Identifying factors influencing on the cash flow of construction companies: Evidence from Vietnam stock exchange

Thi Tu Oanh Le[a], Thi Thanh Thuy Vu[b] and Van Cong Nguyen[c*]

[a]Accounting Department, University of Labour and Social Affairs (ULSA), Vietnam
[b]Accounting Department, University of Labour and Social Affairs (ULSA), Vietnam
[c]School of Accounting and Auditing, The National Economics University, Vietnam

C H R O N I C L E	A B S T R A C T
	Good management of cash flow will help managers control cost estimates, control plan implementation as well as control additional costs, ensuring project success. Therefore, identifying the factors influencing the cash flow of enterprises helps create synchronous solutions to improve the efficiency of cash flow management, contributing for improving the operational efficiency of the enterprises. This study is based on a survey to determine the factors influencing the cash flow through the questionnaires and interviews of 105 construction companies listed on the Vietnam Stock Exchange in 2018. The study conducts descriptive statistics analysis of surveyed enterprises; check the Exploratory Factor Analysis (EFA) analysis conditions to determine the groups of influencing factors on cash flow in construction companies listed on the Vietnam Stock Exchange. At the same time, this study remains to check a sample T-test with a value set to 3.0 and 5% reliability and analysis of EFA discovery factors to select components with the highest coefficients and load components. Based on the EFA analysis results, the study finds six main groups of factors affecting the cash flow of construction companies. They are: macro environment; construction period; payables and receivables; construction cost; retention; loan payment and tax. The study also shows that the effect of variables to cash flow management varied with a mean value from 0.17 to 0.518. Based on the research results, the authors provide some recommendations to strengthen cash flow management in construction companies listed on the Vietnam Stock Exchange.

1. Introduction

Construction enterprises play an important role in the economy, reflecting the sustainable development of the economy and participating in most other economic sectors. Construction enterprises face many risks due to the large value of goods. If the inventory is high, slow debt recovery will affect liquidity, thereby slowing down the ongoing activities of the enterprises. Many previous studies have shown that poor liquidity is a fundamental factor affecting the breakdown of contracts and leading to the bankruptcy of construction businesses (El-Kholy, 2014). Cash flow management is one of the governance contents dominating the survival of a business. Cash flow management is an important activity to create the liquidity of a business to monitor, to analyze and to maximize the net value earned when taking the earned money minus the amount to be spent. In order to manage cash flow effectively, it is necessary to understand the factors affecting cash flow. The research on cash flow and cash flow index has been more

focused since the beginning of 1966 in the world. Cash flow is considered as an important predictor of the enterprises' financial situation. Cash flow not only plays an essential role in credit rating but also helps business forecasting the risk of bankruptcy. The collapse of Lehman Brothers was an alarm bell to businesses for ineffective cash flow management. The cash-flow problem can influence productivity and affect the quality of the product (Gundecha, 2018).

In Vietnam, the management of cash flow in enterprises has not really been properly concerned. Since the characteristics of the construction industry are associated with large-scale products, complex structures; long construction time; companies must spend a large amount of initial capital. Finding out the factors affecting cash flow is really necessary to help businesses improve liquidity and manage cash flow effectively. This study is carried out to identify factors influencing on the cash flow of Vietnamese construction companies to find appropriate solutions to strengthen cash flow management, ensure solvency and security of financial security and contribute to improve business efficiency. The study is experimental research on identifying and analyzing the factors impact on the cash flow in Vietnamese listed construction companies. The study also recognizes the factors affecting businesses' cash flow by regression analysis. Factors are divided into groups of factors that influence cash flow by analyzing the correlation between them.

To conduct this study, the authors conducted a sample and surveyed 105 construction companies listed on the Vietnam Stock Exchange in 2018. The survey results received 102 valid responses, accounting for 97.14% in the total issued questionnaire. We believe our sampling fully meets the comprehensive and complete aspects of the research sample to ensure that research results are reliable when they are analyzed and verified. The selection of our research sample is based on the following criteria:

First, enterprise size: Selected construction enterprises include large and medium-sized enterprises, excluding small and micro-small enterprises. This stems from the characteristics of construction business that requires a large amount of capital, long production time, slow payback period so small and micro-small businesses often do not meet the requirements. Second, type of enterprise: The research samples collected are public companies, including companies that have made public offerings; The company has shares listed on HOSE, HNX, and Upcom. These are companies that make extensive capital mobilization from the public through issuing securities (stocks, bonds) listed at securities trading centers or unlisted securities but traded through securities brokerage institutions.

