

Impact of factors on the quality of accounting information system in civil engineering construction enterprises

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ABSTRACT

This study focuses on identifying the effects of Information Technology, Corporate culture environment, Training and Education, Management Commitment, Top Management Support and Owner Knowledge to quality of accounting information system (AIS). At the same time, it determines the impact of quality of AIS on firm performance in civil engineering construction enterprises in Vietnam. Based on the questionnaires that sent to 710 Directors, Deputy Directors, Chief Accountants, Accountants, Internal Controllers, Internal Auditors of construction civil engineering enterprises, the paper employs Frequencies, Cronbach's Alpha test, Exploratory Factor Analysis (EFA), Affirmative Factor Analysis (CFA) and Structural Equation Model (SEM) for analysis. The results show that the relationships are statistically significant and the hypotheses are accepted.

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1. Introduction

Susanto (2013) explained that quality of AIS is an integrated system of information system (IS) that consists of interrelated elements and subsystems. The quality of AIS helps determine whether a project is a success or a failure. Managers can make the right decision and in accordance with the conditions of the project. Actually, the quality of AIS has not been fully implemented in enterprises. The phenomenon of poor quality in the process of implementing AIS for civil engineering construction enterprises such as: information provided for financial statements submitted slowly, errors in the document circulation process of accounting staff, managers have not closely in managing. Typically, civil engineering construction businesses are civil engineering works that often have their own designs and construction methods, each project is built in different locations with different construction conditions, scattered and be reliable accounting systems. Therefore, it is very difficult to manage, control or the business itself is confused in the audit to ensure and improve the quality of AIS. Civil engineering construction enterprises need an agile and accurate AIS to make appropriate decisions. Although in Vietnam, the system of legal documents and supervision of the State is quite sufficient in accounting such as the Vietnamese Accounting Law (2015), accounting standard system, the accounting regime to guide the implementation of enterprises. However, in the implementation process, including both subjective and objective causes of most enterprises, especially construction civil engineering construction enterprises applying the system of inadequate legal documents and qualifications of staff accounting is limited, financial transparency is transparent. In recent years, firms are facing many challenges, in which competition from businesses in the region and around the world is extremely fierce. Moreover, users inside and outside the enterprise on accounting information require more about processing, collecting and using accounting information. The variability of the directions for improving the quality of AIS has received much attention from both domestic and foreign researchers. Typically, in the early 20th century,

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scandals of famous enterprises such as Enron, WorldCom, Health South, Olympus, Tyco International, etc. caused huge financial losses to investors. Therefore, the issue of the quality of AIS is of top concern in governance activities. In fact, there have been many scientific studies and proofs about the influence of accounting information in making important decisions related to investors, managers within enterprises, creditors, state management agencies, confirming the role and importance of accounting information and enterprise accounting information system. In Vietnam, in the current context of extensive international economic integration, the quality of AIS has been increasingly focused. So, are there any factors affecting the quality of AIS in civil engineering construction enterprises in Vietnam? How much do these factors affect the quality of AIS in these businesses? How does the quality of AIS improve operational efficiency and increase market competitiveness? These are also very important questions for managers in civil engineering construction enterprises. Stemming from the aforementioned issues, the purpose of the study is to identify and measure the factors that affect the quality of AIS and the quality of AIS affecting the performance of civil engineering construction enterprises of Vietnam. On that basis, the study proposes solutions to improve the quality of AIS in civil engineering construction enterprises in Vietnam.

2. Theoretical basis

The term quality can also mean success (Delone & McLean, 2003; Seddon, 1997) or efficiency (Gelinas, 2012) or user satisfaction (Stair & Reynolds, 2010). The quality of AIS proposed by Sacer et al. (2006) is used to demonstrate the integration of many AIS components: hardware, software, human, networks and database quality, job quality, and user satisfaction. In essence, AIS is also an IS and AIS also has the characteristics of an IS. In the context of IS, quality means the compatibility between the required specifications and those used (production) by businesses (Susanto, 2013). The quality of AIS is AIS integrated from all relevant factors, suitable to create useful accounting information, including software, hardware, human, networks and database quality, job quality, and user satisfaction. Susanto (2013) explained that the quality of AIS is an integrated system of IS that consists of interrelated elements and subsystems. The quality of AIS can help determine whether a project succeeds or fails, so that managers can make the right decision and fit the project's conditions. On the other hand, Bagranoff et al. (2010) argue that the quality of AIS is a data collection and data processing that creates the necessary accounting information for users. Thus, from the above statements, it can be said that the quality of AIS has many views, some authors judge it through the effectiveness and efficiency of AIS, evaluate it through AIS's success, evaluate it through satisfying the information needs of system users. The quality of AIS is the system that comes from combining the integrated components in the system. These components must operate effectively and effectively make decisions based on the useful information provided from the system.

