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Late Payments for Contractors Working for Bahrain Government Building Construction Projects: Part I (Factors and Consequences of Late Payment)

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Abstract: ***The problem of late payment is considered one of the major issues in the construction industry, it is an important issue faced by many countries including Kingdom of Bahrain, and it has many consequences on building construction projects. The main objectives of this research are to identify the factors, consequences of delay in payment and their importance, and to determine solutions to overcome this issue. The main factors, consequences and solutions of payment delay were identified through a questionnaire collected from (104) respondents working in building construction engineering field in both governmental and private sectors. Thereafter, the questionnaire results were analyzed, and the highest ranked factors were identified, and solutions to overcome their consequences were recommended.***

Keywords: Interim payment delay, Variation payment delay, Payment delay, Ministry of Works (MoW).

1. Introduction

Construction projects may face many problems and one major problem affecting construction projects is delay in payment. Late payment can severely affect a construction project. Identifying the causes of the late payments and their solutions can help in reducing the occurrence of other delay factors (Enshassi, 2015). These causes can affect the cash flow for the contractors and sub-contractors through the construction pyramid structure starting from the client at the top of the pyramid to other parties in the lower level of the pyramid (Prisim, 2013). Late payments' factors are also affecting the projects of the Construction Projects Directorate (CPD) in Ministry of Works (MoW) – Bahrain. This study aims to investigate the late payment causes and effects based on the perspective of the engineers and contractors working for MoW. Importance of the late payments factors is identified through interviews and questionnaire. In the following sections the literature review will be presented first, where it includes related previous studies, followed by MoW payments practices, research methodology, and results and analysis of survey collected data. Finally, conclusions will be presented and recommendations will be suggested in order to overcome the payment delay issue.

2. Literature Review

2.1 Introduction

Payment is one of the most important factors that can be affected by delay risks leading to late payment consequences. This shows that late payment is an important problem which can influence the structure of the construction industry pyramid starting from the client to the main contractor and so on (Judi and Rashid, 2010). Payment problems are frequently occurring, and have affected many industries in construction, this is the reason why many researches have been done to study and address the issues and problems in payment to mitigate or find solutions to prevent its effects on the parties of a construction industry.

2.2 Causes and Consequences of payment delay

In 2010 a study by Ye and Abdul Rahman (2010) was conducted in Malaysia to identify the causes of late payment. The study established seven significant factors, which are: cash flow problems due to deficiencies in client's management capacity, client's ineffective utilization of funds, lack of capital to finance the project, clients failure to generate income from bank when sales of houses do not hit the targeted amount, and poor cash flow because of lack of proper process implementation, delay in releasing of the retention monies to contractor, and delay in the evaluation and certification of interim and final payment.

Abdul-Rahman et al. (2011) addressed construction projects issues related to financial delays. The results showed the major factors causing payment delay and indicated that the client and main contractor are the major reasons of the problems and the issue should be mitigated through many recommendations such as risk management.

In 2011 a study was conducted by Ansah (2011) to investigate the important factors of delay in payment. Some of the identified causes discovered in the study are: Employer's poor financial management, conflict among parties involved in the contract, and delay in certification. The suggested solution by the study to overcome the payment issues are to enforce clauses of delayed payment in contracts, imposing charges on late payments and the establishment of a payment section to be accountable for saving the history of delayed payment and penalties given to those who fail to pay on time as specified in the contract.

Amoako (2011) established the effects of delay in payment problems and their consequences on the contractors and other stakeholders associated to roads in Ghanaian. The results from the survey showed that the major factors are: contractors are forced to take money from the financial institutes, cash flow problems that lead to cost overrun, effects on the reputation of the contractors leading to temporary suspension of work. As respondents pointed out

that there should be payment interests on payment, regular periodic payments, and a defined payment time frame.

Ayudhya (2012) studied the factors that cause delay in payment in Thailand for residential building projects, through questionnaire and interviews. The results showed that the causes of delay in payment that had the highest ranking are: owner's financial problems, disputes between the owner and main contractor, delay in approval, improper or accuracy of bill of quantity.

In 2014 a study that aims to inspect the causes of late and non-payment in the Malaysian construction industry was done by Azman et al. (2014), it included a sample of 100 contractors. The results showed that the major causes of late and non-payment are: local attitude and culture, delay in certification by consultant, client poor financial management, and communication between contract parties.

A research was conducted in 2015 by El-Sawalhi and Nasser (2015) to recognize the causes, effects and solutions of payment delay and to create a model to quantify the risk of payment delays. The highest ten ranked consequences were included in the design of the model. The Neurosolution (5.07) program was selected to build the model, the performance accuracy of the adopted model recorded (93.47%) indicating good performance. El-Sawalhi and Nasser (2015) recommended that the contractors should have enough cash before beginning projects, and to submit timely accurate invoices with complete documents. The owners were advised to work within stipulated budget kept in bank account before starting the project execution, to pay progress payment to the contractors on time, and to introduce payment bonds to contractors.

In 2016 a study was implemented in Malaysia by Badroldin et al. (2016) to examine the late payment problems observed in the Malaysian construction industry. The data of the study were obtained through thirty-seven questionnaires from contractors and subcontractors in the state of Selangor. The highest three influences of late payment are: negative chain effect on other parties; delay in project completion; and sluggish company growth. The study stated that most of the contractors often faced payment delay.

No research was found to study the payment delay in Kingdom of Bahrain and precisely in governmental building construction projects. Therefore, this study is aimed to identify the causes and effect of payment delay in governmental construction projects in Bahrain.