Finally, business field: Enterprises operating in the construction industry are divided into three groups: Building houses of all kinds, construction of civil engineering works and specialized construction. Within each industry group, there are different types of industries. For example: Construction of civil engineering works includes: Construction of railway and road works (construction of railway works, construction of road works), construction of public works (construction electrical works, construction of water supply and drainage works, construction of telecommunications, communication, construction of other public works), construction of other civil engineering works (construction of waterworks, construction of mining projects, construction of processing, manufacturing and construction of other civil engineering works) (Prime Minister, 2018). This shows the specific nature of the construction industry, the complexity, and diversity of construction business activities affecting cash flow and cash flow management. The main objective of this study is to point out the characteristics of the construction industry that affect the cash flow in construction companies in order to (i) identify the factors affecting the cash flow of construction businesses, and (ii) determine the impact of each factor on the cash flow of construction companies listed on the Vietnamese stock exchange. To achieve the goal, the authors surveyed to answer key questions: Factors affecting the cash flow of construction companies and how to examine the effect of factors on cash flow in construction companies.

2. Literature review

Financial management has drawn interest to many scholars, including personal financial management and the organization's financial management. There have been a number of studies mentioning various factors affecting cash flow, including: The organization of enterprise (Ivan, 2017); Financial risk, including loan repayments, supplier debt repayments, taxes payable (Jiang et al., 2011); Retention, including retention rate, refund time and minimum retention (Bausman, 2004; Park et al., 2005); Delayed payment, including time, payment conditions and advances (Ramachandra & James, 2011); Complaint: Complaint has a negative impact on the cost and time of the project, the late handoffs will be high to compensate for the damage that affects the project cost due to delays (Ling & Liu, 2005); Completion according to schedule: Completion according to schedule helps the parties predict the cash flow because the payment date is calculated according to each stage of project completion (Garner, 2012); Measure the difference (redundant and missing): The amount of excess and lack of measurement is determined as the second most influential factor affecting the contractor's cash flow (Buertey & Adjei-Kumi, 2012); The management of cash flow under the operational management system: It is affected by environmental factors and controlling subjects (Bento & Bento, 2006); The macroeconomic factors, including information technology, politics, and law, tax policy, inflation, interest rate (Jack, 2018). The cost of raw materials accounts for a large proportion of the total cash outflows of enterprises (Dosumu; 2015); Delaying payables (30-45 days) also substantially affects the cash flow of businesses (Arditi & Chotibhongs, 2005); The factors affecting the management of cash flow of construction enterprises include: (i) Receivables (Payment term; Conditions of payment; Advance); (ii) Amounts of retention (Rate and return time); (iii) Financial status; (iv) Payables (Repayment of loans; Repayment of materials; Employee salaries payment); (v) Bank interest rates; (vi) Volume measurement (over/under) (Issa and & Zayed, 2007); The assessment of the factors affecting the cash flow of construction projects consists of 6 groups: financial management, subcontractors, suppliers, before construction, during construction; communication skills and other factors (Tarek & Yaqiong, 2014). The drawback of most of these studies is only the introduction of factors that influence content-based cash flow management such as accounts receivable management, accounts payable management and dark cash levels. Optimizing, forecasting cash flow, establishing relationships with financial institutions to deal with surpluses or lack of budgets without building the optimal budget model as well as determining factors affecting cash flow are among other factors influencing cash flow. On the other hand, these studies only consider and evaluate the factors affecting cash flow by each individual factor or group of factors, while construction enterprises' cash flow is dominated by a series of factors at the same time. Moreover, in Vietnam, there is hardly any specific study devoted on the impact of factors on cash flow in the construction industry. Therefore, this study will initially solve some of the limitations in previous studies and show the relationship between factors with cash flow from which to recommend effective management solutions money flow. From the review of the above studies, in this study, we focused on determining the impact of the six major groups of factors on cash flow; in which, we also consider the impact of each component. This includes Financial risk (payment for suppliers, delayed payment for suppliers, selling price adjustment, claims, loan payment, withholding tax, bank loan Interest rate) and Retention (retained rate, time of releasing retention, the limit of retention), etc.

