Chapter Four

Result Analysis and Discussions

4.1Introduction

In chapter three, the project performance instrument was reliable and valid, so the data obtained through this instrument can be used for data analysis. The data will then be processed and analyzed by SPSS program to generate the results which will then be tabulated and used for further discussion.

4.2 Project stages analysis

The qualitative data were generated from literature review, to measure the project performance while quantitative data were generated from questionnaire survey, and were analyzed using average index technique. The summary of the data analysis will be tabulated in the next section and the result will be used as the basis for further discussion in the next chapter.

The developed questionnaire was distributed in a sample containing thirty (30) targetedrespondents within the locality of Khartoum contractors.

4.3 The questionnaire results

The questionnaires survey was conducted as explained in chapter 3, and the data was collected and then analyzed in order to determine the critical factors affecting all project stages.

Table (4.1): Contract type

Types of contract in the project					
Cumulative Percent	Valid Percent	Percent	Frequency		
53.3	53.3	53.3	16	Unit price contract	Valid
66.7	13.3	13.3	4	Cost contracts against expenses return ratio	
93.3	26.7	26.7	8	Total price contract	
96.7	3.3	3.3	1	Targeted cost contracts	
100.0	3.3	3.3	1	Other	
	100.0	100.0	30	Total	

53.3% of projects used unit price contracts, 26.7 % used sum lump contracts and 13.3% used cost contract as shown in table(4.1)

Construction contracts lay out the rights and responsibilities of the contractor and the project owner. There are a variety of construction contracts, and depending on the type, one party may benefit from a specific type of contract than the other parties. Each contract carries with it advantages and disadvantages that may benefit the contractor or the owner, but half of the projects in Sudan deal with Unit price because it is the most effective in changing order and additional works by simply pricing the new order as the same item preceding. The researcher’s opinion is that it’s suitable and very fair for both sides.

Table (4.2): Project documents

Were all documents provided before project launch					
Cumulative Percent	Valid Percent	Percent	Frequency		
66.7	66.7	66.7	20	Yes	Valid
100.0	33.3	33.3	10	No	
	100.0	100.0	30	Total	

More than half; 66.7%, answered that all documents were ready before starting the project, while 33.3% said they were notas shown in table(4.2). Although the documents are not a big reason for delay as shown above, yet, coordination must take place in a variety of contents. For example, the work of project participants must be coordinated both within each discipline.

Table:(4.3)Document delay

If answer was No, then delay in documents' availability was due to:					
Cumulative Percent	Valid Percent	Percent	Frequency		
40.0	40.0	40.0	12	Owner	Valid
46.7	6.7	6.7	2	Contractor	
50.0	3.3	3.3	1	Consultant	
96.7	46.7	46.7	14	n/a	
100.0	3.3	3.3	1	Owner & Consultant	
	100.0	100.0	30	Total	

40% said the delay is caused by the owner, 6.7% said it occurred because of contractor and 46% is missing data.as shown in table(4.3)

The owner's familiarity with the construction process and level of in house management capability has a large influence over the amount of outside assistance required during the process and may guide the owner in determining the appropriate project delivery method. An owner must make an assessment of its ability to properly perform under the various delivery methods.

Therefore the second hypothesis is not applicable in the Sudan construction industry.

Table (4.4):Contract type delay

Does the type of contract have an effect on the project delay					
Cumulative Percent	Valid Percent	Percent	Frequency		
43.3	43.3	43.3	13	Yes	Valid
100.0	56.7	56.7	17	No	
	100.0	100.0	30	Total	

More than half; 56.7% think the type of contract doesn’t cause in delaying the project, and 43.3% said the type of contract does affect.as shown in table(4.4).

Construction contracts lay out the rights and responsibilities of the contractor and the project owner. There are a variety of construction contracts, and depending on the type, one party may benefit from specific type of contract more than the other. Each contract carries with it advantages and these which may benefit the contractor or the owner. So in Sudan the most preferred type of contract is the unit price.

Table (4.5:) Grace period

Is there a grace period in the contract					
Cumulative Percent	Valid Percent	Percent	Frequency		
42.9	42.9	40.0	12	Yes	Valid
100.0	57.1	53.3	16	No	
	100.0	93.3	28	Total	
		6.7	2	System	Missing
		100.0	30	Total	

More than half: 53.3% said grace period is included in the contract, while 40% said that there isn't.as shown in table(4.5).

A time stated in a contract in which a late payment or performance may be made without penalty, often after penalty, often after the grace period, ends without payment or performance by the person who is supposed to pay the contract, is suspended. For example, if you don't pay your insurance payment (premium) by the stated deadline, you usually have a few days extra to pay before the absolute deadline. If you don't pay by then, penalty is applied as per the contract.

