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**CIVIL PROJECT MANAGEMENT AND ITS
IMPACT ON THE IMPLEMENTATION OF
INFRASTRUCTURE PROJECTS IN IRAQ -
SALAH AL-DIN CASE STUDY**

Obayda ALMULEES

Master's Thesis

Supervisor

Asst. Prof. Dr. MOHSEN SEYEDİ

Istanbul, 2023

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ABSTRACT

CIVIL PROJECT MANAGEMENT AND ITS IMPACT ON THE IMPLEMENTATION OF INFRASTRUCTURE PROJECTS IN IRAQ - SALAH AL-DIN CASE STUDY

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Infrastructure is a basic system for the rehabilitation of all construction projects, This study aims to identify the role of project management in infrastructure projects in Salah al-Din province in Iraq. The practical aspect of the research includes interviews with a sample of engineers and contractors and a field survey to study the reality of applying project management requirements to infrastructure projects in Iraq. Salah al-Din governorate is considered one of the developing regions, and it needs many infrastructure projects, in line with the population growth of the governorate. Despite the establishment and rehabilitation of many infrastructure projects within the budget of regional development these projects were suffering from not being completed on time, as many other problems Finally, the results of the study showed that the lack of a role for engineering management in preparing an infrastructure rehabilitation plan in Salaheddine province was a major reason for project delays.

Keywords: Management Projects, Infrastructure Types, Infrastructure Project, Construction Projects, Salah Al-Din Case.

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ABBREVIATIONS

WPS	:	Work Breakdown Structure
CPM	:	Construction Project Management
PM	:	Project Management
BOT	:	Build Operate Transform



LIST OF SYMBOLS

B.O.O.T : Build Operates Owns and Transfer

BOO : Build Operate Owns

BLT : Build Lease Transfer



1. INTRODUCTION

1.1 OVERVIEW

The building sector is the totality by which physical progress is realized, and this is really the locomotive of the national economy. An economy's level of self-reliance is determined by how much of the nation's resources are given by the national economy. Building complex infrastructure projects requires construction managers to execute projects on schedule, within the agreed-upon price, and with good quality.

The effective completion of building projects and maintaining them on time and under budget need an approach that involves solid engineering judgment. It's a fact that many projects are plagued by lengthy delays that end up costing more than expected. This issue is especially prominent in conventional or adversarial contracts, in which the contract is granted to the lowest bidder - the awarding approach used for the bulk of public projects in developing nations. Consequently, enhancing building efficiency via cost-effectiveness and on-time delivery will surely contribute to cost savings for the nation as a whole. While construction spending is typically 3–4 percent of a country's GDP, it accounts for 15 percent of the country's overall GDP in Korea. The construction industry's productivity growth has a greater impact on GDP growth than any other industry's does, hence.

1.2 PROJECT MANAGEMENT

Individuals working together toward the same objective, in the same time period and with the same budget in order to generate recognizable deliverables are called projects. For more than half a century, the success of a project has been determined by its adherence to strict schedule, budget, and output guidelines [4]. For the last 50 years, projects have been unable to attain this well-known iron triangle in their efforts. Repeated surveys and research efforts clearly show that the project team's capacity to regularly reach the project's aim is poor [11].

The application of information, tools, skills, and procedures to project-related activities with the purpose of attaining predetermined objectives is known as project management. Planned activities are translated into actions, which are measured in terms of progress and

accomplishment, and finally performance is evaluated in accordance with predetermined goals and targets [5].

1.3 THE CONCEPT OF INFRASTRUCTURE

The visions and concepts regarding the definition of infrastructure differed according to its nature, purpose and the goal that it contributes to achieving. In addition to services that depend on labor-intensive such as waste collection and the provision of public transport services, the infrastructure includes roads, airports, ports, railways, drinking water plants and their networks, power plants and their networks, natural gas networks, sewage, communications and utilities, in addition to health services [2].

The concept of infrastructure was initially associated with the Industrial Revolution, where it was defined as a set of auxiliary services required for the industry, or the so-called industrial infrastructure or the structural structure necessary for the industry. Then the concept expanded through the inclusion of social capital activities, and both, [14]. Indicated that infrastructure is characterized by being:

- a. Industries that produce essential services and are considered a prerequisite for stimulating industrial and economic growth include:
- b. The productive services are slow to move, so the energies that are produced from these services must be produced within the same country;
- c. The energies producing these services are characterized by some characteristics, such as the scope they target, their long processing times, and they are unusually durable.
- d. Infrastructures can also be defined as unique, non-replicating projects, which are models that have a long-term impact on the economic and social policies of the state, and are considered long-term projects at least: 5 years for planning, 5 years for feasibility studies, 5 years for construction, and the entire project it could take 50 years [31].

As for the World Bank, the infrastructure is defined as the in-kind capital invested in public utilities and services in the fields of roads, transportation, communications, water and sewage, electric power plants, railways, ports and airports, with the aim of serving the private sector, both the family and the business sector. Then services were added to this definition

Health, Housing and Education [7]. Some social organizations have defined infrastructure as the invisible background to support the natural, cultural and technological environment necessary for the development of the city, and these take multiple directions as the base capital and include tangible resources such as the level of education and the health level of the community in general in addition to the potential inherent in society and institutional infrastructure [7].

1.4 THE IMPORTANCE OF INFRASTRUCTURE

Infrastructure services are of great importance to urban residents in recent times, and the reason for this is the increasing human need for those services, especially after the development in the level of urbanization experienced by human groups and the development of techniques and methods used in their provision and provision, as well as the different and varying levels of their types in the place. As a result of the acceleration of the growth and development of cities and the high levels of urbanization, which made the matter of their availability in all its forms and types necessary and essential. Rather, their availability became of standards, standards and features of urbanization that countries are going through, and what is important in this is that services are efficient, sufficiency, quality and quantity as standards of civilized and technological development, given that the two aspects are related to the importance of its existence [3].

To clarify the importance of infrastructure in achieving social development, the (mentioned some social areas that directly affect infrastructure:

- a. Health, Safety and Social Welfare
- b. Quality of Life in Local Communities
- c. Reliability and speed of communications
- d. Time and cost
- e. Develop resilience and recover quickly from natural disasters.

As for the importance of infrastructure in achieving economic development, it comes from the fact that it is the basis for the flow of investments automatically with the flow of

economic activities in developed countries in particular as a result of the availability of infrastructure services and the consequent expansion of absorptive capacity. In the same context, an American study conducted on the elements of infrastructure and productivity in the American economy during the period (1971- 1985) confirms that the decline in the rate of spending on infrastructure projects in the American economy is responsible for the decline in total productivity. In the sense that there is a direct relationship between spending on infrastructure projects and the increase in total productivity [7].

The Palestinian Council for Development and Reconstruction ,2008) indicated the importance of infrastructure through the following facts:

- a. Developing countries invest about \$200 billion in infrastructure annually;
- b. The World Bank recommends that the least developed countries devote 6% of their GDP to infrastructure development, while this percentage is reduced to 3.8% for medium-developed countries;
- c. The world is rapidly urbanizing and that 85% of the world's population will live in urban areas within the next 20 years;
- d. Implementation of part of the road network in India increased the overall production of rural areas by 7%;
- e. the implementation of a rural electricity project in Costa Rica increased the number of major businesses from 15 to 86 in a short period of time;
- f. The implementation of a rural road in Morocco not only increased agricultural production, but also helped to double the number of people enrolled in education in schools and institutes and to increase the number of health services users;
- g. The highway network in the United States of America saves 18 cents in annual production costs for every dollar invested by the state in building infrastructure, and the entire road network saves 24 cents for every dollar in annual production costs.

