

Full Length Research Paper

Project schedule influenced by financial issues: Evidence in construction industry

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Financial issues in construction projects lead to serious consequences that may retard the development of a project and influence the overall economical condition of a country. This paper addresses the issues of financial-related delays in construction projects. Aiming to determine the major causes of financial-related problems leading to construction delay and to identify possible solutions in mitigating financial-related construction delays, data was collected through a questionnaire survey and a follow-up interview survey. Responses were obtained from a combination of clients, contractors, consultants and bankers in the questionnaire survey. Contractors' unstable financial background, client's poor financial and business management, difficulties in getting loan from financiers, and inflation were identified as the most significant causes. Findings indicate clients play the most important role in reducing the impact of financial problems towards project delay. Recommendations in mitigating financial-related delays are provided accordingly.

Key words: Construction delay, financial-related delay, construction industry, project monitoring, civil engineering.

INTRODUCTION

Delay is one of the most serious problems in the construction industry and is also an important issue to the completion of a project. According to Shen et al. (2001), majority of the building projects usually cannot be accomplished within the stipulated contract period. The problem of project delays is a worldwide phenomenon. In Australia, only one-eighth of building contracts were accomplished within the schedule completion dates and the average time overrun exceeded 40% (Bromilow, 1974). Hence, the construction industry in Malaysia, a fast developing country in South-East Asia is not an exception. In 2005, approximately 17.3% of 417 government contract projects in Malaysia were considered sick with more than three months delays or abandoned (Sambasivan and Yau, 2007). The construction industry is one of the important industries

that contribute to Malaysia's economic growth. The total contribution by the construction industry to the nation's Gross Domestic Product (GDP) is significant, accounting for nearly 3.3% of GDP in the year 2005 with about 600,000 workers (MALBEX, 2005). This contribution expanded to 4.6% in year 2007, which is the highest growth since year 1999. The construction industry poses a great challenge as it is essential in generating wealth, improving the quality of life of the citizen through the provision of social and economic infrastructures and it links the whole spectrum of the economy with a multiplier effect that enables other industries to prosper alongside (Construction Industry Working Group on Payment, 2007).

The construction industry is regarded as one of the most risky, dynamic and challenging business which suffered a temporary crisis between year 1997 and 2000 during the ASEAN economy crisis, but had improved gradually since then. However, delays still occur in projects as the industry is famed for poor risk management with many projects failing to meet deadlines and cost targets. This research aimed to determine the

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major causes of financial-related problems leading to construction delay in Malaysian, to analyze the differences in the attitudes and perceptions of the four major industry parties (clients, contractors, consultants, and bankers) towards the financial-related delays, and to identify possible solutions in mitigating those kinds of construction delays.

Construction delay intertwined with financial issues

Delay is common in construction projects and its extent varies considerably from project to project. Some projects are only a few days behind schedule; some are delayed by over a year (Ahmed et al., 2003). In construction, delay could be defined as time overruns either beyond the completion date stipulated in contract or beyond the agreed date for delivery of a project between the parties (Assaf and Al-Hejji, 2006). Aibinu and Jagbora (2002) describe delay as a circumstance when the contractor and the project owner jointly or severally contribute to the non-completion of the project within the original or the stipulated or agreed contract period. Bramble and Callahan (1987) define delay as the time during which some part of the construction project has been extended or not performed due to an unanticipated circumstance. Hence, delay is a situation where the work is being slowed down without stopping it entirely.

Delays in construction projects lead to serious consequences that may retard the development of the construction industry and influence the overall economical condition of a country (Arditi et al., 1985). According to Shen (1997), delay in the completion of construction projects could be the greatest cause for extra cost and loss in financial return or other benefits from project. Thus, delay is costly for both owner and contractor. To the owner, a delay means loss of potential revenue; while to the contractor, a delay means increased costs in overhead. Numerous studies (Al-Khalil and Al-Ghafly, 1999; Assaf and Al-Hejji, 2006; Chan and Kumaraswamy, 1998; Mansfield et al., 1994) were conducted to identify the common causes of delays in local construction projects with an intention to lessen the extent of delays and its impact. Most of the survey results (Al-Khalil and Al-Ghafly, 1999; Frimpong and Oluwoye, 2003) show that financial problem is one of the main causes of delays. While the problem of delays looms large in the local construction industry, no attempt has been made to identify the root causes of financial-related problems. According to Ahmed et al. (2003), the possible financial-related factors that lead to delays in Malaysian construction projects are financial problems of client such as delayed payments, financial difficulties and economic problems; financial and cash flow problems of contractor; and external factor of poor economic conditions, such as currency and inflation rate. Beside, difficulties in getting loans (Arditi et al., 1985) and short of funding are adverse