Table (4.6): Grace period override

Has the project exceeded the grace period					
Cumulative Percent	Valid Percent	Percent	Frequency		
75.0	75.0	60.0	18	Yes	Valid
100.0	25.0	20.0	6	No	
	100.0	80.0	24	Total	
		20.0	6	System	Missing
		100.0	30	Total	

More than half: 60.0% said the project exceeded the grace period, while 20% said it didn't, and 20% is missing data,as shown in table(4.6).although this percentage, we first need to look at the separate activities forming the whole project, that cause a delay. So we need to have a clear understanding of the general types of delays that can occur in them. There are four basic ways to classify delays:

- Critical or non-critical
- Excusable or non-excusable
- Concurrent or non-concurrent
- Compensable or non-compensable

Table(4.7):Delay penalty

Is there a penalty condition for delay in the contract					
Cumulative Percent	Valid Percent	Percent	Frequency		
80.0	80.0	80.0	24	Yes	Valid
100.0	20.0	20.0	6	No	
	100.0	100.0	30	Total	

80% said contracts contain delay penalty, while 20% answered no delay penalty is mentioned in the contract.as shown in table(4.7). If a builder breaches contract by not achieving substantial completion by specific date, the builder can then be responsible for damages. In the event in which damages can't be specifically determined, liquidated damages clause can be added to make clear in advance penalties from the delay. Liquidated damages clauses are typically enforceable as long as the amount specified for damages is considered to be reasonable assessment of losses rather than solely intended to punish the part in breach. So in Sudan most projects include this item just to improve performance.

Table (4.8):Project schedule

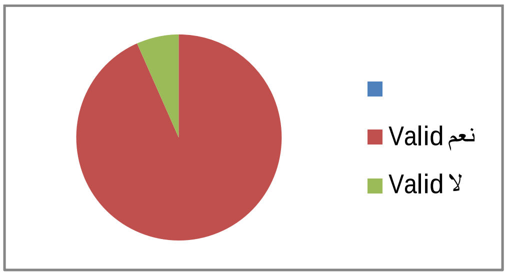
Did the contractor present a time schedule before starting the project					
Cumulative Percent	Valid Percent	Percent	Frequency		
93.3	93.3	93.3	28	Yes	Valid
100.0	6.7	6.7	2	No	
	100.0	100.0	30	Total	

93% said there is a schedule submitted in the beginning of the project and 6.7% said no schedule was.as shown in table(4.8). Contractor should try to include the following in their contract: as shown in chart (4.1)

- Obtain a schedule with terms.
- See that it defines a specific project, with the time scheme.

- Define as clearly as he can what he is doing.
- Show that he has the terms to keep him out side.

Most of the third hypothesis is applicable in the construction industry in Sudan.



Chart(4.1) project schedule

<u>Table (4.9):Schedule tool</u>

Did the contractor use a specific tool to calculate the time schedule					
Cumulative Percent	Valid Percent	Percent	Frequency		
73.3	73.3	73.3	22	Yes	Valid
100.0	26.7	26.7	8	No	
	100.0	100.0	30	Total	

73% replied that the contractor used specific tool for scheduling while 26% said they do the table without tools,as shown in table(4.9).to this article lists of top software options on the market of tracking a project schedule, and the pros and cons of each package are discussed to help you to choose the right package to fit your needs.

When you are planning a project schedule, it can be hard to find the perfect software for your project. There are certain features like the ability to display Grant and Pert charts that are the most popular. Then there are pricing concerns - some software assumes a much larger budget than your project might need. You might also need to consider usability - and the team members have a steep learning curve with particular pieces of software, so these five project scheduling software packages are our picks for the best options:

- Microsoft project
- ZOHO project
- Fast Track schedule 9
- Primavera 3-4-5-6
- Task

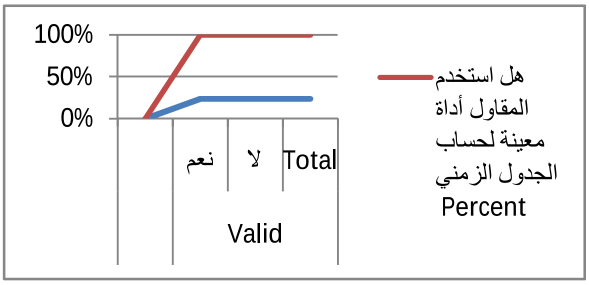


Chart (4.2) Schedule tool

Table (4.10):Software type

Was the tool one of the below computer software						
Cumulative Percent		Valid Percent	Percent	Frequency		
63.3	63.3	63.3	19	PRIMAVERA	Valid	
73.3	10.0	10.0	3	OTHERS		
100.0	26.7	26.7	8	MS. project		
	100.0	100.0	30	Total		

More than half: 63.3% use primavera for scheduling, 26.7% use MS project and 10% use other programs.as shown in table(4.10).