1.5 INFRASTRUCTURE COMPONENTS

Infrastructure consists of a long list of basic elements necessary to support population and business activity. [1] clarified a set of these components as follows:

Potable water: the demand for water is constantly increasing, and the individual's need has reached about one thousand liters per day in Some industrialized countries, while others suffer from a water problem, and the per capita share does not exceed 20 liters per day and may be much less, especially in countries that suffer from drought, and accordingly, the local authorities in the city must work seriously to provide water to meet the need for increased demand On water and the expected population increase, many Arab cities have faced problems in providing water to their residents adequately for several reasons, including the lack of its sources, poor distribution and increase in population. In order to sustainably conserve water resources,) National Research Council of indicated the need to [7]:

- a. Manage and maintain existing assets
- b. Dam safety guarantee
- c. Planning and developing projects to meet future resource needs
- d. Developing alternative means of saving water:
- e. Develop programs to promote water conservation:
- f. Implementation of electrical engineering research.

Electric energies: Energy is one of the important and necessary services on which the various joints of life depend. The need for that service has increased with the increase in technological development until that need reached 16 thousand watts per day in some countries, while the share of the individual in some countries is less than 20 watts per day. And urban residents may face a problem in obtaining electrical energy in sufficient and equal quantities for all city residents for many reasons, including the lack of an adequate source of energy and the second failure to distribute it in a manner consistent with the population density and distribution of land uses and the lack of development of sources of energy provision that is related to and increased demand for it:

Communications: Communication services are one of the necessities of life at the present time, which has developed in a way that has made the world, as some call it a small village, thanks to the multiplicity of communication channels with all parts of the world and from anywhere. Therefore, the state must provide such services to all members of society, otherwise the society that is deprived of them will remain isolated from the world and ignorant of many things: | Sanitation: Sanitation services are one of the basic elements that must be provided in urban areas.

Roads: The network industry, such as roads and bridges, has undergone a profound transformation in the past twenty years and an attempt to change what can be changed. This change was linked to the technological framework and interaction with road or bridge users. In order for a tourist area to attract cars, it must have the appropriate conditions for the current and expected movement of cars with its comfort and safety, but this does not mean that every tourist area in order to attract car tourism has to have highways, but it is sufficient that the road capacity is wide.

Lesigne (2012) pointed out that road infrastructure is not limited to roads, bridges and railways only, but also includes pedestrian paths, animal paths, etc.

Facilities for health care: all members of society need health care as well as tourists, and tourist areas need health care that takes into account the expected volume of tourist movement, age groups and types of activities they practice, such as mountain resorts, skiing areas and mountaineering areas. Each type of these sports needs To health care that is commensurate with what is expected of accidents, and medical centers must be provided in the arrival areas in ports and airports; Transportation: Transportation technology is considered one of the most important infrastructure services because it has an important impact on the process of transporting goods and transporting people and therefore it is an effective means in the development process and the progress of the economic development process in its healthy image or towards the right track. Transport is one of the important services on the basis of which the extent of Countries are advanced or delayed, and one of the aspects that a person thinks of when he wants to live in a place, often residential areas are established on the outskirts of cities, but there are no means of transportation to serve these areas, so people are reluctant to live in them, even if the rent is low. Therefore, transportation constitutes an important nerve in the .The life of urban, rural and rural

residents, but in the cities, its importance is clearly visible, and the citizen may face difficulty in moving from his place of residence to his workplace due to the lack of means of transportation or because of the crowded streets.

1.6 THE IMPORTANCE OF THE STUDY

From the theoretical point of view: the importance of the study from the theoretical point of view emerges from the importance of information Which will be obtained from its sources and related to the role of the engineering department in preparing Infrastructure rehabilitation plan. The current study is one of the first studies within the limits of the researcher's knowledge, which is applied In Iraq with regard to the issue of the administration's role in preparing a plan to rehabilitate the infrastructure, which It is a new addition to the Arabic library. From an applied point of view, this study can benefit from the following categories:

- a. Researchers by making this study as a scientific basis for other similar studies.
- b. Those interested in preparing a plan to rehabilitate the infrastructure in Salah al-Din Governorate to identify on the mechanism through which rehabilitation can be carried out in an appropriate way.
- c. Workers in engineering offices and workers in infrastructure projects for the two sectors public and private to benefit from the results of this study.

1.7 STUDY PROBLEM

Salah al-Din Governorate is one of the developing regions, and it needs many infrastructure projects Infrastructure, in order to keep pace with the population growth of the province, despite the establishment and rehabilitation of many projects Infrastructure within the budget for the development of the regions and the petro- dollar, but these projects were It suffers from not completing it on time, as this phenomenon deserves to be studied and interest, hence the importance of conducting an applied study to survey the opinions of employees Infrastructure projects in the public and private sectors in Salah al-Din Governorate To find out the main reasons for this phenomenon, The problem of the study is also the lack of adoption of a party Specific to a system through which engineering projects can be

rehabilitated in a way that makes it easier for the government authorities to build standards, foundations, and models through which these projects can be rehabilitated. More specifically, the problem of the study is to answer the main question next one:

What is the role of the engineering management in preparing a plan to rehabilitate the infrastructure in Salah Al-Din Governorate?

1.8 STUDY OBJECTIVES

The study aims to identify the factors causing delay in projects and re-running projects Drafting new standards to be used in preparing a plan to qualify engineering projects: for the purpose of Defining the tasks or role of the engineering department in preparing a plan to rehabilitate the infrastructure in the governorate Salah Al-Din by identifying:

- a. Getting to know the nature of government projects.
- b. Describe the nature of the infrastructure.
- c. Identifying the factors causing delays in government projects.
- d. A statement of the nature of qualifying engineering projects.
- e. Demonstrating the role of the engineering administration in preparing a plan to rehabilitate the infrastructure through
- i. Explain how to reformulate new standards used in preparing a plan Rehabilitation of projects.
- ii. Find out whether there are statistically significant differences in the role of management Engineering in preparing a plan to rehabilitate the infrastructure in Salah Al-Din Governorate due to demographic changes?

1.8.1 The Limits and Limitations of the Study

The limits of the study are as follows

Spatial Boundaries: This study is applied in Salah El-Din Governorate.

Time Limits: The study will be conducted in 2022\2021

Objective Limits: Civil project management and its impact on the implementation of infrastructure projects in Salah al-Din Governorate.

Human Limits: The study is applied to workers in the infrastructure projects of the two sectors public and private.

1.9 THE THESIS ORGANIZATION

Each section of the study is broken down into a chapter. An overview of the research is provided in Chapter One under the areas of: Background to the investigation, the statement of the issue, objectives of the study, significance of the study, research questions, scope of the investigation, and organization of the study.

On the other hand, in Chapter Two, a comprehensive evaluation of the relevant literature is conducted. Data collection techniques are discussed in detail beginning in Chapter Three. They include, for example, administering surveys or conducting interviews or just watching people.

The findings, comments, and analysis of the study's data are presented in Chapter Four. Conclusions and suggestions are included in Chapter Five.

2. LITERATURE REVIEW

2.1 GENERALS

The goal of project management is to ensure that a project is completed on time, on budget, and to the specified quality standards, and to do so by planning and coordinating all aspects of the project from inception to conclusion. When a project goes outside the standard scope of an organization's operating responsibilities, it is often designated for high-risk, time-limited, non-repetitive operations.

2.2 DEVELOPMENT OF MANAGEMENT SCIENCE

The Great Wall of China and the Egyptian Pyramids are commonly cited in discussions of the history of major projects. They were undoubtedly big and intricate constructions, constructed to the highest standards, which must have required a significant amount of money to construct.. For this reason, the management approaches utilized can only be relied on guesswork since no such systems have been formally published [30].

The roots of management go back to the distant past, like the old professions such as law, medicine and education, but professional appearances of management did not appear only in relatively recent years, as the profession is an institution based on a set of knowledge that experience has demonstrated the validity of which is used to serve others. therefore, the researcher in the field of management should read the writings of the first scientist in the field of scientific research and who have contributed the abundant share in clarifying the concepts involved in science in the determination of its foundations and principles, who have been credited with the first in the development of management information in a situation where management is an organized profession. In the below some will be previewed according to their historical ranking [45].