financial-related factors that were identified in previous works. The authors collected nineteen (19) possible causes of financial-related project delay from studies conducted by Ahmed et al. (2003) and Arditi et al. (1985), and grouped them into Table 1. Description on each type of financial-related causes is provided as follows.

Payment failures

Late payment is defined as failure of a paymaster to pay within the period of honoring of certificates as provided in the contract (Harris and McCaffer, 2003). The parties involved in the process of payment claim such as client, contractor, superintending officer, architect, quantity surveyor, banker and other construction players may cause a payment to be delayed. A delayed payment by a party who is involved in the process of payment claim may have an influence on the supply chain of payment in whole. According to the Construction Industry Working Group on Payment (2007), problems in payment at the higher end of the hierarchy will lead to a serious knock-on cash flow problem down the chain of contracts. The identified causes of late payment include: 1) client's poor financial and business management, 2) withhold of payment by client, 3) contractor's invalid claim, 4) delay in valuation and certification of interim payment by consultant, 5) inaccuracy of valuation for work done, 6) insufficient documentation and information for valuation, 7) involvement of too many parties in the process of honoring certificates, and 8) heavy work loads of consultant to do evaluation for work done.

Cash flow issues

The most important aspect of cash flow management is to avoid extended cash shortages which are caused by having too great a gap between cash inflows and outflows. Cash flow management is defined as a process of monitoring, analyzing and adjusting projects' cash flow. As in the case of Dawneys Ltd and FG Minter Ltd, Lord Denning famously said that cash flow is the life-blood of the construction industry and (Construction Industry Working Group on Payment, 2007) ease of cash flow is an essential element in delivering a successful project. Thus, a well managed cash flow is important to enable the delivery of a successful project by performing a cash flow analysis on a regular basis to identify cash flow problems. In analyzing the cash flow of a project, cash flow forecasting is an essential method to head off cash flow problems. Following next is to develop and employ strategies that will maintain an adequate cash flow for the project. Therefore, a well managed cash flow will improve the project's cash flow and subsequently improve the timely performance of a project. Conversely, a poorly managed cash flow represents the opposite. The causes to poor cash flow management can be categorized into: 1)

Table 1. Financial issues.

Category	Sub-categories
Payment issues	Client's poor financial and business management Withhold of payment by client Contractor's invalid claim Delay in valuation and certification of interim payment by consultant Inaccuracy of valuation for work done Insufficient documentation and information for valuation Involvement of too many parties in the process of honoring certificates Heavy work load of consultant to do evaluation for variation order
Cash flow issues	Contractor handles too many projects at the same time Contractor's instable financial background Unqualified contractor underbidding the project cost Lack of regularly cash flow forecasting Poor credit arrangement with creditors and debtors Capital lock-up
Financial resource issues	Difficulties in getting loan from financiers Allocation of government budget not in place
Market issues	Increment of interest rate in repayment of loan Inflation (material prices, labor wages, transportation costs) Increment of foreign exchange rate (imported materials and plants)

contractor handles too many projects at the same time, 2) contractor's instable financial background, 3) unqualified contractor underbidding the project cost, 4) lack of regularly cash flow forecasting, 5) poor credit arrangement with creditors and debtors and 6) capital lock-up.

Financial resource issues

According to Kaming et al. (1997), one of the most important factors causing delays of high-rise projects in Indonesia is the shortage of resources. A survey by Ubaid (1991) concluded that the contractor's resources is one of the major measures on the contractors' performance that causing delays. The resources include financial resources, human resources, material resources and equipment resources. However, only the financial resources are focused in the research as Abdul-Rahman et al. (2006) addressed that lack of funds may affect the project's cash flow and lead to delay of site possession which consequently causes delays to the project as whole. The factors that would cause insufficient financial resources are: 1) difficulties in getting loan from financiers and 2) allocation of government budget not in place.

