time series plot of the original data from Chinese QS consulting companies, it is evident that the data does not exhibit stationary. Therefore, it is necessary to perform differencing.

**Table 2:** Augmented Dickey-Fuller test statistic (ADF) results

Y	Difference order	ADF	Prob.*	t-Statistic		
				1%	5%	10%
Business income	0	3.253	1.000	-4.939	-3.478	-2.844
	1	1.175	0.996	-5.354	-3.646	-2.901
	2	-4.617	0.000***	-4.665	-3.367	-2.803
Number of enterprises	0	1.753	0.998	-4.939	-3.478	-2.844
	1	0.775	0.991	-5.354	-3.646	-2.901
	2	-4.472	0.000***	-5.354	-3.646	-2.901
Number of employees	0	1.251	0.996	-4.473	-3.29	-2.772
	1	-2.51	0.113	-4.473	-3.29	-2.772
	2	-4.322	0.000***	-4.665	-3.367	-2.803

Source: Author

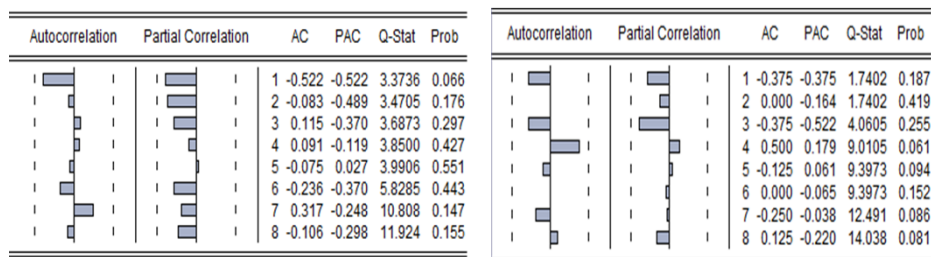
First-order differencing and second-order differencing are applied to the original data to make it stationary. The Augmented Dickey-Fuller (ADF) test is used to determine whether the first-order differenced and second-order differenced series are stationary (Wang, 2005). The results for the business income of QS consulting enterprises, the number of QS consulting enterprises, and the number of employees in QS consulting enterprises are presented in Table 2.

Based on the variables of “Business income of QS consulting enterprises”, “Number of QS consulting enterprises” and “Number of employees in QS consulting enterprises”, the results of this sequence test are as follows. When differencing at order 0 and order 1, the significance level with a p-value does not exhibit significance, and we cannot reject the null hypothesis (Wang, 2005). This indicates that the sequence is non-stationary.

However, when differencing at order 2, all the three variables’ shows significance level with p-value of 0.000\*\*\* which are highly significant, and we can reject the null hypothesis (Wang, 2005). This indicates that the sequence becomes stationary after second-order differencing. From the table, it is evident that after second-order differencing, the p-value is less than 0.05, which leads us to reject the null hypothesis (Wang, 2005; Daniel, 2019). This confirms that the data is now a stationary time series, and  $d=2$  has been determined. With the time series transformed into a stationary form, we can proceed with fitting an ARIMA model, with  $d=2$  as a confirmed parameter for all the three variables.

### ACF and PACF

The next step involves determining the values of  $p$  and  $q$  for the time series. Typically, the determination of  $p$  and  $q$  values for a time series is done using the method of visual inspection, specifically by examining the autocorrelation and partial correlation plots of the second-order differenced data (Wang, 2005; Daniel, 2019), as shown in Figure 3.