3. Research Methods

To achieve the research objectives and answer research questions, we use some quantitative research method with the help of SPSS 22 specialized software. Through descriptive statistics, we conduct a summary of the data, describing the companies surveyed in the form of data tables. Next, we examine the conditions for EFA analysis and test One sample T-test. Finally, we conduct the EFA discovery factor analysis. Thus, we have an overview of the influencing factors and the relationship between the factors affecting the cash flow in Vietnamese construction companies. Research data is collected by a design questionnaire on google form and sent via email and Facebook to Vietnamese construction enterprises. The questionnaire is divided into 3 main parts: (i) Information about businesses; (ii) Factors affecting

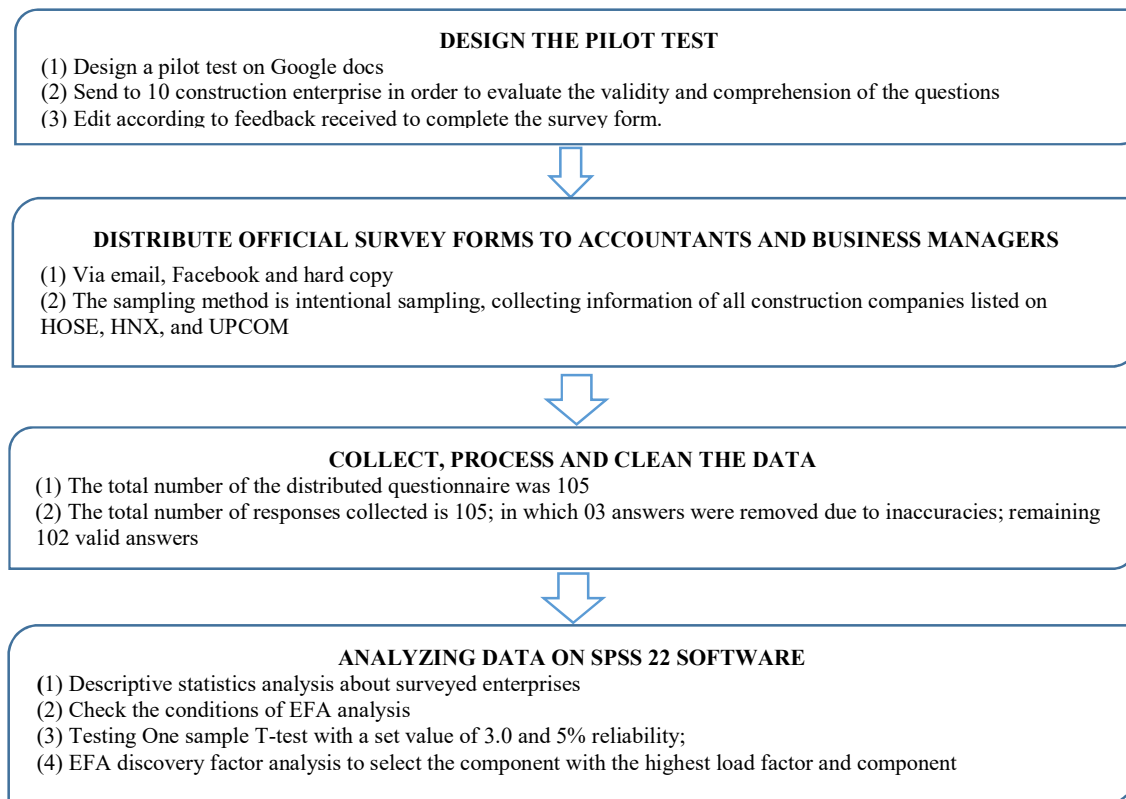cash flow and (iii) Information of respondents. The research process can be summarized in Fig. 1 as follows,

DESIGN THE PILOT TEST
(1) Design a pilot test on Google docs
(2) Send to 10 construction enterprise in order to evaluate the validity and comprehension of the questions
(3) Edit according to feedback received to complete the survey form.