So knowing which software to choose for specific construction scheduling services or a specific type of project, can significantly improve the efficiency of the construction scheduling process and produce a higher quality construction CPM schedule that is more commensurate with the needs of the project. Based on our professional opinion and extensive construction scheduling experience, the researcher almost and always recommends primavera applications for the vast majority of construction schedules, although MS project can still be a useful tool in the correct application.

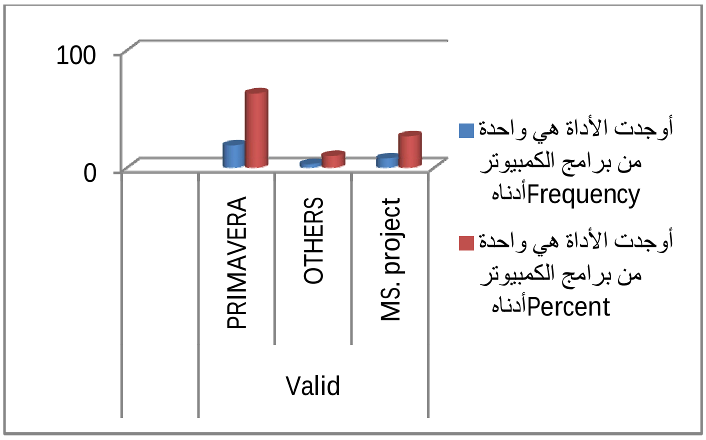


Chart (4.3)Software type

Table (4.11):Schedule continuous update

Has there been a regular update for the time schedule					
Cumulative Percent	Valid Percent	Percent	Frequency		
48.3	48.3	46.7	14	Yes	Valid
79.3	31.0	30.0	9	No	
100.0	20.7	20.0	6	Sometimes	
	100.0	96.7	29	Total	
		3.3	1	System	Missing
		100.0	30	Total	

More than half: 46.7% update the schedule periodically, 30% don't do any updates, however20% said updates are made sometimes. as shown in table(4.11).So in Sudan it isn't used in all projects. Schedules are updated at regular intervals in order to:

- Evaluate the project's status.
- Predict the completion date.
- Create historical records of the project.

Half of the third hypothesis is not applicable in construction industry in Sudan.

Table (4.12):Update intervals

If there was an update, how regular was it					
Cumulative Percent	Valid Percent	Percent	Frequency		
13.3	13.3	13.3	4	weekly	Valid
66.7	53.3	53.3	16	Monthly	
100.0	33.3	33.3	10	n/a	
	100.0	100.0	30	Total	

More than half: 53.3% answered that updates are made every month,13% made it every week and 33%is missing data.as shown in table(4.12).

At a minimum, the schedule should be updated as specified in the contract documents, for most projects, the schedule is updated monthly to correspond with the contractor's pay applications. Monthly updates are normally sufficient however some sophisticated owners require weekly or monthly schedule update to monitor the dates.

Table (4.13):Corrective Decision

Were corrective decisions made regarding the acts causing delay					
Cumulative Percent	Valid Percent	Percent	Frequency		
73.3	73.3	73.3	22	Yes	Valid
90.0	16.7	16.7	5	No	
100.0	10.0	10.0	3	Sometimes	
	100.0	100.0	30	Total	

73% of the respondent answered the decisions are taken with regard to activities that may cause delay, while 16% said no decisions are taken, 10% answered with “sometimes”.as shown in table(4.13).

Finding based on preliminary data have indicated that construction experts can in fact benefit from the model in that it supports decisionmaking by providing the decision maker with an overview of the performance of a number of alternatives available for a particular construction process. This is extremely useful when considering that the number of alternatives can be high. Additionally the use of the model is expected to provide more reliable assessment of the risk associated with the various alternatives.

Table (4.14):Productivity

Is the calculation of time remaining based on workers’ productivity and count					
Cumulative Percent	Valid Percent	Percent	Frequency		
46.7	46.7	46.7	14	Yes	Valid
80.0	33.3	33.3	10	No	
100.0	20.0	20.0	6	Sometimes	
	100.0	100.0	30	Total	

Less than half: 46.7% said “yes” is estimated according to productivity, 33.3% answered with “No”.as shown in table(4.14).The objective of this manual is to describe a task level labor productivity measurement and performance evaluation system that can be used by owners, contractors, and subcontractors who presently do not have a formalized effort. The procedures are applicable to industrial and commercial projects that exceed several million dollars, and to maintenance activities. The emphasis is on expensive and accurate measurements that can be made in a timely manner. This is especially important on smaller projects where task duration may last only several months or less. Only selected labor – intensive tasks are monitored, and reporting can be done by a foreman or supervisor.