- a. Frederick W. Taylor (1856-1915): Frederick Taylor of the men of the production and management and counseling, was one of the most top management influences in defining the concepts of modern science as it has applied the scientific method to solve the problems of the plant, and analysis of these problems could be found a set of organizing principles that can be used as an alternative means of trying and error, which was commonly used at that time. Taylor has cited the example of the applied became known as the means by which scientific management in a famous paper called "Shop Management", which were presented at a meeting of the American Society of Mechanical Engineers in 1903. It was Frederick Taylor believes that scientific management in essence include a comprehensive revolution has two sides: The first side on-line workers employed in industry and moving towards the intellectual revolution of duties connected with their work and the work of their colleagues and also for their relationship with their colleagues and management, or who provided them the opportunity to work in the project. The second side online management representatives as heads of the workers, foremen, project owners, the Governing Council and head towards the intellectual revolution of their duties to their fellow workers in management and the workers and also to the everyday problems that were facing them. As it was felt that such a fundamental change in the mindset of humanitarian groups working in the project has led to the promotion of peace and unification within the work attitudes of both management and workers and unify their goals and establish mutual trust between them instead of waiting and uncertainty that reigned in their relationship. There is no doubt that this was called to the need for the development of scientific management and improves or refines the foundations and principles.

Taylor has found that there were four basic principles of scientific management related to the way new scientific developments that have accompanied the new management he summarized:

First: develop a science for each aspect of a man's profession, replacing the previous rule of thumb approach. Second: use scientific methods to pick, train, educate, and develop the workers, while in the past he selected his own job and trained himself to the best of his ability. Third: enthusiastically collaborate with the guys to ensure that all of the job is done in line with the science that has been created. Lastly, there is a nearly equal allocation of the

labor and responsibilities between management and the workers. When it comes to tasks for which management is more equipped than workers [defining how labor is to be done], the males used to be left with the bulk of the workload, and the responsibility that came along with it.

Henry Gantt (1861-1919) :Gantt gave his interest in the largest to the man who led work, and was of the opinion that the willingness to use peaceful means and skills in the performance of the work is important as the importance of knowing the means and acquire skills. 13 In this he was able to confirm the importance of the human element in production may display Gantt method of bonus and working time. Gantt was an excellent knowledge work is defined as those that could be described and defined in the minds of a few individuals.

The typical work is work that can be described clearly and easily to any individual and the Gantt view that the biggest problem we face is to transfer excellent knowledge to the knowledge of typical lead by typical meaning. Gantt is providing a standard day rate regardless of performance, which provided security to workers during training and when delayed because materials were not available; workers who accomplished the specified daily production received an additional bonus, as did their foreman. Gantt was also noted for his work in developing charts that graphed some function of performance against time.

Henry Fayol (1841-1925) :Fayol is considered one of the first writer in the field of management, who tried a successful attempt to summarize the basis of management in his book (the general principles of management), Fayol has reached a number of principles that are seen as more applicable in the field of management, namely:

- a. Authority and responsibility must be related
- b. The division of labor
- c. Unity of command
- d. Discipline
- e. Subordination of individual to general interest
- f. Unity of direction

- g. Centralization of authority
- h. Remuneration must be fair and bring the best satisfaction
- i. Scalar chain
- j. Order
- k. Equity
- l. Initiative
- m. Spirit of the team
- n. Stability of tenure

He believed that the industrial activities can be divided to :

- a. Technical.
- b. Commercial.
- c. Financial .
- d. Security .
- e. Accounting .
- f. Administrative .

He also divided management to :

- a. Planning / Forecasting,
- b. Organizing.
- c. Command.
- d. Coordination.
- e. Control.

2.2.1 Project Life Cycle

Project life cycles might be referred to by a variety of names, but they always follow a similar pattern. In certain cases, the stages or phases are referred to by various names. Although some authors believe there are more than four stages in the project life cycle, these are the ones that the majority of projects go through on a regular basis. These stages are called [3].

- a. Initiation phase.
- b. Planning phase.
- c. Executing phase.
- d. Closing phase.

The researcher, on the other hand, feels that project control and monitoring is not a stage in and of itself, but rather a technique that must be implemented throughout the project's whole life cycle, not only at the end.

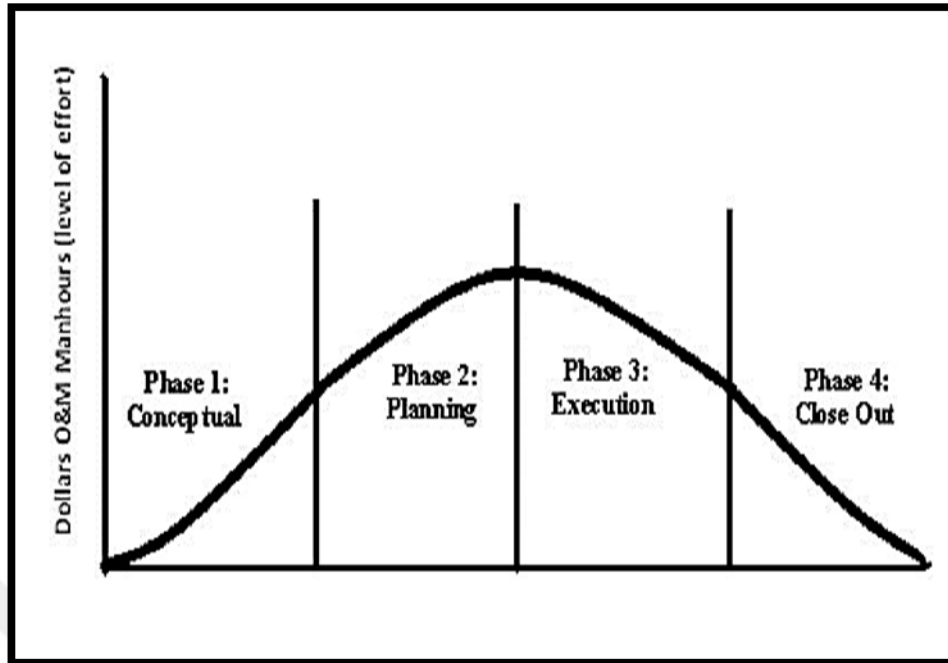


Figure 2.1: Tasks Accomplished by Project Phase [16].

2.2.2 Initiation Phase

A project chart is created and the project team is assembled once the customer or funder has identified and described all of the necessary criteria and specifications. This period is referred to as the project's inception, or the beginning of its development. Included in this process are the project description papers and the feasibility study as well as the needs that are identified. The crew has a number of crucial tasks to complete and prepare for at this time, including:

- a. Client, funder or stakeholder interviews and workshops to determine their requirements and objectives.
- b. Researching and planning to gather all the necessary data for the project's various stages.
- c. Project idea and diagrams, together with all necessary documentation, are prepared.
- d. All the standards, laws, and guidelines that are required to accomplish the project must be gathered and thoroughly studied. (43)

While the project is still in its early stages, there are still certain issues that may arise, such as:

- a. The funder or other stakeholders have not made any commitments.
- b. Frustration over the project's inability to get started on time.
- c. It's a challenging and vital element of this stage to put together the proper team with the right personnel.
- d. A project might be doomed even before it starts if the management, stakeholders, funder, or clients cannot agree on key points of view.
- e. Failure to clearly see the project's final outcome, a critical phase in the process of creativity.

The top management of the company formulating and answering questions will assist in the formation of a well-functioning team and in clearing the way to meet the project's objectives and aims [21].

2.2.3 Planning Phase

The planning phase of a project is the most significant and hard one., Many issues and misunderstandings may be avoided later on if the project is well planned out from the outset.. this phase includes:

- a. developing company needs via in-depth analysis
- b. Examining the project's budget, timeline, and start and end dates for each activity.
- c. Determining what resources are required and making them accessible.
- d. Using a work breakdown structure to determine what sort of work is required.

Work breakdown structure helps us correctly arrange the scope of the project by employing a hierarchical framework that allows us to split the project down into smaller sections at each level. The structure of the work breakdown helps to allocate resources, delegate roles, and keep track of and supervise the project. With the use of WBS in planning, project managers

may keep an eye on successes, risks, expenses and time in order to ensure that the project is on track. [29]. As a kind of road map for the project, managers and planners should construct a complete project plan diagram. While recognizing the resources required and the milestones, a project plan is the road map that shows the activities and tasks that must be completed by a specific date and time; it informs the project manager throughout all phases of whether or not he is on track or indicates that changes have occurred.