3. MoW Payment Practices

3.1 Introduction

MoW conditions of contract followed by Construction Project Directorate (CPD) is normally based on the Joint Contracts Tribunal (JCT) "Standard Form" edition 1963, revision of July 1977. The contract reflects the legal and regulatory requirements of Kingdom of Bahrain, and the laws of Bahrain are the proper laws of the contract. The method of payment in CPD projects are mostly a lump sum payment method. Reference to Clause 60 of MoW's condition of contracts, there are three types of payment which are: Advanced payment, Interim payment and Final payment.

3.2 Payment Approval Processes in MoW

Payment certificate is issued for the approval of advanced, interim and final payment, but in case of additional payment (variation) a different process is implemented for the approval of variations prior to the approval of payment certificate as a last step which will be further discussed later. CPD is designing and constructing two types of projects: Locally funded, and externally funded projects. The first type is the projects funded by kingdom of Bahrain government, where the payment certificates issuance for these projects follows the process starting from step (1) to step (6) as shown in Figure (3-1). The second type is the projects that are under MoW (design and constructions) but are financially sponsored by other entities that can be from outside of Bahrain. The Payment process for these funded projects is following the same previous process as shown in Figure (3-1) excluding step (6) and moving directly to step (7) where MoF Prepares their recommendations and submit it to the sponsoring client and finally step (8) where client makes direct payment to the contractor. Funded projects may face a higher risk for late payment because of their longer process.

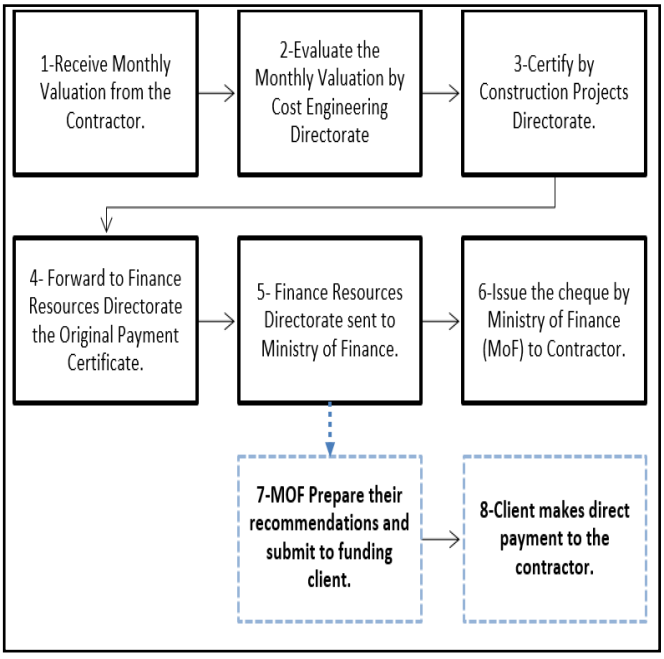

Figure 3-1: Interim payments approval

3.3 Additional Payment (variation) Approval Process

Reference to Clause 51.4 and Clause 53.1 of Condition of Contract, the process of variation approval for projects funded by government of Bahrain upon receiving of any changes by client or design section during construction period is shown in Figure (3-2). The process includes 2 stages, the first stage from step (1) to step (8) and it starts, when a change is done by the client or the design section during construction period. The second stage is for the

payment certification, and it includes two steps as shown in Figure (3-2).

The process of variation approval for projects financially sponsored by other entities is shown in Figure (3-3). The process includes 3 stages, the first stage includes 4 steps, second stage includes 7 steps, and third stage includes 2 steps. The first stage is implemented to obtain the prior approval from the external funding entity; the second stage is for the purpose of formalizing the variations; and the third stage is for the certification of payments.