(a)

(b)

Autocorrelation	Partial Correlation	AC	PAC	Q-Stat	Prob
		1 -0.475	-0.475	2.7978	0.094
		2 -0.071	-0.384	2.8692	0.238
		3 0.070	-0.241	2.9511	0.399
		4 0.106	0.010	3.1740	0.529
		5 -0.340	-0.378	6.0385	0.302
		6 0.297	-0.109	8.9544	0.176
		7 -0.120	-0.224	9.6638	0.208
		8 0.033	-0.132	9.7689	0.282

(c)

**Figure 3:** ACF and PACF of  $d(Y)$ : (a) Business income of quantity surveying consulting enterprises; (b) Number of quantity surveying consulting enterprises; (c) Number of employees in quantity surveying consulting enterprises

Source: Author

Combining the information from the plots and applying the AIC and BIC criteria, the optimal model is selected by choosing the values of  $p$  and  $q$  that minimize both AIC and BIC coefficients (Wang, 2005; Daniel, 2019). In this case,  $p=0$  and  $q=1$  were found to be the optimal values. Additionally, the model fitted to the second-order differenced data was determined to be the best fit, resulting in the final model being ARIMA (0, 2, 1) for the three variables.

### Model evaluation and testing

Before using the ARIMA (0, 2, 1) model to forecast, it is essential to evaluate the model. Model evaluation assesses the goodness of fit of the model, typically by checking if the residual values of the prediction model follow a distribution that resembles random errors (Wang, 2005; Daniel, 2019). A better fit of the model is indicated when the residual values closely resemble random errors. Conversely, if the residuals show systematic patterns, it suggests that some factors have been overlooked in the model (Wang, 2005). To evaluate the fitted model, you can examine the residuals to see if they behave like white noise. If the model's fit is good, the residual sequence should be a white noise sequence, meaning that the residuals are uncorrelated, and the model has captured the information in the series effectively. On the other hand, if the residual sequence is not white noise, it indicates a poor fit, and the model has not extracted the information adequately (Wang, 2005; Daniel, 2019). In such cases, it may be necessary to redevelop the model. According to the ARIMA model (0, 2, 1) test table (Table 3), based on the three variables of "Business income of QS consulting enterprises", "Number of QS consulting enterprises" and "Number of employees in QS consulting enterprises", the analysis of the Q-statistic results reveals the following: Q6 does not exhibit significance at the significance level, indicating that we cannot reject the hypothesis that the model's residuals are a white noise sequence. Meanwhile,



the three models' goodness of fit  $R^2$  are 0.931, 0.688 and 0.858 respectively, suggesting excellent model performance and all the three models largely meet the requirements (Daniel, 2019).

**Table 3:** ARIMA (0, 2, 1) model test

Item	Symbol	Value		
		Business income of enterprises	Number of enterprises	Number of employees
<b>Df Residuals</b>		7	7	7
<b>Sample size</b>	<b>N</b>	11	11	11
<b>Q statistic</b>	<b>Q6(P value)</b>	0.572(0.449)	0.028(0.868)	0.382(0.536)
<b>Information criterion</b>	<b>AIC</b>	83.213	26.518	103.87
	<b>BIC</b>	83.805	27.11	104.462
<b>R<sup>2</sup></b>	<b>R<sup>2</sup></b>	0.931	0.688	0.858

Note: \*\*\*, \*\* and \* represent the significance level of 1%, 5% and 10%, respectively

Source: Author

**Table 4:** Model parameter

	Coefficient	std.	t	P> t	0.025	0.975
<b>Constant</b>	5.691	1.71	3.329	0.001	2.23	9.042
<b>ma.L1.D2.Business income</b>	-1	0.329	-3.041	0.002	-1.644	-0.355
<b>Constant</b>	0.079	0.073	1.075	0.282	-0.065	0.222
<b>ma.L1.D2.Number of enterprises</b>	-0.997	0.355	-2.809	0.005	-1.692	-0.301
<b>Constant</b>	7.691	5.387	1.428	0.153	-2.868	18.249
<b>ma.L1.D2.Number of employees</b>	-1	0.348	-2.876	0.004	-1.682	-0.318

Note: \*\*\*, \*\* and \* represent the significance level of 1%, 5% and 10%, respectively

Source: Author

In summary, the three ARIMA (0, 2, 1) models that have been established exhibits a high level of goodness of fit. The three models can be utilized to forecast the “Business income of QS consulting enterprises”, “Number of QS consulting enterprises” and “Number of employees in QS consulting enterprises”, for the next 5 years respectively. The three models' formula are as shown in Eq. (1), Eq. (2) and Eq. (3).