There should also be many plans in place if the project is significant, including one for each of the following: resources; money; quality; and communications. In order to save the project, a risk strategy must be in place [27].

- a. Execution phase: The execution or operation phase is another name for the third phase. In this stage, the project's true body is developed and ready to be turned over to the customer. It's a lot of work since it's lengthy and has a lot of information. Several procedures, such as:-, are required at this stage.
- b. Time management : A team's ability to complete a task on time is referred to as "time management." The manager will be able to observe which tasks have been completed, how long they took, and the times they began and ended as a result of having this information. By comparing the amount of time allocated for a task to the amount of time spent actually carrying it out, time management may also be of use.
- c. Cost management: Cost management is a technique that is necessary to keep track of the project's expenditures. With this tool, you can keep an eye on the project's expenditures and compare them to the budget at all times. This procedure guarantees that the manager is aware of all of the company's expenditures [28].
- d. Quality management: This procedure is necessary at this point to ensure that the team's output matches precisely what the client or customer had agreed upon. In this stage and throughout the whole project, quality management is essential. At this stage, it's critical to confirm that the public's expectations of our work match the original design [30].

- e. Change management: All of the project's modifications are managed via the use of the change management procedure. Changes may be documented, examined, authorized, and analyzed thoroughly via efficient change management. Using this method, project managers may keep track of changes and their impacts before they have a negative impact on the project, ensuring that necessary modifications can be implemented quickly and positively.
- f. Risk management: A risk process is a set of steps that must be followed in order to identify and manage potential issues before they arise. In order to minimize risk, it is necessary to conduct risk assessments and determine the activities required to reduce the risk and avoid negative effects. All stages of the project need risk management, and careful management will assist eliminate the uncertainties [25].
- g. Software Management: Project management planning and monitoring tools like as Gantt charts, PERT charts, CPM charts, and Gantt schedules have been greatly aided by the development and use of software like Microsoft Project (MS Project) and Primavera. Additionally, the WBS forms may be created using software, which can assist the user in generating accurate records and data such as time-line adjustments as well as schedules and budgets [28].

2.3 CLOSING PHASE

The last step of a project's life cycle is the closure phase. There are a number of steps that must be followed in order to end the project, including:

- a. Delivering the project to its owner or customer.
- b. Providing the customer with all of the documentation and information they need.
- c. The stakeholders are given complete information on the project's personnel and equipment releases.
- d. Determine which activities and duties should be halted when the project is completed, as well as which ones should be continued and for how long.

- e. Making a determination as to whether or not the project was completed on time and on budget while also terminating any contracts with suppliers.
- f. The project's success, failure, and accomplishments should be documented so that the lessons learnt may be used in future initiatives [44].

2.4 BASIC ELEMENTS OF PROJECT MANAGEMENT

Resources, time, and money are the four cornerstones of every successful project, and an effective PM must keep an eye on all four of these at all times. If the project and the project manager are to be a success, all of these factors must be controlled simultaneously. Each of the following components must be appropriately managed [41].

2.4.1 Managing Resources

Resource management is critical to the success of a good Project Manager. The project team's time is included in this figure. Managing subcontractors and suppliers is also part of this. In order to effectively manage human resources, it is necessary to have the appropriate people, with the right abilities and the right tools, in the right amount at the right time. Managing human resources Project resource management, on the other hand, often entails more than just personnel management. It is the project manager's responsibility to ensure that all of the project's equipment and materials are properly maintained, as well as the project's budget.

2.4.2 Managing Time and Schedule

A project manager's ability to effectively manage their time is essential to their success. Lack of schedule management is the most typical reason of inflated project costs. Fortunately, there is a plethora of project management software available today. It is possible to decompose every project into a series of activities that must be carried out. The project manager must first determine the tasks to be completed, how long they will take, what resources they will need, and what sequence they should be completed in.

2.4.3 Managing Costs

To be a successful Project Manager, one must have the capacity to successfully execute a project on time and within the set budget parameters. Estimated expenses, actual costs, and unpredictability are all included in the costs. The cost of contingencies accounts for the impact of the weather.

2.5 KNOWLEDGE AREAS OF PROJECT MANAGEMENT

The nine knowledge areas of project management are integration, scope, time, cost, quality, human resources, communication, risk and procurement.

2.5.1 Project Integration Management

There are a number of steps that must be taken to ensure the effective completion of a project. These include: Identifying and defining all the processes and activities that make up the project; combining and unifying them; articulating them; and coordinating them. Integration management entails the following steps:

- a. Create the project's mission statement.
- b. Create a strategy for managing the project.
- c. Oversee and control the progress of the project.
- d. Keep an eye on the project's progress.
- e. Integrate the process of change management.
- f. Ensure the project or phase is completed [41].

Cost, time, quality and personnel all need to be integrated into the project as a whole. This indicates that no project choice should be made in a vacuum, without input from others. This component is responsible for communicating the project management method, as well as a strategy for project management. Initiation, planning, execution, and closure are all communicated via the project management process. An effective project management plan outlines the goals, methods for achieving them, tools and techniques used, as well as the

steps that must be taken to bring them to fruition. Stakeholders are informed of the project's viability, planning, execution, and closure across the project life cycle.

2.5.2 Project Scope Management

In order to guarantee that the project contains all the work necessary to execute it effectively, project scope management encompasses all of the necessary steps [37]. Scope management includes the following steps:

- a. Define scope.
- b. Collect requirements.
- c. Verify scope.
- d. Control scope Scope is an explicit version of the client's objective.
- e. Create work breakdown structure (WBS).

Initially, the customer shows an interest or need to be involved in the construction process. The customer picks the project manager, who in turn briefs the project team via both verbal and nonverbal communication. The project team's communication efforts are critical to ensuring that the scope of the project is properly documented.

2.5.3 Project Time Management

Project time management includes the processes required to manage timely completion of the project. The processes of time management are:

- i. Sequence activities
- ii. Define activities.
- iii. Estimate activity durations.
- iv. Estimate activity resources.
- v. Control schedule
- vi. Develop schedule [37].

In order to manage project time effectively, one must first determine how long the project will take to finish and then plan and schedule the different tasks to achieve that deadline. The critical route dictates that activities must be completed within a certain amount of time in order to be completed successfully. A project's scope will be unable to meet its goals if there is no clear indication of when it will be completed.

2.5.4 Project Cost Management

There are several procedures involved in project cost management such as cost estimation and forecasting as well as cost budgeting and control [37].

The processes of cost management are:

- a. Determine costs.
- b. Control costs
- c. Estimate costs [37].

2.5.5 Project Quality Management

To guarantee that the project's outputs and the procedures by which they are delivered match stakeholders' expectations, quality management applies a discipline known as project quality assurance to ensure that both the outputs and the processes fulfill the project's goals[21].

The processes of quality management are:

- a. Perform quality control
- b. Perform quality assurance.
- c. Plan quality [37].

The procedures and actions of the participating organizations that set quality policies, goals, and responsibilities are included in project quality management. This ensures that the project meets the requirements for which it is done. Continuous process improvement activities are carried out as necessary across the policies and procedures of a quality management system [37].

2.5.6 Project Human Resources Management

There are a number of human resources management practices that are involved in a project's overall success. All members of the project team are allocated specific tasks and duties for the project's completion. Human resources management entails the following steps:

- a. Acquire project team.
- b. Develop human resources plan.
- c. Manage project team
- d. Develop project team [41].

2.5.7 Project Communication Management

An important part of project communication management is making sure all information is collected and sent in a timely and suitable manner. Communication with team members and stakeholders, both internally and outside, is the primary task of project managers.

In order to effectively manage communication for projects, the following steps should be followed:

- a. Plan communications.
- b. Identify stakeholders.
- c. Manage stakeholder expectations.
- d. Report performance
- e. Distribute information [37].