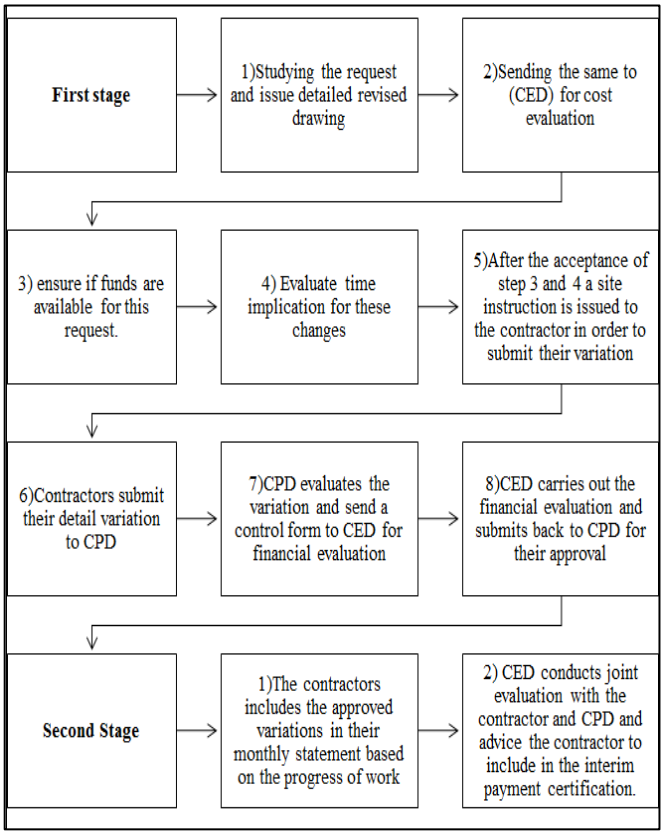

Figure 3-2: Variation payment approval for locally funded projects

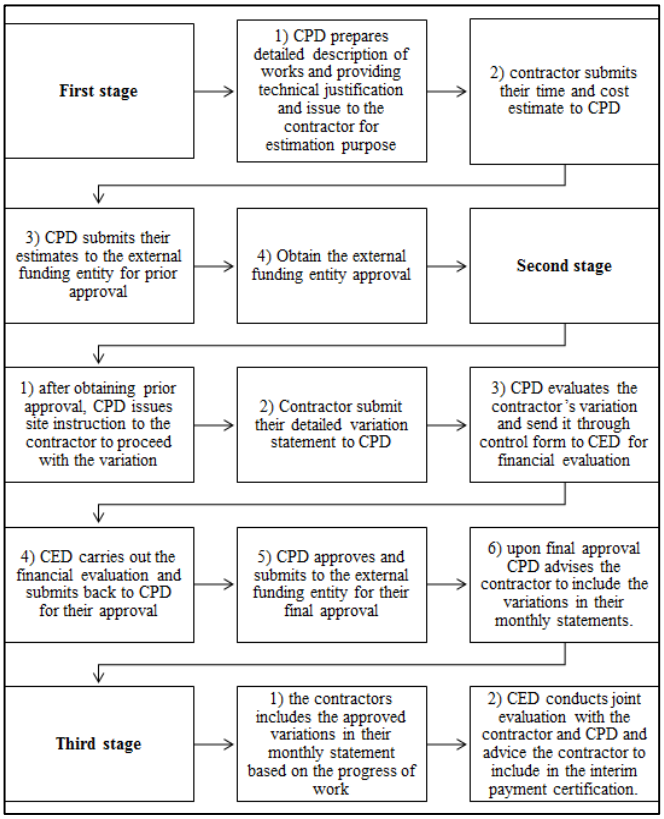

Figure 3-3: Variation approval for projects externally sponsored

4. Research Methodology

4.1 Introduction

The study is conducted in Kingdom of Bahrain. Addressing the issue of payment delay in governmental projects based on case studies of MoW. The methodology determines the most appropriate methods used for the study based on it is objectives, resources and limitations. This section comprises the techniques undertaken to collect data, conduct analysis, and develop a predictive payment model.

4.2 Data Collection and Questionnaire Design

The factors and consequences of late payment and the possible solutions to mitigate payment problems were identified through interviews targeting experienced engineers, historical data of previous projects, and previous literature studies. The questionnaire covered both the causes and effects of late payment that had been identified and the suggested solution based on the perspective of the concerned parties. The questionnaire results were ranked thereafter based on how frequent it occurred. The questionnaire results were analyzed accordingly using appropriate analysis techniques and statistical methods. The questionnaire was distributed to both CPD Engineers and the contractors working for MoW. The questionnaire was designed in four sections as shown below.

1-Section A which includes general informations about participants such as; place of work; age; professional background; working experience; total projects accomblished; and respondent opinion about the

existence of payment delay issue in building construction projects.

2- Section B includes factors contributing to causes of payment delay, these factors are grouped into four major subsections: owner related factors (other governmental ministries), consultant related factors, contractor related factors; and others.

3- Section C includes consequences and effects of payment delay, these consequenses are grouped into two major subsections: Consultant and project characteristics related consequences; and Contractor related consequences.

4- Section D includes effective solutions to payment delaythat were suggested by the industry experts through several interviews.

4.3 Questionnaire Distribution

The questionnaire was distributed to the respondents through email, social media, and personal meetings. The targeted groups in this study are contractors working with MoW building construction projects and MoW Engineers. According to MoW approved contractors list, there are 49 contracting companies classified as (A and B) classes. According to MoW Engineers List, there are about 62 engineers working in building construction sector. The owners were other governmental ministries. Israel (1992) showed that the sample size can be calculated for 95% confidence level using the following equation:

$$n = \frac{n^\circ}{1 + \frac{n^\circ - 1}{N}} \quad (4\text{-}1)$$

Where n is the sample size for finite population, and N is the population size. n° is the sample size from infinite population, (n°) can be adjusted using Equation (4-2) developed by Cochran (1963) for populations that are large to yield a representative sample for proportions:

$$n^\circ = \frac{z^2 \rho q}{e^2} \quad (4\text{-}2)$$

$z^2$is the abscissa of the normal curve that cuts off an area α at the tails (1 – α) equals the desired confidence level), (to achieve a confident level of 95% z=1.96 from statistical tables), e is the desired level of precision, p is the estimated proportion of an attribute that is present in the population, and q is 1-p. According to the calculations and results of sample sizes, 111 questionnaires were distributed as follows: 62 to (MoW) consultant engineers and 49 to contractor engineers. One hundred and four (80.71%) questionnaires were received, 58 (55.77%) from consultants and 46 (44.23%) from contractors.

4.4 Data Measurement

In this research, a format of five-level frequency Likert scale was used for the ranking of the factors and consequences of late payment given in the questionnaire Sections (B) and (C) of the questionnaire. The ordinal Likert scale categories were: Always, often, and sometimes, rare and never. Whereas for Section (D) an interval Likert scale was used to address the effectiveness of the suggested solution to the payment delay ranging from 1 to 5, where 5 is very less effectiveness and 5 is very high effectiveness.

4.5 Data Analysis

The procedure used in analysis of data was aimed at examining each factor contribution to payment delay by using the relative importance index (RII) shown in Equation (4-3). The important factors were ranked and determined.

$$RII = \frac{n_1 + 2n_2 + 3n_3 + 4n_4 + 5n_5}{5 * (n_1 + n_2 + n_3 + n_4 + n_5)} \quad (4\text{-}3)$$

Where $n_1 + n_2 + n_3 + n_4 + n_5$the number of respondents who scored from 1 to 5 where (1) is less frequent or in -effective and (5) is highest frequent or effective. For Section (D) since an interval Likert scale of (5) levels was used, there were five intervals each had a length of $\frac{5-1}{5} = 0.8$. The ranges of the intervals are shown in Table (4-1).