The Eighth hypothesis is not applicable in the construction industry in Sudan.

Table (4.15):Time control

Did the tools used, help in keeping the time					
Cumulative Percent	Valid Percent	Percent	Frequency		
52.0	52.0	43.3	13	Yes	Valid
84.0	32.0	26.7	8	No	
100.0	16.0	13.3	4	Sometimes	
	100.0	83.3	25	Total	
		16.7	5	System	Missing
		100.0	30	Total	

Less than half: 43.3% said the tool did contribute in controlling the time, 26% said it didn’t,and13.3% said it did some time.as shown in table (4.15).

As if the questionnaire reflects no persuade by the tool control, but in the construction industry, the aim of project control is to ensure the project finishes on time within budget and achieving other project objectives. It is a complex task undertaken by project managers in practice which involves constantly measuring progress, evaluating plans, and taking corrective actions when required.

Table (4.16):Resources

What were the resources used in the project					
Cumulative Percent	Valid Percent	Percent	Frequency		
3.4	3.4	3.3	1	Material	Valid
96.6	93.1	90.0	27	All the above	
100.0	3.4	3.3	1	Labor & machinery	
	100.0	96.7	29	Total	
		3.3	1	System	Missing
		100.0	30	Total	

90% said all resources are used in the project (material, labor, equipment and tools), 3.3% is missing data.as shown in table(4.16)

Resources are the means of production needed to complete a project. Most project managers would consider the big three resources that will require the attention to be: materials, labors, and equipment. A key idea when managing the overall capacity, availability and allocation of resources on large construction projects is that the project manager's perspective is from the level of completion of the projects’ major features of work. Others on the team will be concerned with individual material or equipment deliveries, small tools or the productivity of specific workers. Unless there is a specific individual constraint on labor material and equipment that could affect the completion of measure features of work, a project manager views these issues at a high level.

Table (4.17):Available resources

Were the resources available in the project					
Cumulative Percent	Valid Percent	Percent	Frequency		
30.0	30.0	30.0	9	Yes	Valid
76.7	46.7	46.7	14	No	
100.0	23.3	23.3	7	Sometimes	
	100.0	100.0	30	Total	

30% answered all the resources were available in time, while 46.7% said they were not.as shown in table(4.17).

You now need to construct a resource plan, identifying all the resources needed to complete the project, e.g. labor, equipment and materials. You should also produce schedule indicating when each resource will be used and note any assumptions and constraints made during the resources planning process.

Many of the resources required should already be listed in the business case, terms of reference and project plan. For a small project it is sufficient to take each activity listed in the project business case, terms of reference and project plan. For a small project it is sufficient to take each activity listed in the project plan and assign a resource to it. This can be done using a program like Microsoft project, primavera.

Table 4.18Material type

What was the type of material used					
Cumulative Percent	Valid Percent	Percent	Frequency		
44.8	44.8	43.3	13	Local	Valid
72.4	27.6	26.7	8	Imported	
100.0	27.6	26.7	8	Both	
	100.0	96.7	29	Total	
		3.3	1	System	Missing
		100.0	30	Total	

43.3% of projects used local material, 26.7% used imported and 26.7% used both types.as shown in table(4.18)

With prices of building materials going through the roof with every day passing, potential builders are faced with a dilemma on how to procure quality materials at cost-friendly prices. Opting to import materials instead of locally buying them could greatly cut down one's costs but it is not without kinks.

Table (4.19):Local material quality

If the material used was local, how good was its quality					
Cumulative Percent	Valid Percent	Percent	Frequency		
20.0	20.0	20.0	6	Excellent	Valid
63.3	43.3	43.3	13	Good	
90.0	26.7	26.7	8	Medium	
100.0	10.0	10.0	3	n/a	
	100.0	100.0	30	Total	

43.3% think the local material quality is good, 20% think it's excellent while 26.7% think the quality is medium.as shown in table(4.19).Quality assurance of building materials is very essential in order to build strong durable and cost effective structures. When construction is planned, building materials should be selected to fulfill the functions expected from them. We here discuss the importance of quality assurance and product certification of most common building materials such as concrete, steel, aggregates, cement and building blocks in accordance with relevant standards, and a long term and short questionnaires evaluate local materials as good.

Table(4.20) Import material quality

If material used was imported, how good was its quality					
Cumulative Percent	Valid Percent	Percent	Frequency		
40.0	40.0	40.0	12	Excellent	Valid
66.7	26.7	26.7	8	Good	
100.0	33.3	33.3	10	n/a	
	100.0	100.0	30	Total	

40% said the imported material quality is excellent, 26.7% said it's good and 33.3%is missing data.as shown in table(4.20).

Fifth hypothesis is not applicable in the construction industry in Sudan because most construction uses local materials while they evaluated good, while imported materials evaluated excellent.