Market issues

According to Ahmed et al. (2003), the external factor of poor economic conditions such as currency and inflation rate would significantly give impact to project's cash flow and hence affects the timely performance of the project. The causes to financial market instability which will then lead to cash flow problems in construction project include: 1) increment of interest rate in repayment of loan, 2) inflation of material prices, labor wages and transportation costs and 3) increment of foreign exchange rate for imported materials and plants.

The independent variables include late payment, poor cash flow management, insufficient financial resources, and financial market instability. Figure 1 shows the propositions with the direct relationship between main problem and sub-problems. Figure 1 illustrates that the greater the delay in payment due to contractor, the greater the cash flow problems, the greater the extent of delays; the poorer the cash flow management, the greater the cash flow problems, the greater the extent of delays; the greater the shortage of financial resources, the greater the cash flow problems, the greater the extent of delays; and the greater the instability of financial market, the greater the cash flow problems, the greater the extent of delays. Poor cash flow management by a

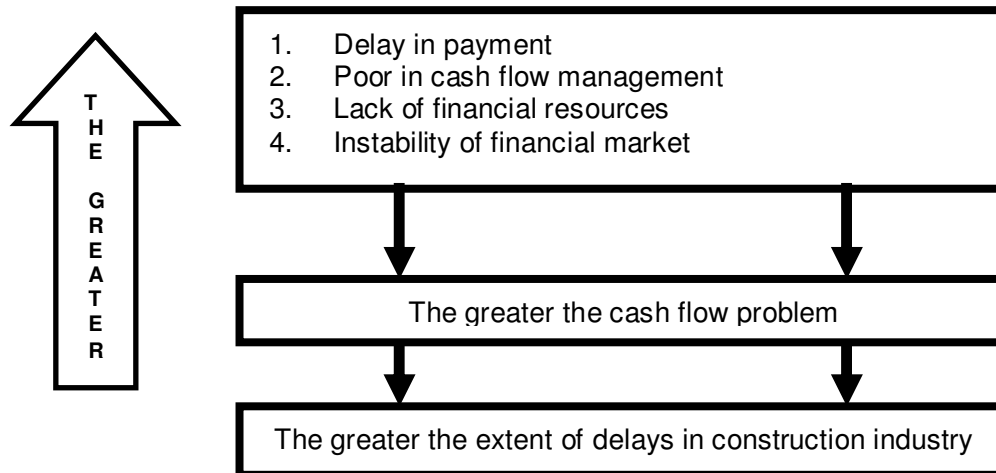


Figure 1. Relationship between main problem and sub-problems.

client of a construction project will cause a late payment to contractor. The delay payment for work done from client will affect the cash flow of the contractor. Besides, the instability of financial market would imply extra financial commitments that are beyond the capacity of the contractor which he or she is not prepared for such extra costs. As a result, the contractor would need to seek for additional financial resources in terms of loans from financial institutions such as banks. In some occasion, the loans are difficult to obtain from financial institutions as they have a strictly regulated checklist of borrowers' financial situation. Due to failure or delay in getting loans, shortage of financial resources at the time will lead to cash flow shortfalls which consequently cause delays in project. In essence, each independent variable is inter-related with each others. The relationship between independent variable forms a continual cycle.

DATA COLLECTION APPROACHES

This research adopted both quantitative and qualitative approaches including a questionnaire survey and a follow-up interview survey. The questionnaire survey was conducted as a quantitative approach to determine the major causes of financial-related problems for the second stage of data collection, before which, an exploratory pilot interview survey was conducted with construction professionals in obtaining preliminary information regarding the causes of financial-related problems in construction industry. The items collected from the literature review and the pilot interviews were used as the formation of the questionnaire design. The questionnaire survey focused on four main groups of participants in construction projects including clients, contractors, consultants (building architects and quantity surveyors), and bankers. The questionnaires were distributed to a random sample of 150 clients, 250 contractors and 150 consultants located in the Klang Valley (Kuala Lumpur and Selangor States) and 8 bankers located in Perak. A one-month period was required for the participants to complete and return the survey forms.

After required data have been quantified by the questionnaire survey, 8 respondents were shortlisted in the follow-up interview

survey as a qualitative approach. These follow-up interviews were conducted to obtain an in-depth understanding of the comments given by those 8 respondents in their questionnaire forms. This kind of approach was adopted because the study involved probing questions whereby respondents were required to provide in-depth answers in order that particularly interesting aspects of the responses could be delved into. The follow-up interviews covered the four main parties involved in construction project with two respondents from each party.