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DISTRIBUTE OFFICIAL SURVEY FORMS TO ACCOUNTANTS AND BUSINESS MANAGERS
(1) Via email, Facebook and hard copy
(2) The sampling method is intentional sampling, collecting information of all construction companies listed on HOSE, HNX, and UPCOM

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COLLECT, PROCESS AND CLEAN THE DATA
(1) The total number of the distributed questionnaire was 105
(2) The total number of responses collected is 105; in which 03 answers were removed due to inaccuracies; remaining 102 valid answers

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ANALYZING DATA ON SPSS 22 SOFTWARE
(1) Descriptive statistics analysis about surveyed enterprises
(2) Check the conditions of EFA analysis
(3) Testing One sample T-test with a set value of 3.0 and 5% reliability;
(4) EFA discovery factor analysis to select the component with the highest load factor and component

Fig. 1: Conceptual framework

Source: authors' results

From the research overview, we propose a model of groups of factors influencing cash flow in Vietnamese listed construction enterprises. The scale details are shown in Table 1.

Table 1
Detailed description of the scale

Factors	Cod	Variables
1. Financial risk	F11	Payment for suppliers
	F12	Delayed payment for suppliers
	F13	Selling price adjustment
	F14	Claims
	F15	Loan payment
	F16	Withholding tax
	F17	Bank loan Interest rate
2. Retention	F21	Retained rate
	F22	Time of releasing retention
	F23	Limit of retention
3. Receivables	F31	Payment duration
	F32	Terms of payment
	F33	Advance payment
4. Construction cost	F41	Cost of materials
	F42	Wages of labor and staff
	F43	Plan and equipment costs
5. During construction	F51	Under work measurement
	F52	Over work measurement
	F53	Work execution errors
6. Macro environment	F61	Lending interest rates of state banks
	F62	Inflation
	F63	Tax policies
	F64	Political instability
	F65	Technological advances
	F66	Global financial crisis

Source: Compiled by the authors based on research results

4. Results and Discussions

The results of the descriptive statistics analysis of surveyed enterprises are given in Table 2 as follows.

Table 2
Profile of the companies

Characteristics		No. = 102	Percent (%)
Revenue	< 200 billion VND	43	42.2
	200 – 1,000 billion VND	30	29.4
	> 1.000 billion VND	29	28.4
Number of employees	< 200 people	71	69.6
	200 – 1000 people	20	19.6
	> 1000 people	11	10.8
Years in construction field	< 10 years	30	29.4
	10 - 20 years	60	58.8
	> 20 years	12	11.8
Listing status	Unlisted	36	35.3
	Listed	64	64.7

Source: Compiled by the authors based on research results

Profile of companies are shown in Table 2. In terms of revenue, out of 102 surveyed enterprises, 43 enterprises with the previous year's revenue reached 200 billion VND at the highest rate, 42.2%. The businesses achieved revenue from 200 to 1,000 billion VND and over 1,000 billion VND are equivalent. In terms of the number of employees, enterprises with under 200 people account for 69.6%, followed by enterprises with 200 to 1,000 people (at the rate of 19.6%), the rest are enterprises with more than 1,000 people. Thus, according to the classification criteria of the Vietnamese Government, enterprises satisfy the conditions of small and medium enterprises are 42%. In terms of years in the construction sector, the majority of businesses have a number of years from 10 to 20 years (58.8%), followed by enterprises with less than 10 years (29.4%), the rest are enterprises of over 20 years. According to the listing status, listed companies account for a high proportion (64.7%) prepared to unlisted companies.