Table 4-1: Average of the intervals for likert scale

1-1.79	1.80 to 2.59	2.60 to 3.39	3.40 to 4.19	4.20 to 5.00
Very low	Low	Medium	High	Very high

As shown in Table (4-1), factors scoring a mean of 3.4 to 4.19 were considered as high, and those with a score of 4.2 and above were considered as very high. The mean of the data was calculated using Equation (4-4). To achieve the research goal, Microsoft Excel program was used for calculating and analyzing the data.

$$Mean = \frac{n_1 + 2n_2 + 3n_3 + 4n_4 + 5n_5}{(n_1 + n_2 + n_3 + n_4 + n_5)} \quad (4\text{-}4)$$

5. Results and Analysis of Survey Collected Data

5.1 Introduction

This section presents the results of the study questionnaire collected from (104) respondents working in building construction engineering field in both governmental and private sectors.

5.1 General Information

This section includes general information about the respondents in terms of place of work, respondent's age, respondents educational background, respondents years of experience, number of construction projects that the respondent has participated in, the participants opinion of the payment delay problem in building construction projects in kingdom of Bahrain.

5.1.1 Place of work

Table (5-1) shows the percentages and the number of respondents from MoW (consultant) and contracting

companies. The total number of responses is 104 engineers from both consultant and contractors.

Table 5-1: Place of Work

Place of work	No of Responses	Percentage of responses
Ministry of Works	58	55.77%
Contracting companies	46	44.23%
Total	104	100%

5.1.2 Participant's age

Table (5-2) shows the age distribution of the sample. The sample of respondents is quite well spread and combines the opinion of experienced engineers in the field and youth engineer's opinion.

Table 5-2: Participant's Age

Age range	No of responses	Percentage (%)
(25-30)	29	27.88%
(31-35)	18	17.31%
(36-40)	28	26.92%
(41-45)	8	7.69%
(46 and above)	21	20.19%
Total	104	100%

5.1.3 Participant's professional background

Table (5-3) shows the number of responses and percentages of each professional background for both consultant and contracting companies. The important roles of these three professions in the payment procedure insure the high quality of the results.

Table 5-3: Participant's Professional Background

Educational background	No of responses	Percentage (%)
Civil Engineering	35	72.12%
Architectural Engineering	45	6.73%
Quantity Survey Engineering	11	11.54%
Electrical Engineering	9	5.77%
Mechanical Engineering	3	2.88%
Others	1	0.96%
Total	104	100%

5.1.4 Participant's work experience

Table (5-4) shows the number of responses and percentage versus range of work experience (years) in building construction sector. The table shows more than 70% of respondents have work experience of more the 7 years, out of whom about 33% with experience of more than 15 years. These percentages of long experience give confidence on the collected results.

Table 5-4: Participant's Total Work Experience (years)

Total Work Experience	No of responses	Percentage (%)
3-7	29	27.9
8-11	18	17.3
12-15	22	21.2
16-19	6	5.8
20-23	10	9.6
24-27	9	8.7
28-31	4	3.8
32 and above	6	5.8
Total	104	100%

5.1.5 Participant's total projects accomplished

Table (5-5) shows the number of responses and percentages versus range of projects accomplished. The fact that more than (71.4%) of the participants have accomplished more than 10 building construction projects will be reflected in the level of reliability and accuracy of the provided information.

Table 5-5: Participant's Total Projects Accomplished

Number of completed projects	no of responses	percentage
5-10	29	28.16%
10-20	57	55.34%
20-30	8	7.77%
30-40	8	7.77%
40-50	2	1.94%
50 and more	29	28.16%
Total	104	100.00%

5.1.6 Participant's opinions on payment delay problem

Table (5-6) shows the participant's opinion on whether the payment delay problem of the building construction projects is an issue worth to be investigated or not. It's concluded that most participants' opinions (83%) consider payment delay as an issue in building construction projects that should be investigated.

Table 5-6 Participant's Opinions on the Payment Delay Problem

Is payment delay an issue in Bahrain public building construction projects?	no of responses	percentage
Strongly Agree	29	28.16%
Agree	57	55.34%
Unsure/Uncertain	8	7.77%
Disagree	8	7.77%
Strongly Disagree	1	0.97%
Total	103	100.00%

5.2 Factors Causing Payment Delay

The factors of late payment were identified through interviews with experienced engineers, historical data of previous governmental projects and previous literature studies. Thirty-five factors were chosen for the questionnaire design. The factors are grouped into four groups; Owner related factors (five factors), Consultant related factors (twelve factors), Contractor related factors (fifteen factors), and Other factors (three factors). The RII of factors were calculated using Equation (4-3). The factors were then ranked as per consultant and contractors perspective as shown in Table (5-7).