3. Research Method and Hypothesis

The research methods used include of qualitative and quantitative methods:

- **Qualitative method:** The study uses mainly inference methods and in-depth expert interviews. The authors synthesize the previous theories, from which, introduces the research model and conducts the actual research according to the model through the survey using questionnaires and statistical tools. Based on the inheritance of theories and research works, the authors conduct the survey design, interviews directly with experts who are enterprise managers, chief accountants of enterprises ... there are many experiences. Experienced accountants, those who are knowledgeable about AIS and provide support in arranging each relevant research concept. The authors synthesize and analyzes into the theoretical framework of enterprise AIS quality. At the same time, the authors compare the quality of AIS in civil engineering construction enterprises in Vietnam based on the information processing process by specific methods such as investigation, interview, observation. Then, identifying the factors affecting the quality of AIS, building and perfecting the quality of AIS scale, the scale of the quality of AIS, the scale of performance.

Table 1
Summary of factors affecting the quality of AIS

No.	Factor	Source	Agreements	%
1	Information Technology	Ismail & Malcom (2007), Ivana & Ana (2013)	10/15	86,67%
2	Management Commitment	Ismail & Malcom (2007), Rapina (2014)	9/15	60%
3	Organizational culture environment	Rapina (2014), Nusa (2015)	9/15	60%
4	Organizational structure	Rapina (2014), Nusa (2015)	5/15	33,33%
5	User Involvement	Meiryani (2014), Omran (2017)	5/15	33,33%
6	Top Management Support	Meiryani (2014)	10/15	66,67%
7	Accounting Software	Ojua (2016)	4/15	26,67%
8	Internal control system	Binh, Nguyen (2016)	5/15	33,33%
9	Training and education	Mona và Anik (2017)	11/15	73,33%
12	Continuous improvement	Omran (2017)	2/15	13,33%
13	Manager's knowledge	Huyen & Bao (2017)	8/15	60%
14	Risk Management	Omran (2017)	3/15	20%
15	Firm size	Ismail & Malcom (2007)	7/15	46,67%
16	External Expertise	Ismail & Malcom (2007)	3/15	20%
17	External Expertise	Ismail & Malcom (2007)	3/15	20%

Source: Authors' data.

After discussion and consultation with 15 experts (Table 1), the results of discussion on the model of researching factors affecting the quality of AIS in civil engineering construction enterprises in Vietnam. The authors use data collected from the research sample to test factors that have the support level of experts over 50% in his research, research hypotheses and aggregated measurement criteria. as follows:

3.1 Factors that affect the quality of AIS

Firstly, Information Technology (IT): Studies show the influence of factors including hardware and software systems on the effectiveness of AIS (Ismail & Rosliza, 2009). Moreover, IT application enhances the company's competitive advantage, makes it easy for users to use and improves user satisfaction (Ivana & Ana, 2013). As such, IT plays a very important role with AIS, it has a great influence on the efficiency of accounting work, and the quality of AIS provided. Therefore, the authors proposed hypothesis H1 as follows:

H₁: Information technology has a positive impact on the quality of AIS.

Secondly, Corporate culture environment: Based on the studies of Schein (2010), Armstrong (2005), Robbins and Judge (2009), research by Rapina (2014) defines Corporate culture environment as a series of codes and common value systems to control the interaction between members of an organization and between its members and those outside the Corporate culture environment is a system of common beliefs and values built into the organization and guides the behavior of its members. Therefore, the authors propose the hypothesis H2 as follows:

H₂: Corporate culture environment has a positive impact on the quality of AIS.

Third, Training and Education: Nah et al. (2003) suggest that adequate training and education can also support employees who have a positive belief in the system being used and more importantly it can help users increase system usability. Therefore, well-trained and education human resources will improve the quality of AIS to achieve the organization's objectives. Many other researchers also agree that training and education affect the quality of AIS such as Holmes and Nicholls (1988), Respati et al (2013), Ane & Anggraini (2012). Therefore, hypothesis H3 is proposed as follows:

H₃: Training and education has a positive impact on the quality of AIS.