Table (4.21):Labor productivity

Did the labor produce work as how it was planned					
Cumulative Percent	Valid Percent	Percent	Frequency		
32.1	32.1	30.0	9	Yes	Valid
78.6	46.4	43.3	13	No	
100.0	21.4	20.0	6	Sometimes	
	100.0	93.3	28	Total	
		6.7	2	System	Missing
		100.0	30	Total	

43.3% said labor productivity was not as planned,30% said, yes, the labor productivity was as planned, 20% said it was sometimes, and 6.7% is missing data.as shown in table(4.21). So to increase the productivity rate we can use one of the following:

1- Two or more shifts instead of one.

2- Apply overtime increase in shift's period up to 10 hours instead of 8.

3- Increase the use of resources; labor and equipment.

Table (4.22):Labor Quantities

Was the number of labor enough					
Cumulative Percent	Valid Percent	Percent	Frequency		
63.3	63.3	63.3	19	Yes	Valid
83.3	20.0	20.0	6	No	
100.0	16.7	16.7	5	Sometimes	
	100.0	100.0	30	Total	

63.3% said labors'quantities were enough, 20% said labors quantities were not, while16% said they were some times.as shown in table(4.22).

The calculation of labor productive impacts of the most contentions topics in the construction industry, so from the schedule stage the labor quantities should be estimated depending on their productivity.

Table (4.23)Equipment availability

Has the equipment been used in the activities requiring them					
Cumulative Percent	Valid Percent	Percent	Frequency		
93.3	93.3	93.3	28	Yes	Valid
100.0	6.7	6.7	2	No	
	100.0	100.0	30	Total	

93% answered, yes,equipment was used, while 6.7% said no equipmentwas, which means that this issue isn't viewed as one of the problems of construction in Sudan.as shown in table(4.23).

Table (4.24):Tools availability

Were the tools available for workers on time					
Cumulative Percent	Valid Percent	Percent	Frequency		
73.3	73.3	73.3	22	Yes	Valid
100.0	26.7	26.7	8	No	
	100.0	100.0	30	Total	

73.3% said yes equipment was available on time, while 26.7 % answered with no.as shown in table(4.24).

Table (4.25):Labor type

What is the type of labor used in the project					
Cumulative Percent	Valid Percent	Percent	Frequency		
10.0	10.0	10.0	3	Foreign	Valid
83.3	73.3	73.3	22	Local	
100.0	16.7	16.7	5	Both	
	100.0	100.0	30	Total	

73.3% of the projects used local labor,10% used foreign labor, while 16.7% used both types.as shown in table(4.25).So while most construction workers learn on the job as an informal apprentice to an experienced tradesman. Formal apprenticeship programs are common, particularly in developed countries with trade unions.

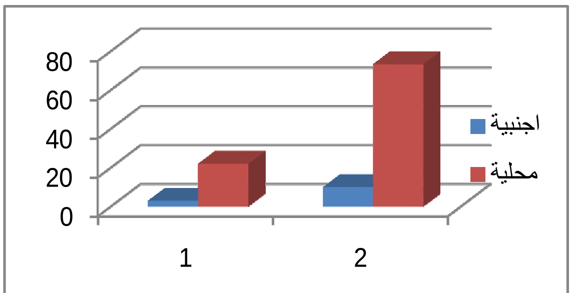


Chart (4.4) Labor Type

Table(4.26)Quality of local labor

If labor was local, what’s your evaluation to their work					
Cumulative Percent	Valid Percent	Percent	Frequency		
6.7	6.7	6.7	2	Excellent	Valid
40.0	33.3	33.3	10	Good	
90.0	50.0	50.0	15	Medium	
96.7	6.7	6.7	2	Weak	
100.0	3.3	3.3	1	n/a	
	100.0	100.0	30	Total	

33.3% answered the quality of local labors is good, only 6.7% answered with excellent, and 50% answered with “medium”.as shown in table(4.26). Jobs in construction field require workers to hold various skills from construction managers to floor installer. These workers generally learn their trade on the job, but may require a more formal education through college classes or apprenticeships.

Additionally, some high schools offer vocational programs in construction that create a solid background for future employment in the field.

Table (4.27):Quality of foreign labor

If labor was foreign, what's your evaluation to their work					
Cumulative Percent	Valid Percent	Percent	Frequency		
16.7	16.7	56.7	5	Excellent	Valid
40.0	23.3	23.3	7	Good	
43.3	3.3	3.3	1	Medium	
100.0	56.7	16.7	17	Weak	
	100.0	100.0	30	n/a	

56.7% evaluated foreign labor performance as excellent, 23.3% said it was good, 3.3% think their performance was medium and 16.7% is missing data.as shown in table(4.27).So the strategy of the country should be how to educate local labors to improve their productivity by training them with the foreign labors.