2.5.8 Project Risk Management

A project's risk management process involves the following activities: risk management, planning, identification, analysis, reaction planning, and monitoring and control. A primary goal of project risk management should be to maximize the likelihood and impact of successful outcomes while simultaneously minimizing adverse outcomes. There are three steps to risk management:

- a. Identify risks.
- b. Plan risk management.
- c. Perform qualitative risk analysis.
- d. Perform quantitative risk analysis.
- e. Monitor and control risks.
- f. Plan risk responses [37].

2.5.9 Project Procurement Management

Purchasing or acquiring items, services, or results from outside the project team is the responsibility of procurement management [37]. The processes of procurement management are:

- a. Conduct procurement.
- b. Plan procurement.
- c. Close procurement
- d. Administer procurement [37].

In the field of procurement, tasks including creating a procurement strategy, writing contracts, finding and hiring vendors, and monitoring the status of contracts are all possible [21].

2.6 INFRASTRUCTURE TYPES

There are many views on the types of infrastructure. In terms of impact, there are two types of infrastructure, social infrastructure, which are structures that do not directly affect economic development, such as education, health services and sanitation, and economic infrastructure, which are structures that directly contribute to the industrialization process and economic activities such as transportation. Irrigation, Energy and Communications [32].

In terms of financing, infrastructure is classified into three types: national infrastructure, facilitating trade within the country and increasing the domestic product and private infrastructure achieved by the private sector, and joint infrastructure between the public sector and the private sector, as these two contribute primarily to achieving economic development and improving infrastructure in backward and even developed countries [27].

Other categories of infrastructure include: heavy infrastructure such as airports and mines, technological infrastructure such as databases and information and communication technology, and cultural infrastructure such as education and scientific events. At the regional level, there are three types of infrastructure: regional infrastructure that enhances productivity, regional infrastructure that enhances trade such as gas and oil pipelines, and regional infrastructure that improves mobility [27].

2.7 CHARACTERISTICS OF THE INDUSTRY AND THE ESTABLISHMENT OF INFRASTRUCTURE

Explained the most important characteristics of infrastructure projects as follows [17]:

- a. These projects are of great social and political importance, as they provide the public with basic and necessary services such as water, electricity, gas and communications, roads, airports, ports, railways, and others;
- b. The benefits and services of these projects do not accrue to an individual or a group of individuals or certain entities, but rather to all members of society, whether directly or indirectly, and they do not benefit an economic sector alone, but rather include many sectors of the economy, and the right of any individual Or an entity in the community to

benefit from it regardless of the extent of its contribution to its establishment, cost, operation and maintenance.

- c. It is of great importance for economic development in different societies. It cannot be imagined that economic or social development will occur in any society without an advanced infrastructure in it. Some applied studies have proven that every increase in the state's balance of infrastructure by 1% is accompanied by an increase in output. local in about the same proportion.
- d. Some of these projects may generate financial income for the state, but others may lose this characteristic, and these projects may be kept on the state to retain their ownership for political and social considerations: the state should not establish these projects and provide their services with good quality and at low cost, because the unsatisfactory provision of these services to the public may result in some disturbances and political instability.
- e. The large size of the investments of these projects and consequently the large amount of funding required for them, as well as the large volume of consumers of the services of these projects and the diversity of their income levels. / Transparency to the user is also one of the most important characteristics of the infrastructure [27].

In addition to the previous characteristics, referred to the most important characteristics of manufacturing and establishing infrastructure projects in developing countries with the following specifications:

- a. Lack of infrastructure including roads, water, sanitation, housing, education and health services:
- b. Public sector control of most of the demand:
- c. Lack of basic building resources such as iron and cement
- d. Lack of high-qualified labor for construction:
- e. Increasing the number of small projects and their spread over wide geographical areas:
- f. Lack of and weak management experience

- g. Lack of attention to maintenance of existing facilities and machines:
- h. Limited capabilities of the local private sector
- i. Lack of training and qualification programs for administrators and practitioners of the construction profession.

It should be noted that when dealing with the issue of private sector participation in infrastructure projects, the most prominent characteristic of infrastructure is the monopoly of those projects, which the state must protect consumers from any potential abuses by the monopolist.

Some infrastructure projects are also of strategic importance. Infrastructure services are usually not exportable and therefore their prices are determined in the local market and their revenues are denominated in the local currency, which may sometimes make them unattractive in the eyes of foreign investors due to exchange market risks and convertibility risks [36].

In addition, infrastructure companies are often large in size, require large initial investments, have low returns in the early years and have long payback periods, which makes it difficult to finance infrastructure projects and require guarantees for future revenues. Besides, some networks such as telecom networks may be inconsistent and cause equipment duplication and increased costs. By extension, the distribution of risks associated with infrastructure projects between states and the private sector is an important issue for investors who wish to achieve an adequate return on their capital that allows them to cover costs and achieve a reasonable profit [36].

2.8 METHODS OF FINANCING INFRASTRUCTURE PROJECTS

There are several methods for financing infrastructure, which can be summarized as follows:

2.8.1 Build-Operate-Transform (BOT) Method

Infrastructure Transfer Project (BOT) refers to that type of investment in which the private sector establishes and operates an infrastructure project that was used to be built and managed by the public or government sector, provided that it is transferred again to the

government after a sufficient period of time, the invested capital is recovered and a rate of Reasonable Return [22].

The report of the United Nations Commission on International Trade Law (CNUDCI) states that bot projects are essentially a form of project financing whereby a government grants a group of investors, and a private entity (local or global) referred to as a project consortium, the privilege to formulate and operate a particular project. Its management and commercial exploitation for a number of years will be sufficient to recover construction costs, in addition to achieving appropriate profits from the proceeds from operating the project [26].

Accordingly, [36].explained that the previous definition focused on several points, including:

The possibility of using the BOT system in both public and private projects.

Restricting the construction, operation, management and maintenance process to the project company:

The different forms of the company executing the project, it may be one private company or several private companies, it may be a local company or an international company. The national capital, in order to ensure that it has control over the management of the project,” or it is “the foreign money that flows into the host country intends to establish projects owned by the foreign entity and take its returns after paying a percentage of these returns, and within terms agreed upon with the host country:

The project company operates within the host country through the use of the concession granted to it, and for a period that allows the company to recover all investment costs while achieving a rewarding return for it.

2.8.2 Build, Operate, Owns and Transfer (B.O.O.T) Method

This type is not very different from BOT projects, except for the temporary ownership of the project [46].

This method is a means of financing huge infrastructure projects such as roads, bridges, energy, dams and others, whether in industrial or developing countries, and the private sector

pumps the required and necessary funds to construct, build and operate any project for a period to be agreed upon with the government, and this period usually ranges between 15-30 years. The ownership is then transferred to the concerned governments, and the main goal is to reduce the financial burden on the government budget while allowing the development of these projects through the highly efficient private sector, and the state will be any financial burdens, and the state can obtain the infrastructure without cost The trouble of building and construction, as it opens a wide field for the private sector to carry out this task, and this method is very modern, as it does not exceed two decades of age, so it is difficult to make a serious and clear assessment of its benefits [21].

This type of contract is concluded between the state and an investor or group of investors for the purpose of establishing the project, establishing it and owning it by a concession company that will supervise the operation during the term of the contract. Or upon the expiry of the project life, or the state compensates the investor for the ownership shares according to the assessment of the assets and liabilities of the legislator, and the state is then entitled to contract with others to manage the project through submitted offers that are chosen from the best, and in all cases the government receives a share of the revenues generated by the project In return for awarding the contract and supporting the project before the various authorities, the administration has the right in this contract to supervise its implementation, even if the operation and management of the project falls on the investor's shoulders [31].

2.8.3 Build, Operate and Owns (B,O,O) Method

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2.8.4 Build-Lease-Transfer (BLT) Method

In this method of contracts, the private company builds the project and owns it temporarily, then leases it to the owner or to a third party, then transfers its ownership to the state at the end of the contract term, as the contracting investor may be unable to operate it, so he leases it to another investor to manage and operate it during the contract period [26].

2.10.6 Term Payment Method

It is meant for the government to provide guarantees to the global company, as this method requires the presence of a government guarantor (a guarantor bank) with well-known financial suitability in the world so that the executing company can adopt banking facilities and the world has confidence in it in order to provide the requirements and requirements for the implementation of projects, and many countries have adopted This method, for example, Turkey, the UAE, Saudi Arabia and other countries [21].