Fourth, Management Commitment: Research of Nurhayati (2014) shows that Management Commitment is correlated with the quality of AIS. The same conclusion was made by Rapina (2014) when studying the impact of factors on the quality of AIS of enterprises in Indonesia, Management Commitment is one of the factors that affect the AIS of these businesses (the remaining two factors are organizational culture and organizational structure). Ruhul (2016) argues that Management Commitment includes goal setting and communication, the division of tasks and responsibilities, direction and motivation, evaluation and adjustment. Therefore, the authors propose the hypothesis H4 as follows:

H₄: Management Commitment has a positive impact on the quality of AIS.

Fifth, Top Management Support: Research by Mona and Anik (2017) suggests that Top Management Support is the involvement of senior management in planning and controlling AIS. The scale of this factor includes: (1) Top management is good at using computer; Top management has high expectation on the use of the information system; (3) Top management is actively involved in planning the information system operation; (4) The top management gives serious attention towards the quality of information system; (5) Top management is highly satisfied with user rating of information system from the user departments. At the same time, in the qualitative research of Meiryani (2014) has demonstrated the influence of senior management has improved the quality of AIS and positively impacted the quality of accounting information. Therefore, the authors propose the hypothesis H5 as follows:

H₅: Top Management Support has a positive impact on the quality of AIS.

Sixth, Manager's knowledge: Researchers point out that manager's knowledge plays an important role in the successful implementation of AIS in enterprises. Thong (1999) shows that one of the important factors affecting the application of AIS is management knowledge. Ismail & Malcolm (2007) also believe that owner / manager knowledge about accounting and finance affects the implementation of AIS in enterprises. Therefore, the authors propose the hypothesis H6 as follows:

H₆: Manager's knowledge has a positive impact on the quality of AIS.

3.2 The quality of the accounting information system affects the performance of enterprises

There are many views of researchers pointing out the relationship between AIS and the performance of enterprises. The performance of an organization can be determined in two ways: objective or subjective. The measurement objective is based on financial data (such as financial results). However, subjective measures are based on managers' assessments related to their perceptions of the impact of information technology. According to Miller (1987), subjective measurement is better than objective measurement because the published accounting information may have been processed by the owner for various reasons, so the accounting information generally unavailable and low reliability. Therefore, the hypothesis H7 is proposed by the authors as follows:

H₇: Quality of the accounting information system has a positive impact on performance of enterprises.

- **Quantitative method:** The study carried out a survey to collect opinions on the impact of factors on AIS quality in civil engineering construction enterprises in Vietnam, through the questionnaire of those who are doing accounting work at enterprises. Combining from the scale obtained in the qualitative research phase, the authors developed a questionnaire, conducted data collection, preliminary analysis to assess the scale, adjust the scale and adjust the research model before conducting formal research. The authors analyzed the data using SPSS22-AMOS software to test the factors as well as the value and reliability of the scale of factors affecting AIS quality in civil engineering construction enterprises in Vietnam.

3.3 Sample size: The studies of SEM model, there is a lot of debate around whether to maximize the sample size or at least 200 to 300 observations to increase the certainty of the results. In the model of research, the authors intend to use as many questions as possible, so many samples (Bollen, 1989). Therefore, in this study the minimum sample size would be: $44 \times 5 = 220$ samples. To ensure that the number of observations is enough for regression analysis and represents the whole, according to calculations from the 2019 statistical yearbook, the authors sent 710 questionnaires to civil engineering construction enterprises (50% overall) details by field of construction. According to Table 2, the respondents are the chief accountants accounting for the highest proportion, the accountants, managers like the Director, the other subjects are internal control and internal audit; Respondents who have main working experience from 10 to 15 years account for 57.21%; 15 years of working experience accounts for 9.46%; working experience from 5 to less than 10 years accounts for 29.28%; The remaining is less than 5 years' experience. This is consistent with the fact that this study investigates medium and large-sized enterprises, of which medium size accounts for 66.22%, large-scale accounts for 33.78% and is mainly owned by joint stock companies. Official research sample has 222 enterprises participating in the survey.

Table 2
Descriptive statistics results

Variable	Content	Number of businesses	Percent (%)
Feedback objects	Managers	35	15.77
	Chief accountants	126	56.76
	Accountants	54	24.32
	Others	7	3.15
Working experiences	Less than 5 years	9	4.05
	From 5 - 10 years	65	29.28
	From 10-15 years	127	57.21
	Over 15 years	21	9.46
Type of ownership of the businesses	Co., Ltd	80	36.04
	Joint stock companies	138	62.16
	Private enterprises	3	1.35
	Other	1	0.45
Firm size (number of employees)	100- under 200	147	66.22
	> 200	75	33.78
Total revenue of the year (VND)	50-under 200 billion	147	66.22
	> 200 billion	75	33.78

Source: Authors' data.