$$Y_1(t) = 5.691 + 2Y_1(t - 1) - Y_1(t - 2) + \varepsilon_1(t) - \varepsilon_1(t - 1) \quad (1)$$

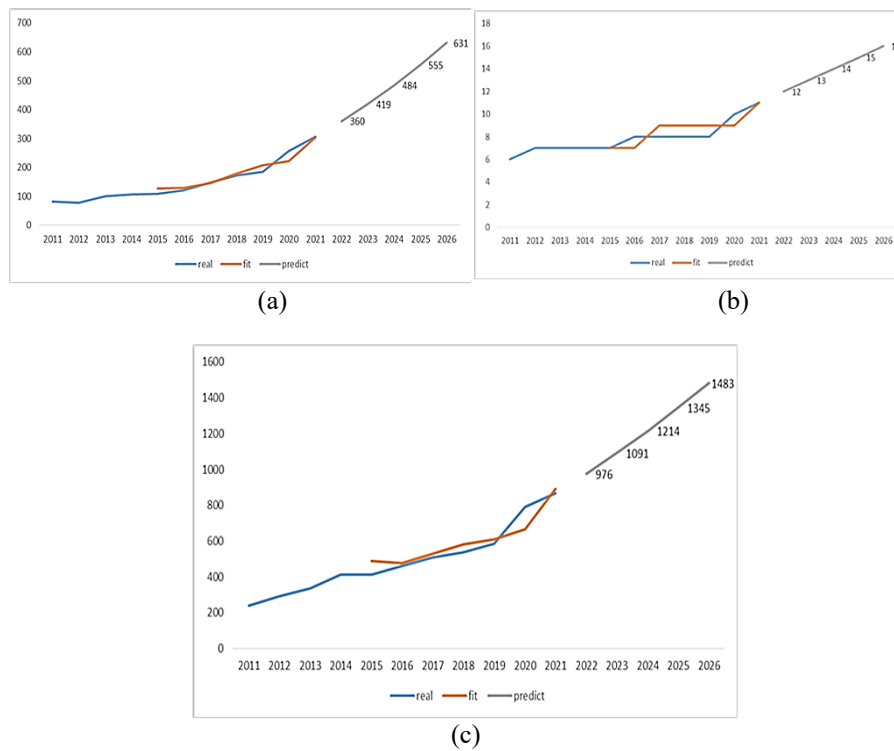
$$Y_2(t) = 0.079 + 2Y_2(t - 1) - Y_2(t - 2) + \varepsilon_2(t) - 0.997\varepsilon_2(t - 1) \quad (2)$$

$$Y_3(t) = 7.691 + 2Y_3(t - 1) - Y_3(t - 2) + \varepsilon_3(t) - \varepsilon_3(t - 1) \quad (3)$$

where  $t = 1, 2, 3, \dots, n$ . and  $\varepsilon$  is the error term.

### Results of model prediction

Using the three previously fitted models, the forecast of the “Business income of QS consulting enterprises”, “Number of QS consulting enterprises” and “Number of employees in QS consulting enterprises” for the next 5 years can be generated. Figure 4 displays the forecasted data for the most recent 5 periods based on the time series model.



**Figure 4:** Forecast for the next 5 years (billion RMB): (a) Business income; (b) Number of enterprises; (c) Number of employees

To sum up, the overall development of QS consulting companies in 2022-2026 shows a steady upward trend, and the detailed forecast data are shown in the Table 5.