2.9 THE CONCEPT OF DELAYING CONSTRUCTION PROJECTS

Several definitions of delaying construction projects have emerged. In general, there is an agreement between. These definitions state that the delay is: “Exceeding the execution period for what is stipulated in the contract or on the Tate agreed upon by the two parties to deliver the project, or more than the date specified in the schedule Time to finish the project” [15].

2.9.1 Factors Causing Delays in Construction Projects

- a. Through a review of the literature related to construction projects, there are several Parties contribute to the completion of this project, and each of them may be a reason for delaying or The project stumbled, and whatever it may be, [15].indicated that there are many The factors that cause the delay in construction projects are:
- b. Insufficient study of the site, or failure to estimate the excavation operations. As well as other reasons Such as: labor, supply of materials, subcontractors

- c. The delay may be due to a wrong evaluation of the data on the related activities the project, and the lack of estimation of the weather conditions. Failure to supply the necessary materials on time specified.
- d. There are many other factors that cause delays in projects, which are: designer, changes and modifications, weather conditions, conditions for the project site, Supply of materials, economic conditions of the project, increase in the quantities supplied to the project
- e. Failure to adopt an appropriate timetable for the completion of projects. Damage to the project owner due to delay:

Indicated that there are a number of damages to the owner The project consists of [21]:

- a. Increasing indirect costs, such as rents for buildings and equipment, in order to achieve the project is on time.
- b. Increasing the cost of maintenance due to the mechanisms continuing to work.
- c. Additional operating costs due to the use of inefficient equipment and machinery.
- d. Retail costs of the operations resulting from the partial use of the project buildings.
- e. To increase the period of supervision.
- f. The task of following up the implementation of the contract.
- g. Losses caused by not investing in capital.
- h. Profit losses due to failure to benefit from the project.

2.9.2 Reasons For The Delay in Construction Projects

The delay in the completion of construction projects is one of the major causes of disputes between the owner of the project and the contractor due to the negative consequences of delays, which lead to The project is required to be completed in accordance with the terms of the contract and according to the set plan and to be delivered within the framework of the contract The specified time. The importance arises in the completion of the project in accordance with the main objectives that have been set him, and the time factor plays a big role in that, so the delay in construction projects for him Bad and negative effects on the value of the contract, as this value is highly correlated with the elements of the contract. It is worrying about the resources allocated to the project in terms of materials, labor, construction equipment and finance, which confirms that any delay in the project will undoubtedly result in harm to the parties to the contract are from both the owner and the contractor [25]. And there are four types of delay in the completion of construction projects, which are [15].

- a. The delay that is accompanied by an excuse and is compensated for.
- b. The delay that is accompanied by an excuse and is not compensated for.
- c. The delay that is not accompanied by an excuse.
- d. The delay that is accompanied by an excuse and which is not accompanied by an excuse.

2.9.3 Reasons for The Failure of Construction Projects

As it mentioned earlier, construction projects are affected during their life cycle by several factors Internal and external constraints affect the achievement of its various stages, and confront projects In general, there are several problems in achieving the goals that were set for them this leads to the failure to complete these stages in several forms, and perhaps the most important reasons for the failure are the failure to complete them The project is on time, the delay in the completion of this project, or the complete suspension of it. Which requires the project management to have a major role in the coordination and planning processes Monitoring the project and taking the necessary means to optimize the use of resources [19].

2.9.4 Stalling and Delaying Construction Projects in Their Various Stages

It can be said that there are several stages to complete the project, and each stage may be associated with it stumbled or delayed for one reason or another, and [35].indicated that these stages be as follows:

a. Delaying construction projects during the project design phase

The project delay in the project design phase may be due to the owner, or consultant or other party. as follows:

- i. Delay due to the project owner: We mean by approving extracts and payment Project payments or complications in project implementation procedures and lack of stability Management, lack of sufficient information and not taking timely decisions.
- ii. Delay in the project due to the project consultant: We mean a bad choice The sub consultant, the lack of sufficient funding, and the lack of human. and financial resources for the project The lack of sufficient preparation for the project and the lack of delegation of authority to the administration.
- iii. Delay due to the presence of another party to the project: that means the absence of financial incentives and morale, the lack of sufficient competition and the large number of requirements and legal powers to achieve Project and fluctuation in prices and exchange rates

b. Delayed construction projects in their implementation stage:

There are several factors that may hinder and delay the implementation of construction projects as follows [23].

- i. Financial problems, which are represented in the lack of sufficient financial coverage of the project, and the delay disbursement of company dues.

- ii. Failure to follow up on the owner's deduction of the delay fines owed by some contractors.
- iii. Not setting a timetable for the implementation of the project.
- iv. Shortcomings in the supervisory authorities, lack of good technical expertise, and failure to follow up on the contractor. to fulfill its contractual obligations.
- v. The lack of training of national elements in some of the contracts concluded.
- vi. The lack of sufficient liquidity with the contractor to implement the project. g - Concluding contracts that violate the required specifications.
- vii. Problems related to preparing drawings, specifications and approximate quantity

3. METHODOLOGY

3.1 INTRODUCTION

It deals in this chapter with a description of the study methodology and for the study community members and their sample as well. It explains the methods of preparing it and how to build the study tool, collect the necessary data for it, and use it scientific procedures and methods to verify the validity and reliability of the study tool and how it was applied. The field study and finally the statistical treatments that the researcher relied on in analyzing the study. The researcher used the descriptive approach to the study through the survey approach, which is based on Based on the case study as it is in reality, as previous studies were viewed Related to the subject of the standards used and affecting the preparation of a plan for the rehabilitation of infrastructure projects Infrastructure so that it is compatible with the descriptive-analytical approach that will provide the data And the facts of the problem of the subject of the research and to determine its implications and interpretation by referring to it To various documents such as books, scientific journals, newspapers and other materials that It has scientific credibility. The adoption of this method by the researcher is to reach the Accurate and detailed knowledge to solve the research problem and achieve the most accurate and best perception of a topic Research, and this does not depend on collecting information about the phenomenon and its different relationship only Rather, it includes analysis, linkage and interpretation to reach conclusions upon which the perception is built the proposal The researcher also used the random sampling method In choosing the study sample, he used the questionnaire to collect the primary data for the study.

3.2 DATA COLLECTION METHODS TWO TYPES OF DATA COLLECTION WERE USED

3.2.1 Primary Data

Resorting to the primary sources of the study by collecting the necessary data for preparation And the design of the questionnaire to survey the opinions of workers in infrastructure projects at the level of The public and private sectors, and then emptying the questionnaires and analyzing them using the analysis program In order to reach the most important criteria by which (SPSS) statistical Preparing a plan to rehabilitate the infrastructure, then presenting

the results of a sample of workers in infrastructure projects Infrastructure for the public and private sectors is required of decision-makers to support these results, as has been done Surveying the extent of approval and commitment of workers in sanitation projects in the district Salah al-Din sewers by these standards.

3.2.2 Secondary Data

It was resorted to collecting the necessary data for the study through secondary sources through Books and publications related to the topic of research under study Updates related to the topic of the study, as well as the evaluation and statement of similarities and the difference between the current study and previous studies. The opinions of the professors of Samarra University, the engineers supervising the optical cable project in Salah El-Din Governorate and their contractors are also including.

3.3 DATA COLLECTION AND INSTRUMENTS

As a way to gauge the opinions of managers, safety officials, and employees, a questionnaire is commonly recognized.. Based on an extensive review of relevant literature and theory, as well as a discussion with an expert group, thirty one questions in various fields related to the topic of project management that constitute the questionnaire are selected through this process. A breakdown of the survey's numerous infrastructure projects-related questions can be seen in Table (3.1.) The questions are adapted to the local work practices and cultural norms of the area.