4. Research results

The results of the reliability test of the scale of factors show that, Cronbach's Alpha coefficient reaches the maximum value of 0.925 belongs to the Training Education factor; the lowest Cronbach's Alpha coefficient is 0.870, which belongs to the OC factor. All Cronbach's Alpha coefficients of the factors are relatively high from 0.7 upwards. The correlation coefficient of the total variables is greater than 0.3, showing that the variables are closely correlated, ensuring all variables (39 variables of 8 factor groups) meet the requirements of Structural Equation Model SEM analysis (Table 3).

Table 3
Cronbach's Alpha analysis results

Factor	Cronbach's alpha	Variables	Factor	Cronbach's alpha	Variables
Q_AIS	0.907	7	MC	0.913	6
IT	0.884	5	TMS	0.918	4
OC	0.870	4	MK	0.923	4
TE	0.925	5	FP	0.882	4

Source: SPSS22 Analysis Results

The results of the first EFA discovery factor analysis for variables show that the KMO value = 0.884 satisfies the condition $0.5 < 0.884 < 1$. Bartlett's test result has p-value = 0.000 < 0.05 showing the variables. The numbers are interrelated and the EFA analysis is consistent with the sample data (Table 4).

Table 4
EFA analysis results (KMO and Bartlett's Test)

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.884
Bartlett's Test of Sphericity	Approx. Chi-Square	6182.799
	df	703
	Sig.	.000

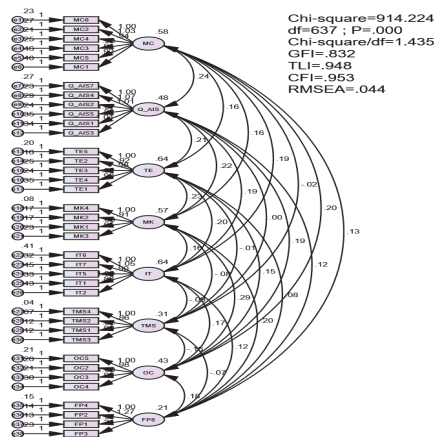
The results showed that 8 factors were extracted with total deduction variance (TVE) explained by 8 factors greater than 50% (Table 5).

Table 5
Pattern Matrix^a

	Factor							
	1	2	3	4	5	6	7	8
MC2	.894							
MC4	.834							
MC6	.821							
MC3	.811							
MC5	.731							
MC1	.683							
Q_AIS4		.888						
Q_AIS7		.825						
Q_AIS5		.807						
Q_AIS2		.791						
Q_AIS3		.727						
Q_AIS1		.643						
TE5			.888					
TE2			.887					
TE3			.838					
TE4			.832					
TE1			.772					
TMS4				.939				
TMS1				.839				
TMS3				.821				
TMS2				.816				
IT7					.853			
IT6					.822			
IT1					.777			
IT5					.764			
IT2					.653			
MK4						.917		
MK2						.903		
MK1						.821		
MK3						.806		
FP4							.883	
FP2							.852	
FP1							.780	
FP3							.627	
OC5								.926
OC2								.817
OC3								.671
OC4								.593

Source: SPSS22 Analysis Results

The scale components are assessed further through the critical model, this model has 632 degrees of freedom and this model is suitable for market data (Chi-Square / df = 1,435 <2; CFI = 0.953 > 0.9; TLI = 0.948 and RMSEA = 0.044 <0.08) (Steiger, 1990) (Fig. 1).



Source: AMOS22 Analysis Results

Fig. 1. Critical CFA model

Table 6 and Table 7 show that the scale of the latent variables achieved a discriminant value since the correlation coefficients between the underlying variables were less than 0.9. The reliability coefficient of the aggregate scale of the underlying variables is greater than 0.6 and the total variance extracted is greater than 50%, so it is satisfactory.

Table 6
Differential value analysis

Factor	OC	MC	Q_AIS	TE	MK	IT	TMS	FP
OC	0.793							
MC	0.407	0.803						
Q_AIS	0.416	0.465	0.789					
TE	0.291	0.264	0.379	0.846				
MK	0.578	0.289	0.427	0.374	0.869			
IT	0.315	0.315	0.340	0.307	0.263	0.778		
TMS	-0.428	-0.057	-0.001	-0.022	-0.196	-0.192	0.862	
FP	0.589	0.370	0.369	0.217	0.579	0.327	-0.253	0.812