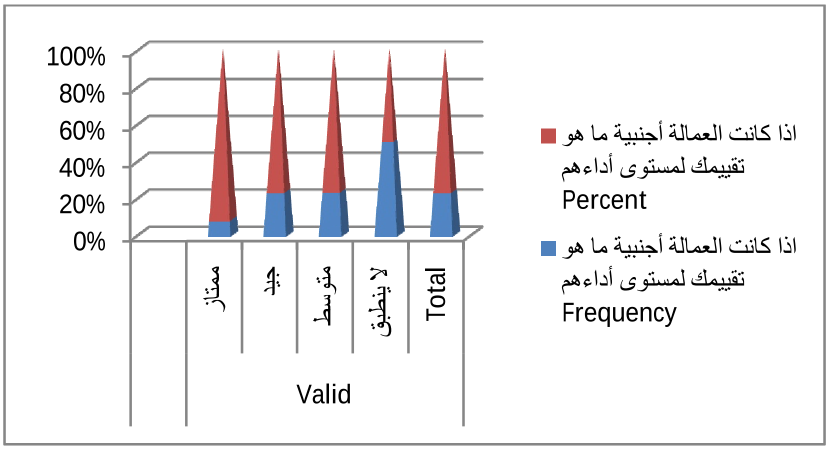


Chart (4.5)Quality of foreign labor

Table (4.28):Effect of labor type

does the type of labor have an effect on the project's time					
Cumulative Percent	Valid Percent	Percent	Frequency		
81.5	81.5	73.3	22	Yes	Valid
92.6	11.1	10.0	3	No	
100.0	7.4	6.7	2	Sometimes	
	100.0	90.0	27	Total	
		10.0	3	System	Missing
		100.0	30	Total	

73.3% think the type of labor affects the project time,10% said it doesn't,6.7% said it does some times, and 10% is missing data .as shown in table(4.28).

So the sixth hypothesis is not applicable in the Sudan construction industry.

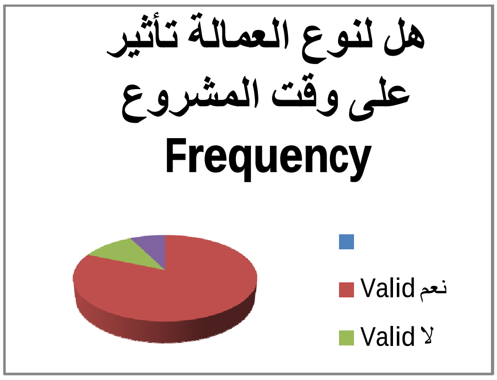


Chart (4.6) Effect of labor type

Table (4.29) Periodic meetings

Have periodic meetings been held to solve the project problems					
Cumulative Percent	Valid Percent	Percent	Frequency		
66.7	66.7	40.0	12	Yes	Valid
88.9	22.2	13.3	4	No	
100.0	11.1	6.7	2	Sometimes	
	100.0	60.0	18	Total	
		40.0	12	System	Missing
		100.0	30	Total	

40% answered that “yes” there were periodic meetings, 13.3% said none were held, 6.7% answered with some times, and 40% is missing data.as shown in table(4.29). Conducting regular project team progress meetings serve as a venue to review project progress and to assist with resolving outstanding issues encountered since the last meeting.

So the seventh hypothesis is not applicable in the construction industry in Sudan.

Table (4.30):Communication between owner and consultant

Your of owner/consultant communication					
Cumulative Percent	Valid Percent	Percent	Frequency		
26.7	26.7	26.7	8	Excellent	Valid
73.3	46.7	46.7	14	Good	
100.0	26.7	26.7	8	Medium	
	100.0	100.0	30	Total	

26.7% said the communication between owner and consultant is excellent, 46.7% think it is good, while 26.7% think it is medium.as shown in table(4.30).

Table (4.31):Communication between contractor and consultant

Your evaluation of consultant/contractor communication					
Cumulative Percent	Valid Percent	Percent	Frequency		
26.7	26.7	26.7	8	Excellent	Valid
80.0	53.3	53.3	16	Good	
100.0	20.0	20.0	6	Medium	
	100.0	100.0	30	Total	

26.7% said the communication between owner and consultant is excellent, 53% think it is good, while 20% think it is medium.as shown in table(4.31).

Table (4.32):Communication between contractor and subcontractor

Your evaluation of contractor/sub-contractor communication					
Cumulative Percent	Valid Percent	Percent	Frequency		
66.7	66.7	66.7	20	Good	Valid
100.0	33.3	33.3	10	Medium	
	100.0	100.0	30	Total	

66.7% said there is good Communication between contractor and subcontractor, 33.3% evaluated communication as medium.as shown in table(4.32).