3.4 THE SAMPLE OF THE STUDY

The study community consists of the opinions of (34) persons included the opinions a group of professors of the college of Engineering at the University of Samarra, as well as the opinions of engineers and building contractors in the office of the resident engineer in the Samarra sewage project as an infrastructure projects in Salah Al-Din governorate. This means that every person in the population has an equal chance of being included in a probability sample. The random number table was used to choose these workers as a sample. In research, sample size is the number of people being studied. Because big samples are a waste of time, resources, and money while tiny samples might lead to inaccurate results (and therefore prevent a Type II mistake), sample size determination is critical [46].

According to, it is a waste of time to do research on a population if the sample size is too small or contains too much data. Sample sizes of at least 30 and no more than 500 are recommended for most studies. Since 30 or more samples are considered to be regularly distributed, a sample size of 30 is often employed as a cutoff threshold [48].

3.5 DESIGN OF THE RESEARCH

Research in this topic is conducted using a non-experimental quantitative method (such as surveys). Using a representative sample of a population, a survey seeks to generalize the results of the study and offer a numerical representation of the population's views and tendencies [46].

The most prevalent usage of surveys in research is for the following reasons:

- a. The process of determining the attitudes, views, or beliefs of individuals with respect to certain topics,
- b. analyzing the demographics of a group based on several factors
- c. Gathering data on population characteristics (such as age, gender, and income, for example). The researcher can gather all of the completed replies in a fair amount of time and it is cost-effective. This is why this design was chosen [50].

It was attempted to collect data from the relevant population (professionals involving in the building construction sector from all stakeholders and construction site workers) to evaluate the perception of different stakeholders on the issues of occupational safety and health; ranking the variables of the causes of occupational accidents, occupational safety management problem and risk factors which contribute for the occurrence of accidents and injuries of workers in construction sites. In order to demonstrate the widespread nature of the issue, this survey-based study approach was chosen as the primary method of investigation. It's feasible to receive some pointers on how to avoid the issue after determining the problem's distribution and identifying the primary components. It also aids in the discovery of discrepancies among various groups and the formulation of suggestions for potential solutions for each group's unique stakeholders

3.6 THE STRUCTURE OF THE QUESTIONNAIRES

The Questionnaires contain 31 questions, the first five questions were about Sex ,Age ,Job , Academic Certificate and finally Experience in Work, while the other 26 questions were in 3 Groups as showed in Table (3.1) below

Table 3.1: The Questions of Questionnaire 1.

	Group I: Evaluating the role of central and local administrations in managing and protecting infrastructure projects
1	What is your assessment of the role of the engineering administration in developing infrastructure projects in Salah al-Din Governorate?
2	What is your assessment of the protection of infrastructure projects by the laws of the Iraqi state?
3	What is your acceptance of the role of the local government in the security protection of the infrastructure in Salah al-Din Governorate?
4	What is your assessment of the distribution of infrastructure projects in Salah al-Din Governorate?
5	What is your assessment of the provision of public services to citizens through the infrastructure in Salah al-Din Governorate?
6	What is your assessment of the availability of safety requirements for workers in infrastructure projects in Salah al-Din Governorate?
7	What is your assessment of the role of the local administration in accelerating the completion of infrastructure projects?
8	What is your assessment of the role of administrative and financial corruption in delaying the completion of infrastructure projects?
9	What is your assessment of the role of administrative and financial corruption in the size and quality of completed infrastructure projects?
10	What is your assessment of the role of government red tape in delaying the completion of infrastructure projects?

Table 3.2: The Questions of Questionnaire 2.

	Group II: Evaluation of the efficiency of infrastructure projects in Salah al-Din Governorate
1	What is your assessment of the number of new infrastructure projects in Salah al-Din Governorate?
2	What is your assessment of the quality of new infrastructure projects in Salah al-Din Governorate?
3	What is your assessment of the previously existing infrastructure projects in Salah al-Din Governorate?
4	What is your assessment of the existence of periodic maintenance works for infrastructure in Salah El-Din Governorate?
5	What is your assessment of the development of the equipment used in the construction of infrastructure projects?
6	What is your assessment of the amount of advanced construction technology in infrastructure works in Salah al-Din Governorate?
7	What is your assessment of the efficiency of the manpower employed in the completion of infrastructure projects in Salah al-Din Governorate?
8	What is your assessment of the efficiency of the completion of infrastructure projects in terms of quality?

Table 3.3: The Questions of Questionnaire 3.

	Group III: Assessment of the impact of infrastructure projects on the local community in Salah al-Din Governorate
1	What is your assessment of the behavior, culture and awareness of citizens in preserving public properties (including infrastructure projects)?
2	What is your assessment of the infrastructure services and their alignment with the population and covering their functional performance in Salah al-Din Governorate?
3	What is your assessment of the role of infrastructure projects in reducing unemployment in Salah al-Din Governorate?
4	What is your assessment of the impact of infrastructure projects on raising the annual income of citizens in Salah al-Din Governorate?
5	What is your assessment of the impact of infrastructure projects on the local environment?
6	What is your assessment of the extent of citizens' satisfaction with the infrastructure projects that have been completed in the recent past?
7	What is your assessment of the extent to which the citizen benefits from the recently completed infrastructure projects or which are in their final stages?
8	What is your assessment of the control and auditing processes of the infrastructure sites in the construction project in Salah al-Din Governorate?

3.7 DATA ANALYSIS

The method of data analysis was both descriptive and inferential statistics were employed in the analysis of the data collected from the respective sources. Descriptive statistics (frequency, and percentage) were used to analyze the quantitative data. Inferential statistics was also used to identify the factors that cause the delays in the implementation of infrastructure projects in Salah Al-Din governorate. A statistical program, Statistical

Package for the Social Science (SPSS) version 18, was selected to assist in analyzing the quantitative data.

The five point Likert's scale (, 1, 2, 3, 4 and 5) for the questions from (6 to 31) is used to calculate the mean score which helps to identify and rank the impact of the project management on the implementation of infrastructure projects in -Salah Al-Din governorate in Iraq where :

f = frequency of response for each score;

MS = Mean score;

N= Total number of responses for each factor.

S= score given to each factor (1 to 5)

The procedure of ranking different factors based on cumulative mean score requires that the same items be ranked by two different parties. Ranks of different factors, as perceived by different parties are tested for correlation. The purpose of a correlation test is to determine the degree of association between the two sets of rankings and to see if there is difference in ranking between two groups of parties. A significant positive correlation signifies that both parties were in agreement with the rankings, while a significant negative correlation signifies that one party ranked the items lowest to highest while the other ranked them highest to lowest. Spearman's-rank correlation coefficient, denoted by r_s , can be calculated to show the degree of agreement between the different parties involved in the survey. The following algorithmic, formula is used to calculate Spearman's-rank correlation coefficient.

Where:

- a. $d = \text{rank } x - \text{rank } y$ (i.e. the difference between ranks given by two parties for each factor)
- b. n = number of pairs of values in the data set. The value of r is such that $-1 < r < +1$. The + and – signs are used for positive linear correlations and negative linear correlations, respectively.
- c. Positive correlation: If two variables have a significant positive linear correlation, r is close to +1. • R values of precisely +1 imply an ideal match. One variable increases in

value in response to a rise in another variable's value. This connection is known as a positive correlation.

- d. Negative correlation: When there is a substantial negative linear correlation between two variables, r is close to -1 . It's impossible to have an imperfect negative fit with a r value of precisely -1 . One variable's value increases while the other one's decreases when both variables have negative values.
- e. In the absence of or with a weak linear connection, the value of r is around zero. r To a large extent, this indicates that the two variables are unrelated in any meaningful way.
- f. A perfect correlation of ± 1 occurs only when the data points all lie exactly on a straight line. If $r = +1$, the slope of this line is positive. If $r = -1$, the slope of this line is negative.
- g. A correlation greater than 0.8 is generally described as strong, whereas a correlation less than 0.5 is generally described as weak.

3.8 DESCRIPTIVE STATISTIC

Descriptive statistics are based on a variety of data, including personnel information and questions from four indicators. The following are some of the parameters for each questionnaire:

- a. Sex : There are two parameters of sex which are male and female.
- b. Ages : There are four parameters of age category, such as 20 to 30 years old, 31 to 40 years old, 41 to 50 years old, 51 to 60 and more than 60 years old.
- c. Job Type : There are four parameters of such as : contractor, implementation engineer, supervising engineer, Designer
- d. Academic Certificate: There are four parameters of prior education, such as Diploma , Bachelors, Master's, Ph.D.
- e. Work period: A worker's tenure may be specified in four ways: for 1 to 5 years, for 6 to 10 years, for 11 to 15 years, or for more than 15 years.