Table 5-7: The Relative Indices and ranks of factors causing payment delay

No	Factors	Contactors perspective		Consultant perspective	
		Relative Index (%)	Rank	Relative Index (%)	Rank
(1)	**Owner related factors**				
1	Changes in scope	74.35	1	78.28	1
2	Long and bureaucratic process	72.61	3	75.17	3
3	Unavailability of funds	58.26	14	62.07	28
4	Refusal to pay for materials stored on job site	45.65	34	62.41	35
5	Refusal to pay interest on late payment	65.22	8	57.59	33
Average		**63.218**		**67.104**	
(2)	**Consultant related factors**				
1	Delay in claim review and evaluation process	71.30	4	66.21	21
2	Delay in issuance of payment certificate Process	65.22	7	58.97	31
3	Slow processing of variations orders	70.43	5	69.66	16
4	Excess work load on the consultant employees	48.70	29	66.90	24
5	Consultant's experience (years)	56.09	18	72.41	29
6	Delays of required documentation needed to fulfill payments	56.52	16	72.07	10
7	Bureaucracy or wrong channels of communication	47.83	32	65.52	27
8	Slow processing of final accounts	70.00	6	70.00	15
9	Lack of periodical meetings to address payment problems	56.52	17	66.55	20
10	Lack of decision making during construction	63.04	9	68.97	17
11	Delay in extension of time approval	72.61	2	73.45	6
12	Inaccurate bill of quantities	60.87	11	64.48	23
Average		**61.59**		**67.93**	
(3)	**Contractors related factors**				
1	Submission of claims with calculation mistakes.	54.78	20	72.41	7
2	Delay in the submission of payment evaluation (Claim)	51.74	26	67.59	5
3	Contractor's experience with governmental projects (years)	54.78	21	72.41	8
4	Incomplete documents for variation claims	56.96	15	76.21	2
5	Delay in progress of works and activities	43.45	35	75.15	4
6	Failure to understand the contract agreement	48.26	30	64.14	13
7	Inability to follow certain procedures of MoW	50.87	27	64.14	11
8	Failure to do work based on bill of quantity	48.26	31	70.34	22
9	Inaccuracy of payment scheduling program	52.61	24	70.34	18
10	Inappropriate implementation of projects program	60.87	10	72.41	9
11	Duplication of work	55.22	19	57.59	34
12	Inappropriate project team	51.74	25	73.79	25
13	Inattention of risk	46.96	33	62.41	28
14	Inaccuracy of estimation	53.91	23	70.69	14
15	Inadequate Financial resource	50.00	28	71.03	19
Average		**52.03**		**69.38**	
(4)	**Others related factors**				
1	Delay in MoF process	54.35	22	75.17	12
2	Rules and regulations changes	60.43	12	57.24	34
3	Economic changes	60.00	13	60.34	30
Average		**58.26**		**64.25**	

Table (5-8) displays the relative indices and ranks of the factors as per their related groups that contribute to the occurrence of payment delay issue in construction projects. As shown in the table the factors related to contractor has the highest relative index (RII) of 69.38% as per consultant perspective, while the group of owner related factors have the highest RII of 63.218% as per contractor's perspective.

These results reflect the disagreement between the different parties of respondents who responded to the survey. Each party is holding the responsibility of payment delay to the other parties in the construction pyramid. The group of contractor's related factors has the highest RII% as per consultant's perspective and the highest number of factors causing payment delay. These results indicate that the contractor factors group has a very major role in the payment delay issue, and by rectifying the factors related to this group the payment delay may be reduced effectively.

Table 5-8: Factors of payment delay related groups

Factors Related	Contactors perspective		Consultant perspective	
	Relative Index (%)	Rank	Relative Index (%)	Rank
1- Owner related factors	63.218	1	67.104	3
2- Consultant related factors	61.59	2	67.93	2
3- Contractor related factors	52.03	4	69.38	1
4- Other factors	58.26	3	64.25	4

Table (5-9) and Table (5-10) show the top ten factors ranked by the contractors and consultant, respectively. The top ten factors as per contractors perspective are: Change in scope, Long and bureaucratic process in governmental departments, Delay in extension of time approval, Delay in claim review and evaluation process, Slow processing of variations orders, Slow processing of final accounts, Refusal to pay interest on late payment, Delay in issuance of payment certificate Process, Weakness in making decisions on issues arising in the course of construction, and finally Inaccurate bill of quantities. The top ten factors as per consultants perspective are: Changes in scope, Incomplete documents for variation claims, Long and bureaucratic process in governmental departments, Delay in the progress of works and activities, Delay in submitting the payment evaluation (claim) by the contractor, Delay in extension of time approval, Submit claims with calculation mistakes, Contractor's experience with governmental projects, Un-appropriate implementation of projects program, and finally Delays of documentation required to fulfill payments. Three out of ten factors as per the perspective of both parties are the same which are: Changes in scope, Long and bureaucratic process in governmental departments and Delay in extension of time approval.

Table 5-9: The top ten factors from contractor's perspective

No	The Causes of payment delay	The factor's source	Contactors perspective (Total 42 responses)	
			Relative Index (%)	Rank
1	Changes in scope	Owner	58.97	1
2	Long and bureaucratic process in governmental departments	Owner	57.59	2
3	Delay in extension of time approval	Consultant	57.59	3
4	Delay in claim review and evaluation process.	Consultant	56.55	4
5	Slow processing of variations orders.	Consultant	55.86	5
6	Slow processing of final accounts	Consultant	55.52	6
7	Refusal to pay interest on late payment	Owner	51.72	7
8	Delay in issuance of payment certificate Process.	Consultant	51.72	8
9	Weakness in making decisions on issues arising in the course of construction	Consultant	50.00	9
10	Inaccurate bill of quantities	Consultant	48.28	10

Table 5-10: The top ten factors from consultant's perspective

No	The Causes of payment delay	The factor's source	Consultant perspective (Total responses 58)	
			Relative Index%	Rank
1	Changes in scope	Owner	78.28	1
2	Incomplete documents for variation claims.	Contractor	76.21	2
3	Long and bureaucratic process in governmental departments	Owner	75.17	3
4	Delay in the progress of works and activities.	Contractor	75.15	4
5	Delay in submitting payment evaluation by the contractor.	Contractor	67.59	5
6	Delay in extension of time approval	Consultant	73.45	6
7	Submit claims with calculation mistakes.	Contractor	72.41	7
8	Contractor's experience with governmental projects.	Contractor	72.41	8
9	Un-appropriate implementation of projects program	Consultant	72.41	9
10	Delays of documentation required to fulfill payments	Consultant	72.07	10

5.3 Consequences of Payment Delays

The relative indices and ranks of the consequences of payment delay in building construction projects are shown in Table (5-11). This section contains two groups; Consultant and project characteristics group contains twelve consequences, and Contractor group contains twelve consequences.