Source: AMOS Analysis Results

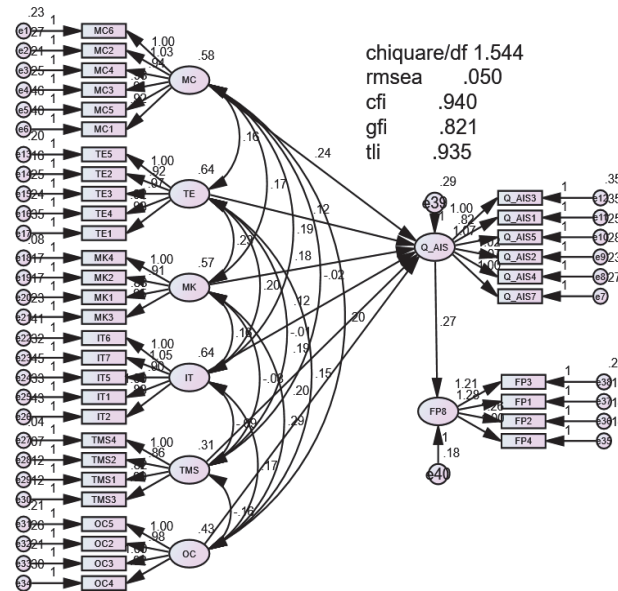
Table 7
Composite reliability and Variance extracted

	CR	AVE
OC	0.872	0.629
MC	0.915	0.644
Q_AIS	0.908	0.623
TE	0.926	0.716
MK	0.925	0.755
IT	0.885	0.606
TMS	0.920	0.742
FP	0.885	0.659

Source: AMOS Analysis Results

5. Model test results and research hypotheses

The research model aims to determine the scale load factors of each potential variable. Each potential variable is not directly observed, it is measured based on the number of scales (observed variables) obtained from the survey or other sources. Eight hidden variables were built according to the proposed model, including: The quality of AIS, Information Technology, Corporate culture environment, Training and Education, Management Commitment, Organizational Culture and Owner Knowledge, Firm Performance.



Source: AMOS22 Analysis Results

Fig. 2. SEM model theoretical analysis results

Fig. 2 shows a linear structure model of SEM showing that the indicators are suitable for market data (Chi-square / df = 1,544; CFI = 0.940, RMSEA = 0.05). SEM linear structure model analysis also gives the following test results:

Table 8
Model test results

			Average estimated coefficient	S.E	C.R	P
Q_AIS	←	MC	.241	.065	3.690	***
Q_AIS	←	TE	.124	.059	2.113	.035
Q_AIS	←	MK	.180	.073	2.474	.013
Q_AIS	←	IT	.119	.060	1.991	.046
Q_AIS	←	TMS	.192	.086	2.228	.026
Q_AIS	←	OC	.203	.100	2.044	.041
FP8	←	Q_AIS	.269	.051	5.291	***

(P *** = p < 0.05)

Source: AMOS22 Analysis Results

Table 8 shows that the relationships are statistically significant. Among the relationships, the impact of the quality of AIS on the strongest firm performance (0.269); The impact of information technology on the quality of AIS is weakest (0.119). The estimation results show that the relationships are statistically significant (Table 9).

Table 9
Test Results of research hypotheses

Hypothesis	Content	Conclusion
H1	Information technology has a positive impact on the quality of AIS.	Accepted
H2	Corporate culture environment has a positive impact on the quality of AIS.	Accepted
H3	Training and Education has a positive impact on the quality of AIS.	Accepted
H4	Management Commitment has a positive impact on the quality of AIS.	Accepted
H5	Top Management Support has a positive impact on the quality of AIS.	Accepted
H6	Owner Knowledge has a positive impact on the quality of AIS.	Accepted
H7	Quality of the accounting information system has a positive impact on performance of enterprises	Accepted

Source: Authors' data.

5. Conclusion

Based on the theory and previous studies related to the topic, the authors built a scale and proposed a research model with 6 main factors including: (1) Information technology; (2) Corporate culture environment; (3) Training and Education; (4) Management Commitment; (5) Top Management Support; (6) Owner Knowledge. Next, the authors using qualitative research methods combined with quantitative research methods to collect opinions of individuals in the construction of civil engineering works in Vietnam. At the same time, the authors analyzed the data collected on SPSS22 and AMOS software to conclude that the relationships are statistically significant and the hypotheses are accepted. These results show a positive association between the factors Information technology, Corporate culture environment; Training and Education; Management Commitment; Top Management Support; Owner Knowledge influences the quality of AIS and the quality of AIS has a positive impact on the firm performance. Thus, the results show that the proposed hypotheses in the theoretical research framework are confirmed.

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