**Table 5: Trend prediction**

<b>Year</b>	<b>Business income (billion RMB)</b>	<b>Number of enterprises (thousand)</b>	<b>Number of employees (thousand)</b>
<b>2022</b>	360	12	976
<b>2023</b>	419	13	1,091
<b>2024</b>	484	14	1,214
<b>2025</b>	555	15	1,345
<b>2026</b>	631	16	1,483

*Source: Author*

### **Discussion**

Through analysing the government public reports and literature review, the data of QS consulting industry status in China from 2011 to 2021 was attained and summarized, which showed a steady growth. In the face of complex international and domestic environment and arduous development tasks, the QS consulting industry maintained a steady and rapid growth under the situation of increasing downward economic pressure (Wu et al., 2020). Additionally, as the related policies for advancing the entire process of QS consulting launched and the market requirement, the overall development of QS consulting companies in 2022-2026 shows a steady upward trend, which explained the results of ARIMA model prediction.

Data used in this forecast was based on the official published data for the 10 years from 2011 to 2021, and without using the 2022 annual report data released in September 2023. The main reason is that the statistical survey system used in the report data of 2022 had been adjusted, which was different from previous years (CCIA, 2023), the statistical scope of data had been adjusted, so the data of 2022 is not included in the basic data of this forecast.

### **CHALLENGES**

While the overall development is statistically positive, however, there are also challenges behind the situation.

Firstly, the growth rate slowdown of fixed asset investment will affect the development potential of traditional QS consulting business. This is evidence based on the findings by Zhu et al. (2020) who elaborated that there are problems such as unbalanced development, coexistence of order and disorder, backward information construction and talent bottleneck in China's QS industry development. And as Adesi et al. (2019) stated that the concentration of traditional QS services in the building construction sector was due to the unwillingness of QS professional service firms to diversify into the non-construction sectors. Moreover, the rapid development of information technology, such as big data and artificial intelligence, not only provides powerful tools for the innovation and development of the industry, but also poses

a great threat to the traditional business (Zhang, 2021). Hence, based on this notion, and according to the data shown above, housing construction project was always occupied the main share of the construction industry market, with a steady proportion. However, as the real estate regulation policy continued be tightened in recent years, it has affected the QS consulting business development. While there will be expansion of infrastructure construction, such as municipal project, road project, water conservancy projects and so on, especially the development situation in municipal project which is good during recent years. Therefore, the QS consultation enterprises should conform to its development, on the basis of stable housing business, expand municipal project and other business areas to strive for the sustainable growth of quantity surveying consulting business (Wu, & Li, 2020).

Secondly, the rise of the whole process business and overseas markets opened up new growth opportunities and challenges for the QS consulting industry. This is evidence based on the “Belt and Road Initiative” which unleashed new vitality for the development of the overseas construction industry investment (Liu & Wu, 2020). Hence, based on this notion, the business scope of the QS industry is not only limited to the domestic market, but also should conform to the development of the construction industry, concentrate resources, expand the business out, and gradually go international (Habizah, 2021; Muhamad-Halil et al., 2022). However, there are few large QS consulting enterprise groups with strong overall strength and high business income, and even fewer enterprises with international degree (Si, 2014). Therefore, facing with the challenges, we should promote the formation of overseas enterprise groups and overseas talents training, improve the competitiveness of the overseas industry (Marcel, 2013; Xueqiang et al., 2023).

Thirdly, new challenges to the business ability and professional knowledge level of the QS related talents. This is evidence based on the findings by Ke et al. (2016) who pointed out that China urgently needs to formulate reasonable and effective talent training and development strategies for QS professionals according to the current talent demand of QS consulting enterprises. Hence, based on this notion, for the core competitiveness of QS consulting enterprises is talent. The real high-end talents in QS consulting need to be interdisciplinary talents who are good at technology, economy, law and management at the same time (Zhang, 2021). Therefore, registered quantity surveyors are the core technical talents of QS consulting enterprises (Wu & Li, 2020). However, from the above proportion of registered quantity surveyors to practitioners, the number of registered quantity surveyors is relatively small. Therefore, it will also become one of the factors affecting the core competitiveness of enterprises. Therefore, in the face of the above opportunities and challenges, the demand for QS talents may show a trend of polarization. Those who lack core technical ability and innovative thinking will be eliminated

in the increasingly fierce competition, while those who have strong comprehensive professional ability and innovative thinking ability will win in the competition (Wu & Li, 2020).