Table 3
One-Sample Statistics

	Cod	Variables	N	Mean	Std. Deviation	Std. Error Mean
1	F31	Payment duration	102	4.15	.894	.089
2	F32	Terms of payment	102	3.98	.901	.089
3	F33	Advance payment	102	3.99	.838	.083
4	F21	Retained rate	102	3.52	.841	.083
5	F22	Time of releasing retention	102	3.38	.833	.082
6	F23	Limit of retention	102	3.09	.822	.081
7	F15	Loan payment	102	4.01	.764	.076
8	F16	Withholding tax	102	3.58	.826	.082
9	F11	Payment for suppliers	102	3.81	.962	.095
10	F12	Delayed payment for suppliers	102	3.46	.886	.088
11	F52	Over work measurement	102	3.18	.813	.081
12	F51	Under work measurement	102	3.14	.912	.090
13	F41	Cost of materials	102	3.7	.818	.081
14	F42	Wages of labor and staff	102	3.99	.751	.074
15	F43	Plan and equipment costs	102	3.5	.793	.079
16	F17	Bank Interest rate	102	3.52	1.041	.103
17	F13	Selling price adjustment	102	3.39	.760	.075
18	F53	Work execution errors	102	3.22	.863	.085
19	F14	Claims	102	3.01	.939	.093
20	F66	Global financial crisis	102	3.6	.859	.085
21	F61	Lending interest rates of state	102	3.72	.905	.090
22	F62	Inflation	102	3.63	.807	.080
23	F63	Tax policies	102	3.73	.810	.080
24	F64	Political instability	102	3.25	.864	.086
25	F65	Technological advances	102	3.55	.779	.077

Source: Compiled by the authors based on research results

The factors in the model are considered to have a positive relationship with cash flow management in construction enterprises. We have used factor analysis method (EFA) to assess the convergence level of

factors affecting the management of cash flow in construction enterprises. The results show that, with a sample size of 102, sample scale and observed variables are 102: 23, this ratio is greater than 3: 1 and KMO coefficient = 0.624> 0.5 (Table 5), the study has enough observable variables to constitute a factor. Sig. = 0 <0.05 indicates that the Bartlett test is statistically significant and the observed variables are correlated. Thus, data are considered suitable for conducting factor analysis. Table 3 and Table 4 present the results of one-sample t-test with the aim of comparing the average score of variables. The test means the value was 3.0 with a 95% confidence level and the respective critical value (t) were generated using SPSS 22. In Table 3, the average of all scales is greater than 3.0. The hypothesis H_0 is that variables with an average value of 3.0 are rejected while the hypothesis H_1 states that variables with a mean of 3.0 are acceptable. Observation from the mean value in Table 3 shows that most of the variables reached the mean at the consent level (the mean ranged from 3.41 to 4.2). However, 8 variables have lower average values (mean between 3.01 and 3.38), which are F22, F23, F51, F52, F53, F13, F14, F64. From Table 4, with the level of freedom of choice of 101 observations, the level of test significance of 3 variables> 0.05 (F23, F51, F14) should not reject the hypothesis H_0 (mean = 3). Based on the results in Table 3, the mean of these variables has the lowest value (from 3.01 to 3.14), meaning that the comments on these variables can reach the average level. The remaining variables are worth Sig. (2 –tailed) <0.05 so the hypothesis H_1 is approved (all variables have a mean level greater than 3, all scales are at the average level and agree).