Table 5-11: The Relative Indices and ranks of consequences of payment delay

	Consequences	Consultant perspective		Contactors perspective	
		RII (%)	Rank	RII (%)	Rank
(1)	**Consultant and project characteristic related Consequences**				
1	Consultants spend longer time than planned	70.34	6	65.65	7
2	Accumulation of uncompleted projects due to payment delay	65.86	9	68.26	3
3	Inability to start with projects in the waiting list	61.72	14	53.91	18
4	Extension of project time	75.86	1	63.04	11
5	Contractor stop/abandon the works	55.86	19	65.22	9
6	Contractor slow down progress until receiving his payment	70	7	69.57	1
7	Inability to control project and deliver it on time	74.48	2	66.96	4
8	Dispute between contract parties	68.27	8	65.65	8
9	Low quality works	62.06	13	47.39	22
10	Poor site safety	58.97	18	47.39	23
11	Termination of contract by owner or contractor	51.38	23	47.39	24
12	Bad reputation of consultant	55.17	22	50.00	21
Average		**64.16**		**59.20**	
(2)	**Contractor related consequences**				
1	Inability of contractor to procure material, equipment and services	73.79	3	69.57	2
2	Inability of contractor to pay his staff salaries	71.03	4	66.96	5
3	Forcing contractor to take loans with high interest rate to pay due expenditures (Borrow from financial organization)	60	17	60.00	14
4	Bankruptcy of contractors	55.86	20	64.78	10
5	Cash flow problems	70.68	5	66.96	6
6	Difficulty for tendering for new projects	65.86	10	60.43	13
7	Contract termination	51.03	24	51.30	20
8	Seek legal entity to resolve payment issues	55.52	21	51.74	19
9	Refusal of sub-contractors to continue works on the project	64.82	12	60.87	12
10	Loss of good reputation	65.51	11	57.83	17
11	Loss of materials	61.38	15	59.13	16
12	Escape of labors and engineers	61.38	16	59.57	15
Average		**63.07**		**60.76**	

Results of Consultant and project characteristics consequences group shows that "Extension of time" and "slowing down the work by contractor until receiving his payment" come in the first place by consultant and contractor's perspective, respectively, as illustrated in Table (5-11) Contractors consequences group shows that "Inability of the contractor to procure material, equipment and services" comes in first place as per consultant's and contractor's perspective. Table (5-12) displays the relative indices and ranks of consequences as per their related groups affected by the occurrence of payment delay. The groups are consultant and project characteristics related consequences group, and contractor related consequences group. As shown in the table, from consultant perspective the consequences related to consultant and project characteristics has the highest average value of RII of 64.16%. While; from contractors perspective the group of contractor related consequences has the highest average value of RII of 60.76%. Both groups of consequences are most affected by payment delay from the point of view of consultants than that of contractors as indicated by RII values for consequences.

Table 5-12: Consequences of payment delay related groups

Groups	Consultant perspective		Contactors perspective	
	RII (%)	Rank	RII (%)	Rank
Consultant & project consequences	64.16	1	59.20	2
Contractor consequences	63.07	2	60.76	1

As mentioned previously, this analysis illustrates the consequences of payment delays affecting two groups: consultant & project characteristics group and also on the contractors group from consultants and contractor's perspective. The top ten and the top twelfth consequences by consultants and contractor's perspective are shown in Table (5-13) and Table (5-14), respectively.

Table (5-13) and Table (5-14) show that eight consequences from the top ranked consequences by consultants and contractors are common in both tables, these are:

1-Contractors slow down progress until receiving his payment.
2-Inability of contractor to procure material, equipment and services.
3-Accumulation of uncompleted projects due to payment delay.
4-Inability to control project and deliver it on time.
5-Cash flow problems.
6-Inability of contractor to pay his staff salaries.
7-Dispute between contract parties.
8-Consultants spend longer time than planned.

The rest of the top consequences are either ranked by the consultants or the contractors only, these consequences are:

1-Extension of project time.
2-Difficulty for tendering for new projects.
3-Loss of good reputation.
4-Refusal of sub-contractors to continue works on the project.

5-Contractors stop/abandon the works.
6-Bankruptcy of contractors.

Table 5-13: Consequences of Payment Delays (Consultant Perspective)

No	Consequences of payment delays.	Affected group	Rank	RII%
1	Extension of project time	Project	1	75.86
2	Inability to control project and deliver it on time	Project	2	74.48
3	Inability of contractor to procure material, equipment and services	Contractor	3	73.79
4	Inability of contractor to pay his staff salaries	Contractor	4	71.03
5	Cash flow problems	Contractor	5	70.68
6	Consultant spend longer time than planned.	Consultant	6	70.34
7	Contractor slow down progress until receiving his payment	Project	7	70
8	Dispute between contract parties	Project	8	68.27
9	Accumulation of uncompleted projects due to payment delay	Consultant	9	65.86
10	Difficulty for tendering for new projects	Contractor	10	65.86
11	Loss of good reputation	Contractor	11	65.52
12	Refusal of sub-contractors to continue works on the project	Contractor	12	64.82

Table 5-14: Consequences of Payment Delays (Contractors Perspective)

No	Consequences of payment delays.	Affected group	Rank	RII%
1	Contractor slow down the progress until payment is received	Project	1	69.57
2	Inability of the contractor to procure material, equipment's and services	Contractor	2	69.57
3	Accumulation of uncompleted projects due to payment delay	Consultant	3	68.26
4	Inability to control the project and deliver it on time	Project	4	66.96
5	Inability of the contractor to pay his staff salaries	Contractor	6	66.96
6	Cash flow problems	Contractor	5	66.96
7	Consultants spend longer time than planned	Consultant	7	65.65
8	Dispute between contract parties	Project	8	65.65
9	Contractor stop/abandon the works	Contractor	9	65.22
10	Bankruptcy of contractors	Contractor	10	64.78