RESEARCH FINDINGS AND RESULTS

Out of the 558 questionnaires delivered, 110 questionnaires were completed and returned, which yielded an overall response rate at 19.71%. Within the 110 returned forms, sixteen (16) were from clients, fifty (50) from contractors, forty (40) from consultants, and four (4) from bankers. Table 2 shows the responding rate of each party. The highest responses at 45% were from contractors, followed by consultants (36%), clients (15%), and bankers (4%). A total of 8 follow-up interviews were conducted with two respondents from each party. Table 3 illustrates the brief profiles of those interviewees.

Payment issues

As shown in Table 4, "contractor's invalid claim" was listed by clients as the most significant cause to late payment with a score at 59; "withhold of payment by client" was scored 202 by contractors; "client's poor financial and business management" was scored 172 by consultants; "withhold of payment by client and client's poor financial and business management" was scored 15 by bankers. Table 5 delineates that "contractor's instable financial background" was agreed by clients, consultants, and bankers as the most significant cause to poor cash flow management with scores at 62, 167 and 17,

Table 2. Respondents' profiles.

Professional group	Sent		Received	
	No.	(%)	No.	(%)
Client	150	27	16	15
Contractor	250	45	50	45
Consultant	150	27	40	36
Banker	8	1	4	4
Total	558	100	110	100

Table 3. Interviewees' profiles.

Interviewee	Position held by interviews	Experience of interviewees
Banker No. 1	Senior sales and marketing executive	6 years
Banker No. 2	Branch manager	14 years
Consultant No. 1	Quantity surveyor	10 years
Consultant No. 2	Quantity surveyor	8 years
Contractor No. 1	Project manager	23 years
Contractor No. 2	Engineer	20 years
Client No. 1	Project manager	10 years
Client No. 2	Project manager	26 years

Table 4. Causes of payment issues.

Causes of late payment	Score				
	Client	Contractor	Consultant	Banker	Total
a) Client's poor financial and business management	58	197	172	15	442
b) Withhold of payment by client	58	202	152	15	427
c) Contractor's invalid claim	59	153	135	12	359
d) Delay in valuation and certification of interim payment by consultant	55	185	127	10	377
e) Inaccuracy of valuation for work done	56	168	113	10	347
f) Insufficient documentation and information for valuation	54	170	139	12	375
g) Involvement of too many parties in the process of honouring certificates	48	191	140	14	393
h) Heavy work load of consultant to do evaluation for work done	41	150	119	10	320
i) Contractor's misinterpretation of client's requirement of variation order	43	154	137	10	344

Table 5. Causes of cash flow issues.

Causes to poor cash flow management	Score				
	Client	Contractor	Consultant	Banker	Total
a) Contractor handles too many projects at the same time	58	174	153	11	396
b) Contractor's instable financial background	62	195	167	17	441
c) Unqualified contractor underbidding the project cost	61	200	165	10	436
d) Lack of regularly cash flow forecasting	58	197	155	15	425
e) Poor credit arrangement with creditors and debtors	57	190	154	13	414
f) Capital lock-up	56	188	151	16	411

Table 6. Causes of insufficient financial resources.

Causes to insufficient financial resources	Score				
	Client	Contractor	Consultant	Banker	Total
a) Difficulties in getting loan from financiers	52	180	148	14	394
b) Allocation of government budget not in place	53	176	144	13	386

Table 7. Causes of market issues.

Causes of financial market instability	Score				
	Client	Contractor	Consultant	Banker	Total
a) Increment of interest rate in repayment of loan	52	178	139	13	382
b) Inflation (material prices, labour wages, transportation costs)	61	211	164	18	454
c) Increment of foreign exchange rate (imported materials and plants)	56	182	142	15	395

Table 8. Significant delays caused by financial issues.

Financial issues	Score				
	Client	Contractor	Consultant	Banker	Total
Late payment	58	212	165	15	450
Poor cash flow management	60	211	174	19	464
Insufficient financial resources	64	198	172	17	451
Financial market instability	54	188	161	15	418

respectively. Besides, the factor “unqualified contractor underbidding the project cost” was scored 200 by contractors.