## **CONCLUSION AND SUGGESTION**

Through analysing the government public reports and literature review, this study attained and summarized the data of QS consulting industry status in China from 2011 to 2021, including the number of enterprises, business revenue, QS consulting business composition, and the number of registered quantity surveyors. It turned out that the QS consulting industry maintained a steady growth. Additionally, in order to predict the QS consulting industry development trends for the next five years, methodology of time series model with ARIMA was used, which also showed a trend of steady growth. As the related policies for advancing the entire process of QS consulting launched, it also showed significant progress about business income and the number of professional personnel. Finally, based on the industry status and development trend forecast, combined with relevant policy analysis, in order to further promote the industry's development, following suggestions are put forward.

### **Expand Business Scope and Innovate Business Growth Points**

The Central Urban Work Conference clearly proposed to carry out major public facilities and infrastructure projects, strengthen the construction of urban rail transit, sponge cities and urban underground utility tunnels, speed up the renovation of rundown areas and dilapidated houses, and promote the comprehensive renovation and engineering maintenance of old residential communities in an orderly manner. The new innovation point, growth pole and growth belt of QS consulting industry are taking shape (Liu & Wu, 2020). Housing construction engineering has always occupied the main share of the construction industry market, which is also the main source of income for QS consulting enterprises (Zheng, 2020). However, as the continued tightening real estate regulation policy in recent years, as well as the continuous expansion of infrastructure construction, municipal engineering, road engineering, water conservancy projects in areas such as construction quantity present a growth trend, especially in municipal engineering recent years, the development situation is good, the rapid increase of income accounted, QS consultation enterprises should conform to its development, on the basis of stable housing business, expanding municipal engineering and other business areas to strive for the sustainable growth of QS consulting business (Ekundayo, 2020).

### **Pooling Resources to Improve the Level of International Business Competition**

The Ministry of Housing and Urban-Rural Development of the People's Republic of China issued the "13th Five-Year Plan of Quantity Surveying Enterprise Development" points out: during the 13th Five-Year Plan period (2016-2020), China's long-term sound economic fundamentals have not changed, and its development prospects remain bright. New urbanization and the "Belt and Road Initiative" have unleashed new impetus and vitality for the development of fixed asset investment and the construction industry, and the demand for structural and institutional reform and transformation and upgrading of the construction industry is growing (Liu & Wu, 2020). Therefore, the business scope of the QS industry is not only limited to the domestic market, but also should conform to the development of the construction industry, concentrate resources, expand the business out, and gradually go international. Since the management reform of QS industry in 2002, remarkable achievements have been made, and the degree of marketization of QS consultation is relatively high (Habizah, 2021; Muhamad-Halil et al., 2022). However, there are few large QS consulting enterprise groups with strong overall strength and high business income, and even fewer enterprises with international degree. Therefore, we should give full play to the basic role of market allocation of various resources, promote the merger and reorganization of QS consulting enterprises, so as to promote the formation of large enterprise groups, improve the status and competitiveness of the industry (Marcel, 2013; Xueqiang et al., 2023).

### **Strengthen the Team Building of Professional and Technical Personnel**

The development of information technology, such as big data and artificial intelligence, not only provides powerful tools for the innovation and development of the industry, but also puts forward new requirements and challenges to the professional and technical personnel in the QS consulting industry (Ekundayo, 2020). It is urgent to increase the number and improve the quality of professional and technical personnel with registered quantity surveyors as the core. There is a lack of interdisciplinary high-level talents who are familiar with the theory and practice of quantity surveying consulting industry, and certain management experience and innovation consciousness. As for the backbone of intermediate business, there is a lack of technical talents who understand modern engineering technology, with rich professional knowledge and solid skills, and are familiar with modern economic and legal knowledge (Zheng, 2020). Therefore, it is necessary to establish a training and continuing education system to adapt to different levels of personnel, such as carry out national exchanges, in line with international standards, learn from the British Royal Chartered Surveyors, Hong Kong quantity surveyors training system, and gradually establish a high-end talent team (Ekundayo, 2020; Muhammuddin et al., 2023; Wu & Li, 2020).