Table 4
One-Sample Test

	Cod	Variables	Test Value = 3					
			t	df	Sig. (2-tailed)	Mean Difference	95% Confidence Interval of the Difference	
							Lower	Upper
1	F31	Payment duration	12.953	101	.000	1.147	.97	1.32
2	F32	Terms of payment	10.992	101	.000	.980	.80	1.16
3	F33	Advance payment	11.928	101	.000	.990	.83	1.15
4	F21	Retained rate	6.239	101	.000	.520	.35	.68
5	F22	Time of releasing retention	4.636	101	.000	.382	.22	.55
6	F23	Limit of retention	1.084	101	.281	.088	-.07	.25
7	F15	Loan payment	13.345	101	.000	1.010	.86	1.16
8	F16	Withholding tax	7.074	101	.000	.578	.42	.74
9	F11	Payment for suppliers	8.543	101	.000	.814	.62	1.00
10	F12	Delayed payment for suppli-	5.251	101	.000	.461	.29	.63
11	F52	Over work measurement	2.191	101	.031	.176	.02	.34
12	F51	Under work measurement	1.519	101	.132	.137	-.04	.32
13	F41	Cost of materials	8.594	101	.000	.696	.54	.86
14		Wages of labor and staff	13.313	101	.000	.990	.84	1.14
15	F43	Plan and equipment costs	6.369	101	.000	.500	.34	.66
16	F17	Bank Interest rate	5.041	101	.000	.520	.32	.72
17	F13	Selling price adjustment	5.212	101	.000	.392	.24	.54
18	F34	Work execution errors	2.524	101	.013	.216	.05	.39
19	F14	Claims	.105	101	.916	.010	-.17	.19
20	F66	Global financial crisis	7.032	101	.000	.598	.43	.77
21	F61	Lending interest rates of state	7.985	101	.000	.716	.54	.89
22	F62	Inflation	7.848	101	.000	.627	.47	.79
23	F63	Tax policies	9.043	101	.000	.725	.57	.88
24	F64	Political instability	2.980	101	.004	.255	.09	.42
25	F65	Technological advances	7.120	101	.000	.549	.40	.70

Source: Compiled by the authors based on research results

Table 5
KMO and Bartlett's Test

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		0.624
Bartlett's Test of Sphericity	Approx. Chi-Square	1833.298
	df	231
	Sig.	0.000

Source: Compiled by the authors based on research results

Table 5 shows that the coefficient KMO = 0.624> 0.5 and Sig = 0 <0.05 indicates that the variables have a linear relationship with each other and factor analysis is consistent with survey data.

Table 6
Total Variance Explained

	Initial Eigenvalues			Extraction Sums of Squared Loadings			Rotation Sums of Squared Loadings	
Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
7.915	35.978	35.978	7.915	35.978	35.978	3.461	15.730	15.730
2.439	11.088	47.066	2.439	11.088	47.066	3.396	15.437	31.167
2.265	10.295	57.360	2.265	10.295	57.360	3.372	15.328	46.495
1.723	7.832	65.192	1.723	7.832	65.192	2.645	12.024	58.519
1.470	6.683	71.875	1.470	6.683	71.875	2.415	10.979	69.499
1.245	5.661	77.536	1.245	5.661	77.536	1.768	8.037	**77.536**
.797	3.622	81.158						
.716	3.253	84.411						
.558	2.537	86.948						
.512	2.325	89.273						
.427	1.941	91.214						
.419	1.905	93.119						
.296	1.346	94.465						
.260	1.181	95.646						
.236	1.074	96.720						
.172	.780	97.500						
.157	.714	98.214						
.127	.578	98.793						
.097	.439	99.232						
.093	.422	99.654						
.054	.247	99.902						
.022	.098	100.000						

Extraction Method: Principal Component Analysis.

Source: Compiled by the authors based on research results

As can be seen from Table 6, there are 6 groups of factors with Initial Eigenvalues > 1 affecting the cash flow management of Vietnamese listed construction enterprises. The total variance extracted is 77,536%, showing that the factors can explain 77,536% for the influence on the management of cash flow of listed construction companies.

Table 7
Rotated Component Matrix[a]

Cod	Variables	Component					
		1	2	3	4	5	6
F61	Lending interest rates of state banks	.871					
F63	Tax policies	.822					
F66	Global financial crisis	.690					
F62	Inflation	.661					
F64	Political instability	.549	**.620**				
F65	Technological advances		.805				
F52	Over work measurement		.759				
F53	Work execution errors		.740				
F13	Selling price adjustment		.657				
F31	Payment duration			.776			
F11	Payment for suppliers			.758			
F32	Terms of payment			.752			
F33	Advance payment			.724			
F12	Delayed payment for suppliers			.661			
F43	Plan and equipment costs				.842		
F41	Cost of materials				.809		
F42	Wages of labor and staff				.704		
F21	Retained rate					.857	
F22	Time of releasing retention					.894	
F15	Loan payment						.817
F16	Withholding tax						.674

Extraction Method: Principal Component Analysis.
Rotation Method: Varimax with Kaiser Normalization.
a. Rotation converged in 6 iterations.