Financial resources issues

Table 6 shows that contractors, consultants, and bankers similarly agreed that “difficulties in getting loan from financiers” was the most significant factor which causes insufficient financial resources in the construction industry with scores at 180, 148, and 14, respectively. On the other hand, clients agreed that “allocation of government budget not in place” was a significant cause to insufficient financial resources with a score at 53. However, the overall results indicated that “difficulties in getting loan from financiers” was the most significant cause to insufficient financial resources with a score at 394. Table 7 shows that in general, the factor “inflation of material prices, labour wages and transportation costs” was the most significant cause to financial market instability with a total score at 454. The scores ranked by the four professional parties (clients, contractors, consultants, and bankers) were 61, 211, 164, and 18, respectively.

Significant delays caused by financial issues

Table 8 identifies the most significant financial issues

leading to delays in a construction project. As shown in Table 8, “poor cash flow management” contributes most to delay (score=464), followed by “insufficient financial resources” (score= 451), “late payment” (score=450) and “financial market instability” (score=418). Table 9 shows that “poor cash flow management” (score=349) is the most frequent cause of delay occurs in the construction industry, followed by “late payment” (score=232), “insufficient financial resources” (score=231), and “financial market instability” (score=228). It agreed that “poor cash flow management” was the root cause of delays by all the four professional parties, while “late payment” was only agreed by three professional parties except bankers. There were 66% respondents agreed that clients have the highest responsibility to lessen financial-related delays, followed by contractors at 30, consultants at 8, bankers at 5, and government at only 1.

Recommended solutions for financial issues

Possible solutions in mitigating financial-related delays were collected during the follow-up interviews. In regard to payment, it was generally agreed that client should make prompt payment to main contractor. Regarding cash flow management, the following four suggestions were given to clients, namely: 1) to structure the market by dividing the housing development into section; 2) not

Table 9. Financial-related causes that frequently occur.

Financial issues	Score				
	(rank 1 = most frequent, 4 = least frequent)				
	Client	Contractor	Consultant	Banker	Total
Late Payment	33	129	90	10	232
Poor Cash Flow Management	58	153	126	12	349
Insufficient Financial Resources	36	91	91	10	231
Financial Market Instability	35	98	87	8	228

to over develop; and 3) to conduct training on cash flow management and financial management. Regarding cash flow management, suggestions were given to contractors as well including 1) accessing risk management in managing material, transportation, labour, and maintenance; 2) to be smart in accepting the contract and to choose a good paymaster; and 3) to apply payment bond with bank and client. Legislation should be amended to give a clear message to constructors and clients as to clarify the payment matters and refund procedures.

DISCUSSION AND SUMMARY

Findings indicate that the root causes of financial-related delays are mainly due to poor cash flow management, followed by late payment, insufficient financial resources, and financial market instability. In detail, contractor's instable financial background, client's poor financial and business management, difficulties in getting loan from financiers and inflation were identified as the most significant causes to each of the four main factors mentioned above. Generally, a contractor's instable financial background is the most significant factor that underlies poor cash flow management which would consequently lead to project delays. Difficulties in getting loan from financiers could cause insufficient financial resources, and inflation of material prices, labour wages and transportation costs could cause financial market instability. Interestingly, bankers do not agree that late payment as the root cause of delays. This may indicate that the bankers do not agree that the payment issues are with their banking systems. If the bankers' view is true, then payment problems are likely caused mainly by clients and main contractors, which is right in line with the findings of Abdul-Rahman et al. (2006). Bearing this in mind, stringent act upon the bad payment culture should be executed and the time of cash flow between all parties should be legally considered.

CONCLUSIONS AND RECOMMENDATIONS

Construction delays could be reduced by identifying the root causes of financial-related problems. It generally

agrees that clients should bear the greatest responsibility and play the most important role in lessening the impact of financial-related construction delays. Possible solutions in mitigating financial-related delay such as to structure the market, not to over develop, to conduct training on cash flow management, to access risk management, to be smart in accepting the contract, to choose a good paymaster, and to apply payment bond with bank and client were suggested to clients and contractors, respectively. It recommends that more intensive researches emphasizing on how clients and main contractors may achieve a well-managed cash flow in obtaining a prompt payment should be conducted in future.

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