Table (4.33):Contractor Payment

When were the due payments paid to the contractor					
Cumulative Percent	Valid Percent	Percent	Frequency		
20.0	20.0	20.0	6	Monthly	Valid
26.7	6.7	6.7	2	Every 3 months	
80.0	53.3	53.3	16	After every stage	
100.0	20.0	20.0	6	Other	
	100.0	100.0	30	Total	

20% said the payment to contractor is monthly based, 6.7% replied that payment takes place every 3 months, and more than half: 53.3% answered that payment is done by the end of each stage of the project .as shown in table(4.33).

Each construction contract governed by this section must define within the contract a monthly billing cycle for the contractor to submit monthly progress payment progress requests and final payment requests to the owner. The contractor should submit payments requests to the owner. Payment requests must be based upon actual or estimated work performed and materials supplied the preceding monthly billing cycle. The requirement does not preclude an owner from mutually agreeing with the contractor to prepay for materials. The owner is considered to have received a payment request when the payment request is submitted to any person designated by the owner in the contract to receive the payment request. So the request must be first review by the consultant and that takes period. So, most answers say that payment comes after every stage, as the questionnaire shows.

Table (4.34):Payment on time

Did the owner pay on the exact date of payment					
Cumulative Percent	Valid Percent	Percent	Frequency		
55.2	55.2	53.3	16	Yes	Valid
82.8	27.6	26.7	8	No	
100.0	17.2	16.7	5	Sometimes	
	100.0	96.7	29	Total	
		3.3	1	System	Missing
		100.0	30	Total	

55.2% of the answers said the owner pay on time, 26.7% said they don’t, while 16.7% said they do some times.as shown in table(4.34).

The goal is to make progress payments to the contractor as work is completed. You don't want to pay for materials that have not been delivered or work that is not complete. It is not your job to provide working capital for the contractor (if you are an owner –builder, the draw schedule will determine when the bank releases money to you to pay for materials and subcontractors).

So half of the forth hypothesis is not applicable in the construction industry in Sudan.

Table (4.35):Currency availability

Was the installments' currency agreed upon, available					
Cumulative Percent	Valid Percent	Percent	Frequency		
82.1	82.1	76.7	23	Yes	Valid
96.4	14.3	13.3	4	No	
100.0	3.6	3.3	1	Sometimes	
	100.0	93.3	28	Total	
		6.7	2	System	Missing
		100.0	30	Total	

76% said yes the currency was available,13.3% said the currency was not available, and 3.3% answered it was sometimes.as shown in table(4.35).

Half of the fourth hypothesis is applicable in the construction industry in Sudan

Table (4.36): Payment late

	What are the owner's reasons for payment delays					
Cumulative Percent		Valid Percent	Percent	Frequency		
89.5	89.5	56.7	17	Economical	Valid
100.0	10.5	6.7	2	Political	
	100.0	63.3	19	Total	
		36.7	11	System	Missing
			100.0	30	Total

More than half: 56.7% said they think that the reason behind late payment is economical, 6.7% think it's political, while 36.7% is missing data.as shown in table(4.36).

Table (4.37):Late payment affected performance

Did the payment's delay play a role in the contractors delay					
Cumulative Percent	Valid Percent	Percent	Frequency		
58.3	58.3	46.7	14	Yes	Valid
83.3	25.0	20.0	6	No	
100.0	16.7	13.3	4	Sometimes	
	100.0	80.0	24	Total	
		20.0	6	System	Missing
		100.0	30	Total	

46% think that "yes" late payment affected in delaying the contractor, 20% think it didn't, 13.3% said sometimes it did affected in delaying the contractor.as shown in table(4.37).

Table(4.38):Currency type

What is the type of currency used for payments					
Cumulative Percent	Valid Percent	Percent	Frequency		
80.0	80.0	80.0	24	Local	Valid
100.0	20.0	20.0	6	Foreign	
	100.0	100.0	30	Total	

80% of payment currency is local while 20% is foreign currency.as shown in table(4.38).