Source: Compiled by the authors based on research results

Table 7 shows that 6 groups of factors are formed with the change of scale compared with the original plan. Specifically:

Group 1: Consisting of 4 observed variables: F61, F63, F66, F62, to keep the same group of Macro environment as originally expected.

Group 2: Includes 5 observed variables: 2 variables from Macro environment group (F64, F65), turn F13 from "Financial risk" group and 2 initial variables of "During construction" group (F52, F53). Therefore, these variables are grouped "During construction".

Group 3: Consisting of 5 variables, grouped by 3 variables F31, F32, F33 of "Receivables" group and 2 variables of "Financial risk" group F11, F12. This group is renamed "Payables and Receivables".

Group 4: The "Construction cost" group consists of 3 unchanged variables.

Group 5: The "Retention" group has 2 original variables. Limit of retention is eliminated due to low factor loading factor (less than 0.5).

Group 6: Includes two variables of the group "Financial risk" is "Payment" and "Withholding tax". The new group is named "Payment of principal and tax".

Table 8

Component Score Coefficient Matrix

Cod	Variables	Component					
		1	2	3	4	5	6
F61	Lending interest rates of state banks	.337	-.096	-.130	-.075	.032	.190
F63	Tax policies	.287	.015	-.087	-.062	-.020	.026
F62	Inflation	.214	-.035	-.048	.084	-.032	-.045
F66	Global financial crisis	.202	.036	.075	-.042	.036	-.328
F65	Technological advances	.022	.337	-.050	-.146	-.054	-.106
F52	Over work measurement	-.112	.250	.010	.037	.000	.004
F53	Work execution errors	-.023	.246	-.076	-.039	.049	.076
F13	Selling price adjustment	-.013	.198	.015	-.018	.111	-.090
F64	Political instability	.123	.170	.007	-.050	-.126	.021
F31	Payment duration	.013	-.121	.316	-.068	-.128	.069
F32	Terms of payment	-.142	.036	.299	-.058	.054	-.081
F11	Payment for suppliers	-.080	.080	.271	-.037	-.088	.005
F33	Advance payment	-.031	-.004	.271	-.121	.198	-.223
F12	Delayed payment for suppliers	-.023	-.036	.209	.109	-.187	.103
F43	Plan and equipment costs	-.143	.027	-.105	.412	-.012	-.001
F41	Cost of materials	.006	-.081	-.016	.381	-.012	-.106
F42	Wages of labor and staff	.123	-.134	-.070	.338	-.031	-.023
F22	Time of releasing retention	-.027	.050	-.117	-.043	.446	-.071
F21	Retained rate	-.013	-.045	-.015	-.028	.390	-.018
F16	Withholding tax	-.066	.120	-.073	-.018	-.015	.399
F15	Loan payment	.027	-.059	.027	-.100	-.050	.518

Extraction Method: Principal Component Analysis.
Rotation Method: Varimax with Kaiser Normalization.
Component Scores.

Source: Compiled by the authors based on research results

Table 8, variables with the highest factor loading and component score coefficient from the rotated component matrix and component score matrix were selected significantly.

In the group of factor 1, "Macro environment", observed variables F61 "Lending interest rates of state banks" has the strongest impact (0.337) followed by "Tax policies" (0.287). Variable "Global financial crisis" has the weakest impact (0.202).

In the group of factor 2 "During construction" and "Technological advances" have the strongest impacts (0.337). The variable with the least impact is "Political instability" (0.170).

In the group of factor 3 "Payables and Receivables", had quite similar effects, of which, the highest impact is "Payment duration" and the lowest is "Delayed payment for suppliers".

Group of "Construction cost" has variables with high impact levels, "Plan and equipment costs" has the greatest impact, followed by "Cost of materials".

The "Retention" group also has a high weight, "Time of releasing retention" is higher than "Retained rate".

The group of "Principal loan and tax payment" has the highest weighting factor, "Loan Payment" is higher than "Withholding tax".