5.4 Effectiveness of Suggested Solutions to the Payment Delay

This section is designed to indicate the possible solutions to mitigate the payment delay problem in governmental building construction projects. The solutions shown in this section are identified through interviews targeting the experienced engineers, historical data of previous projects and lessons learned of previous projects as mentioned earlier. The RIIs and the means have been calculated for each of the subject solutions as per consultant and the contractor's responses shown in Table (5-15). Based on these measures, the effectiveness of each solution on payment delay problem is evaluated as high, medium, or low. The suggested solutions are:

Solution (1) is awarding the contract to competent contractors who have enough staff and experience to provide proper submittals in proper time. This solution can take place by improving the pre-awarding procedures such as the technical evaluation and pre-qualification of contractors. The aim of these procedures is to assure that the contractors added to MoW contractor's list have the proper qualifications to achieve the requirements of MoW specifications and procedures. This solution can be very effective in overcoming many factors causing payment delay such as: inappropriate project team; inadequate financial resources of the contractor; inattention to risk; duplication of work; inappropriate implementation of project programme; failure to do work based on bill of quantity; delay in progress of works and activities; incomplete document by contractor; and delay of submittals by contractor.

Solution (2) is calculating the work load of each staff of the consultant and contractor, and distribute the work load fairly and evenly. The proper scheduling of work load among employees is a success key of any entity. This solution can help in overcoming many causes of delay in payment that can occur because of: the overload each employee is carrying, and mainly the factor of excess work load on consultants employees; delay in review and approvals by consultants employees; delay of required documents to fulfill payments; slow processing of final accounts; delay in extension of time approval; inaccurate bill of quantities; delay in submittals by the contractor; and incomplete documents for variation orders by contractor.

Solution (3) is to introduce a well-studied regulation that will grant an advanced payment for the contractor to allow ordering the required materials to expedite the works. This solution can provide the contractor with a finical support to implement the project programme until further payments are received.

Solution (4) is raising contractor's awareness of contracts and payment process in governmental projects. This solution can help in decreasing the risk of two payment delay factors, which are: contractor's failure to understand

the contract agreement, and inability of contractors to follow certain procedures of MoW.

Solution (5) is to improve and ease the process of payments valuation and certification. The implementation of this solution will help in decreasing or eliminating the delay during payment process such as: delay in claim review and evaluation process; delay in issuance of payment certificate process; slow processing of variations orders; and delay in MoF payment process.

Solution (6) is proper planning and budgeting of all governmental projects. This solution can be through appropriate design, planning and budgeting during design stage. This can be implemented by including all the requirements requested by the owner, also proper revision of drawings and bill of quantities to avoid design mistakes and to incorporate all the comments included in the lessons learned of similar previous projects. These steps help in avoiding change in scope of work by owner during construction stage, unavailability of funds for additional changes and inaccurate bill of quantities.

Solution (7) is proper management of cash flow as per approved scope of work and schedule program. This solution helps in avoiding unavailability of funds during construction stage and insure the smooth implementation of the project activities.

Solution (8) is managing to anticipate any risk that may delay the project due to payment issues. This anticipating can help in avoiding "inattention of risk" factor and incorporating proper precautions to avoid the occurrence of this risk that can cause delay in payment.

Solution (9) is briefings and meetings prior start of works. This solution insures well management of project's issues by providing proper communication channel with the contract parties, addressing payment problems during these meetings, helps in proper decision making during construction and help in decreasing the effect of long and bureaucratic processes in governmental departments.

Solution (10) is compensating the contractor for late payment. This is to recompensate the contractor for the high interest rate burden due to loans, bankruptcy of the contractors and the effect on his reputation.

Solution (11) is proper communication among contract parties (the client, consultants as well as the contractors to resolve payment delay issues). This helps in overcoming the payment delay factor of "bureaucracy or wrong channels of communication".

Solution (12) is that contractors should submit timely accurate invoices with complete documents. This is to avoid the delay in claim submission, submission of claims with calculation mistakes, and incomplete documents for variation claims by contractor. These factors proved to be main cause of payment delay.

Solution (13) is avoiding bureaucracy in governmental system. This is to ease and speed the slow processing of payments in governmental departments.

As a result of the Likert scale analysis and mean results shown in Table (5-15) for the suggested solutions, all the replies are towards medium or high. Table (5-15) shows that one suggested solution is decided on by consultants to be of very high effectiveness, whereas, the contractors decided on as high is "Proper planning and budgeting ofall governmental projects" (Solution (6)). The suggested solutions, that consultant and the contractors both have agreed on to be of high effectiveness are:

1. Awarding the contract to competent contractors who have enough staff and experience to provide proper submittals in proper time (Solution (1)).
2. Improve and ease the process of payments valuation and certification (Solution (5)).
3. Proper management of cash flow as per approved scope of work and schedule program (Solution (7)).
4. Manage to anticipate any risk that may delay the project due to payment issues (Solution (8)).
5. Briefings and meetings prior start of works (Solution (9)).
6. Contractors should submit timely accurate invoices with complete documents (Solution (12)).

One result that is also agreed on by both parties (contractors and consultants) as medium is "Compensating for late payment" (Solution (10)).

As for the rest of the suggested solution results, eight results show that consultants decided on to be of high effectiveness, whereas, the contractors decided on as medium, which are:

1-To introduce a well-studied regulation that will grant an advanced payment for the contractor to allow ordering the required materials to expedite the works (Solution (3)).
2-Raise contractor's awareness of contracts and payment process in governmental projects (Solution (4)).
3-Proper communication among contract parties (the client, consultants as well as the contractors to resolve payment delay issues) (Solution (11)).
4-Avoiding bureaucracy in governmental system (Solution (13)).