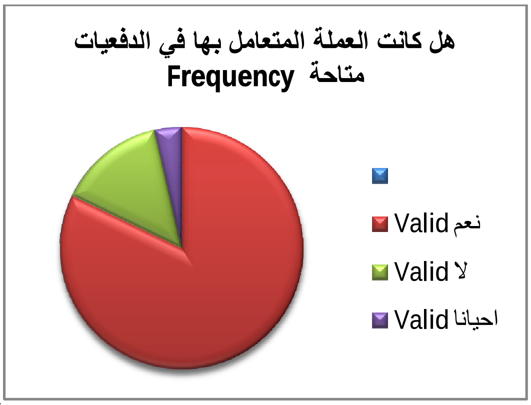
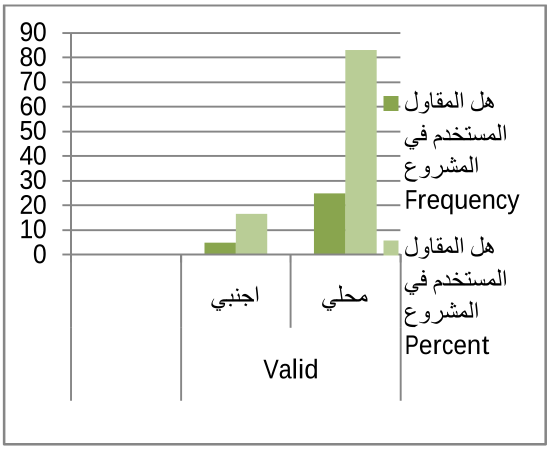


Chart (4.7)Currency type

Table(4.39): Contractor type

Was the project's contractor					
Cumulative Percent	Valid Percent	Percent	Frequency		
16.7	16.7	16.7	5	Local	Valid
100.0	83.3	83.3	25	Foreign	
	100.0	100.0	30	Total	

16.7% said the contractor is foreign whilst 83.3% of contractors are local as per the answers.as shown in table(4.39).



chart(4.8) Contractor Type

Table (4.40):Contractor classification

Was the contractor's company a					
Cumulative Percent	Valid Percent	النسبة	العدد		
3.3	3.3	3.3	1	Public	Valid
100.0	96.7	96.7	29	Private	
	100.0	100.0	30	Total	

96.7% of contractors are private companieswhile 3.3% are government sector,as shown.as shown in table(4.40).

Table (4.41):Chosen Contractor

How was the contractor chosen					
Cumulative Percent	Valid Percent	Percent	Frequency		
40.0	40.0	40.0	12	Tender	Valid
76.7	36.7	36.7	11	Known before	
96.7	20.0	20.0	6	Recommendation	
100.0	3.3	3.3	1	Other	
	100.0	100.0	30	Total	

40% of contractors selection was by tender, 36.7% answered contractors are selected based on past relation with them, 20% answered selection by recommendation.as shown in table(4.41).

- Competitive bidding
- Informal competitive bidding process
- Negotiated contracting
- Duration of the bidding period
- Equal opportunity policy
- Best value contractor selection

Only these six criteria are the scientific method for selection to be followed, otherwise it may cause difficulties in the project.

Table (4.42):Contractor affect in delay

Did the contractor have an effect in the delay					
Cumulative Percent	Valid Percent	Percent	Frequency		
56.7	56.7	56.7	17	Yes	Valid
100.0	43.3	43.3	13	No	
	100.0	100.0	30	Total	

Contractors affect in delay by 56.7% as some respondents answered while 43.3% think they don’t affect in delay.as shown in table(4.42).

Contractor related factors include site management, improper planning, inadequate contractor experience, mistakes during construction methods and delay caused by subcontractors. Delays caused by subcontractors are included among the contractor's factors because the latter is fully responsible for the delays caused by his subcontractors.

Table (4.43):General Reasons of contractor delay

If answer was Yes, explain					
Cumulative Percent	Valid Percent	Percent	Frequency		
3.3	3.3	3.3	1	Economical conditions of the country	Valid
6.7	3.3	3.3	1	The owner's holdbacks	
10.0	3.3	3.3	1	Bad relationship between company's owner and the management	
13.3	3.3	3.3	1	Weak concrete results	
20.0	6.7	6.7	2	Not caring for the time schedule	
23.3	3.3	3.3	1	Contractor has other incomplete projects	
40.0	16.7	16.7	5	Not enough labor	
80.0	40.0	40.0	12	n/a	
83.3	3.3	3.3	1	Contractor hasn't used any tools	
93.3	10.0	10.0	3	Not caring for material	
100.0	6.7	6.7	2	Imported material's delivery	
	100.0	100.0	30	Total	

In addition to the previous tables and percentages read, there was a separate paragraph containing additional reasons for delay, shown in the table(4.43). The researcher will discuss only the reasons that highly contribute in the delay:

1. The delay from contractors may occur because the lake of distributions for the labors and equipment is a priority.
2. Personal relationship between owner and contractor could negatively affect the management of the project.
3. Changes in design, cancelling contractors or changing all these actions cause delays.

4. Getting consultant approval for importing materials to the site long enough before the beginning of activities reduce delay.
5. Complications in currency exchange in case of foreign contractors cause great delay.
6. In cost contract, contractors don’t pay great attention to schedule.
7. Instability in price due to the country economic situation confuses the work.
8. Material importation makes procedures harder.
9. Contractors signing a new contract while working in other running projects cause delay in starting the new one.