5. Conclusions and recommendations

The construction companies listed on the stock exchange of Vietnam largely are formed through the process of equitization of state-owned enterprises, so the management in general, as well as the effective control and use of cash flow, are not flexible and responsive to the decision of the administrator. It is necessary to identify the factors affecting cash flow management for construction companies listed on the Vietnam stock exchange. Research results have pointed out 6 groups of factors affecting the cash flow of listed construction companies on Vietnam's stock exchange, namely: Macro environment; During construction; Payables and Receivables; Construction cost; Retention; Loan payment and tax. In addition, the research has also determined the weight of each variable in each factor to the cash flow of construction companies listed on the Vietnam stock exchange. The determination of 6 groups of factors influencing cash flow management will be a useful information channel for managers of construction companies listed on the Vietnamese stock exchange in making decisions. In addition, the weighting effects of each element in the factor will be suggestions for administrators in choosing the priority for each of these factors. This result can also be applied more widely for Vietnamese construction enterprises.

References

Arditi, D., & Chotibhongs, R. (2005). Issues in subcontracting practice. *Journal of Construction Engineering and Management*, *131*(8), 866-876.

Bausman, D. C. (2004). Retain age practice in the construction industry, foundation of the American subcontractors' association. *Contractors' Knowledge Quest Research Series*, 1-28.

Bento, A., & Bento, R. (2006). Factors affecting the outcomes of performance management systems. *AMCIS 2006 Proceedings*, 7.

Buertey, J. I., & Adjei-Kumi, T. (2012). Cash flow forecasting in the construction industry: The case of Ghana, Pentvars. *Business Journal,*, 65-81.

Dosumu, B. (2015). *Material management on construction sites (a case study of cement management in ibadan, oyo state)*. Retrieved from https://www.researchgate.net/publica

El-Kholy, A. M. (2014). A Multi-Objective Fuzzy Linear Programming Model for Cashflow Management. *International Journal of Engineering Research and Applications (IJERA)*, *4*(8), 152-163.

Garner, J. (2012). *Cash flow Forecasting: RICS Guidance Note, 1st Edition (GN 79/2011)*. Royal Institution of Chartered Surveyors (RICS).

Gundecha, M. M. (2018, 7 15). *Study of factors affecting labor productivity at building construction project in the USA: Web Survey, Unpublished*. Retrieved from http://library.ndsu.edu/tools/dspace/load/?file=/repository/bitstream/handle/10365/22772/Gundech a_Mahesh.pdf?sequen

Issa, A., & Zayed. (2007). *Cash flow analysis of construction projects*. Retrieved from https://www.researchgate.net/figure/Comparing-the-newly-developed-model-with-Al-Issa-and-Zayed-2007-main-categories_fig1_266289526

Ivan, K. (2017). *Cash Flow Management. Case: RE Trading LLC*. Thesis of Saimaa University of Applied Sciences.

Jack, O. A. (2018). *Environmental Factors Affecting Business*. Retrieved from https://www.academia.edu/15768537/Environmental_Factors_Affecting_Business

Jiang, A., Issa, R. R., & Malek, M. (2011). Construction project cash flow planning using the Pareto optimality efficiency network model. *Journal of Civil Engineering and Management*, *17*(4), 510-519.

Ling, F. Y. Y., & Liu, M. (2005). Factors considered by successful and profitable contractors in mark-up size decision in Singapore. *Building and environment*, *40*(11), 1557-1565.

Park, H. K., Han, S. H., & Russell, J. S. (2005). Cash flow forecasting model for general contractors using moving weights of cost categories. *Journal of Management in Engineering*, *21*(4), 164-172.

264

Prime Minister. (2018, 7 6). *Decision on the management of vietnam's economic sector system, No. 27/2018 / QD-TTg*.

Ramachandra, T., & Rotimi, J. O. B. (2015). Causes of payment problems in the New Zealand construction industry. *Construction Economics and Building*, *15*(1), 43-55.

Tarek, Z., & Yaqiong, L. (2014). *Cash flow modeling for construction projects, ISSN: 0969-9988*.