Data Availability Statement: The data in the statistical bulletin of QS consulting are the data of enterprises that have participated in the statistics, not all the data of the QS consulting industry, which inevitably differs from the actual situation of the market, and may have a certain impact on the data analysis of the paper. However, due to the authority of the statistical system of QS consultation, the data in the statistical bulletin of QS consultation should reflect the overall situation of the development of the industry.

## REFERENCES

- Adesi, M., et al. (2019). Segmentation of quantity surveying professional services for focus strategy and diversification. *Journal of Financial Management of Property and Construction*, 1-12.
- China Construction Industry Association. (2022). *Statistics and analysis of China's construction industry of 2022*. <http://www.zgjzy.org.cn/>
- Daniel, J. D. (2019). SPSS data analysis for univariate, bivariate, and multivariate statistics. *United States of America: Library of Congress Cataloging-in-Publication Data*.
- Ekundayo, D. O. (2020). Quantity surveying education and the benchmarking of future needs (Doctoral dissertation). *University of Salford, United Kingdom of Great Britain and Northern Ireland*.
- Habizah, S. L. (2021). Exploring the quantity surveying services from the employers and graduates perspective. *Malaysian Construction Research Journal*, 246-257.
- Liu, F., & Wu, Z. Q. (2020). Suggestions on the development situation of China's engineering cost consulting industry—research based on statistical data from 2011 to 2018. *Engineering Cost Management*, (05), 50-55.
- Marcel, F. J. M. (2013). Critical success factors, opportunities and threats of the cost management profession: the case of Australasian quantity surveying firms. *International Journal of Project Organisation and Management*.
- Muhamad-Halil, F., Hasim, M. S., Kamaruddin, S. M., Mat, N., & Ismail, H. (2022). Tornado financial development cost analysis for green project in Malaysia. *Planning Malaysia*, 20(20), 143-154.
- Muhammuddin, N. N., Mohd-Danuri, M. S., Hanid, M., Ismail, F., & Mohd, M. N. (2023). A preliminary framework for preventing disputes in different stages of building construction projects. *Planning Malaysia*, 21(29), 267-282.
- Ministry of Housing and Urban-Rural Development, PRC. (2021). *2020 Project cost Consultation Statistical Bulletin*. <https://www.mohurd.gov.cn/>
- Si, C.J. (2014). Analysis and suggestions on the development of the engineering cost consulting industry - based on the statistical bulletin of engineering cost consulting from 2010 to 2012. *Engineering Economy*, 11-15.
- Wang, Y. (2005). Applied time series analysis. Beijing: *China Renmin University Press*.
- Wu, L., & Li, Z. Q. (2020). Research on local market demand and occupational competence of engineering cost professionals. *Modern Finance*, 161-162.
- Xueqiang, W., Abdul, G. M. Z., Yuan, G., Qamaruz, Z. N., & Sarkom, Y. (2023). Research of the spatial distribution of public service facilities in Nanchang old

- city, China based on Point of Interest (POI) data. *Planning Malaysia*, 21(29), 432-446.
- Zhang, D.Y. (2020). Analysis of influencing factors of construction industry resumption of work and production in the context of COVID-19. *Proceedings of the 28th Annual Conference of Beijing Li Society (ii)*. Beijing Dynamic Society, 64-66.
- Zhang, S.P. (2021). Research on the development strategy of engineering cost consulting enterprises under the background of cost reform. *Housing Industry*, (09), 89-92.
- Zheng, W. (2020). Investigation on demand-oriented talent training mode of engineering cost specialty. *Shanxi Architecture*, 197-198.
- Zhu, X.S., Zhang, R.Q., & Li, C.D. (2020). Research on the status of engineering cost talents based on the cost engineer exam data. *Engineering Cost Management*, 29-36.

Received: 22<sup>nd</sup> Mar 2024. Accepted: 8<sup>th</sup> July 2024