Finally, one result shows that contractors decided on to be of high effectiveness, whereas, consultants decided on as medium, which is: "calculating the work load of each staff of the consultant and contractor, and distributing the work load evenly" (Solution (2)). These results show that all the suggested solutions are effective to decrease or even overcome the payment delay in governmental projects since all of them fall in the range between medium and high effectiveness as per consultant's and contractor's perspective.

Table 5-15: The Suggested Solutions for Payment Delay Issue

Suggested solutions	Consultants perspective			Contractors perspective		
	RII%	Mean	Result	RII%	Mean	Result
Solution (1)	82.759	4.138	High	71.739	3.587	High
Solution (2)	66.897	3.345	Medium	69.565	3.478	High
Solution (3)	68.621	3.431	High	66.957	3.348	Medium
Solution (4)	75.862	3.793	High	63.478	3.174	Medium
Solution (5)	75.517	3.776	High	72.609	3.630	High
Solution (6)	88.966	4.448	Very high	76.087	3.804	High
Solution (7)	79.310	3.966	High	72.174	3.609	High
Solution (8)	76.897	3.845	High	74.783	3.739	High
Solution (9)	73.103	3.655	High	73.478	3.674	High
Solution (10)	66.897	3.345	Medium	64.348	3.217	Medium
Solution (11)	76.552	3.828	High	66.087	3.304	Medium
Solution (12)	78.966	3.948	High	67.826	3.391	High
Solution (13)	71.379	3.569	High	65.217	3.261	Medium

6. Conclusions and Recommendations

6.1 Introduction

Payment has been described as a very important element in the construction industry which can be hugely affected by delay risk. Payment delay results in accumulated problems through the construction pyramid starting from the owner and all the way to contractors and sub-contractors. This section summarizes the outcomes from the earlier sections and reflects the juice of the work done. Moreover, it shows that the objectives and aims of the study have been achieved. The objective of this study is to identify factors and consequences of payment delay and the effective solutions to overcome this issue.

6.2 Conclusions

The key findings and results of the study are as follow:

The factors that contribute to payment delay in construction projects are ranked as per the values of their RII. These factors are divided to three groups, group (1): owner related factors consisting of five factors, group (2): consultant's related factors consisting of twelve factors, group (3): contractors related factors consisting of fifteen factors; and group (4): other related payment delay factors consisting of three factors. The outcome of the RII analysis has revealed that "contractor related factors" group is the most significant group as per consultant perspective, while "owner related factors" group is the most significant as per contractor's perspective. This is expected because every part is blaming the other and accusing him as the cause of payment delay. These results reflect the important role each of the owner and the contractor plays in the occurrence of payment delay. Moreover, the higher RIIs of "contractor related factors" group as per consultant's perspective and the higher number of factors related to this group indicate the major role of contractors in the occurrence of payment delay, and reveal that by addressing these factors the delay can be decreased effectively. The ranking of the individual factors of payment delay reference to their RII show that three out of the top ten ranked factors as per the perspectives of consultant and contractors are common, these are: Changes in scope; Long and bureaucratic process in

governmental departments; and Delay in extension of time approval.

Similarly, the consequences of payment delay on construction projects are ranked as per the values of their RIIs. The effect and consequences of payment are divided into two groups; group (1) Consultants and project characteristics group consisting of twelve consequences, and group (2) is Contractors consequences group consisting of twelve consequences**.** The results show that consequences related to Consultant and project characteristics has the highest RIIs as per consultant perspective, while Contractors consequences have the highest RII as per contractor's perspective. Also, the results show that eight consequences as per consultant's and contractor's perspective are common. These eight consequences are: Contractor slows down progress until receiving his payment, Inability of the contractor to procure material, equipment's and services, Accumulation of uncompleted projects due to payment delay, Inability to control project and deliver it on time, Cash flow problems, Inability of the contractor to pay his staff salaries, Dispute between contract parties, and Consultants spend longer time than planned.

Thirteen solutions to overcome payment delay issue in Kingdom of Bahrain are suggested by the field experts in this study. The top three effective solutions that are assessed as high by both consultants and contractor's perspectives are: Improve and ease the process of payments valuation and certification; Proper communication among contract parties (the client, consultant as well as the contractor to resolve disputes); and Avoiding bureaucracy in governmental system.

6.3 Recommendations

This study has shown the important role each of the contract parties has on the occurrence of payment delay, some practices can increase the risk of payment delay while others can help in eliminating the risk, in this section some

recommendations are presented to help contract parties in overcoming this issue:

1-The owner of the project is recommended to define accurate requirements for scope of work in order to avoid any additional requests during construction stage which may affect the payment process. This can be done by proper documentation of lessons learned of previous projects and using it as reference to avoid the repetition of same slip-ups.
2-Projects with external funding must have a separate payment process in order to speed up the approvals required from different parties. A representative that has the power for decision making must be available during the construction stage to approve and prompt the payments.
3-MoW projects need contractors with high quality work and highly qualified employees to avoid factors of payment delay. Therefore, during the tendering stage contract must be awarded to competent contractor who can comply with MoW requirements and not only to the lowest bidder.
4-Mow pre-qualification process of contractors must include additional requirements from contractors, who desire to handle MoW projects by attending specific workshops to learn the process of the ministry and all the documents, work procedures and required specifications. Such workshops enhance the communication, decrease the duplication of work, decrease disputes, and enable contractors to understand the payment risk that might occur in order to take proper precautions to avoid any payment risk during construction such as payment delay.
5-MoF process needs to be studied in more details in order to know the reasons of delay and find solution for it.

6.4 Future recommended studies

1-To conduct a comparative study between the payment delay in governmental and private projects in Bahrain, and to determine the sector that is more sensitive to payment delay.
2-To study the payment delay for other departments in MoW such as road and sanitary.

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