4. RESULT AND DISCUSSION

4.1 INTRODUCTION

This chapter illustrates data analysis outcomes and gives an overview of the data collected in this research to evaluate the project management and its impact on the implementation of infrastructure projects in Salah Al-Di governorate.

4.2 QUESTIONS RELATED TO THE CHARACTERISTICS OF THE STUDY SAMPLE

This questionnaire included the opinions of 34 people (9 females and 25 males) on a set of questions that were divided into four groups, including the opinions of the sample on various topics related to occupational safety, as shown in the table (4.1) and in figure (4.1) below. Where the percentage of the male where the percentage of males in the sample is about (73.5 %) while the percentage of females in the sample is about (26.5 %) only.

Table 4.1: The Gender of the Samples.

	Frequency	Valid Percent %	Cumulative Percent
Male	25	73.5	73.5
Female	9	26.5	100.0
Total	34	100.0	

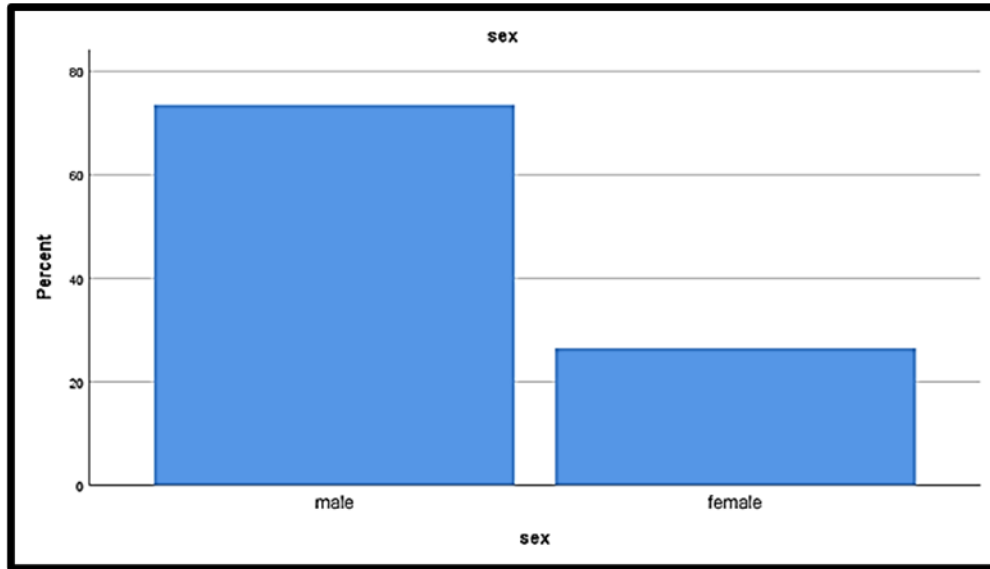


Figure 4.1: The Gender of the Samples.

As for the ages of the sample taken, it was divided into five groups that include ages from (20 to 30), (31 to 40), (41 to 50), (51 to 60), and (more than 60) as showed in table (4-2) and in figure (4-2) ,It is clear from this table that the highest age ratio for the sample was for the group between 41 to 50) which amounted to about (35.3%), while the lowest age percentage for the sample was for the group (more than 60) which amounted to about (2.9%).

Table 4.2 : The Ages of the Samples.

	Frequency	Valid Percent %	Cumulative Percent
20-30	9	26.5	26.5
31-40	8	23.5	50.0
41-50	12	35.3	85.3
51-60	4	11.8	97.1
more than 60	1	2.9	100.0
Total	34	100.0	

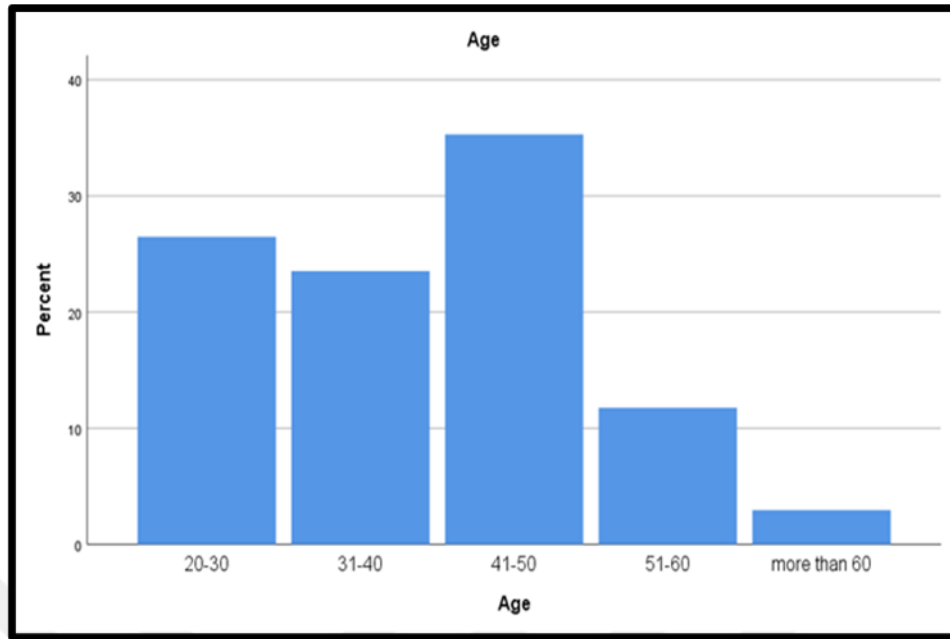


Figure 4.2: The Ages of the Samples.

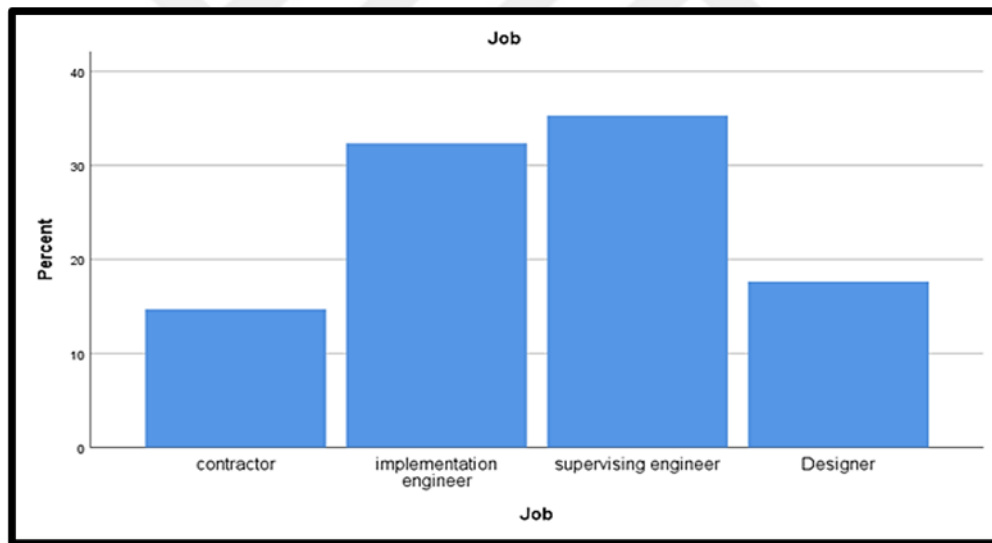


Figure 4.3: The Job of the Samples.

For the job of the samples taken, it was divided into four categories that include certificates (contractor, implementation engineer ,supervising engineer ,Designer)), as shown in Table (4-3) and in Figure (4-3) , through which it became clear that the highest percentage of the job type was the (supervising engineer) which amounted to about (35.3%), while the lowest percentage of job type was (contractor) which amounted to about (14.7%) only.

Table 4.3: The Job of Samples.

	Frequency	Valid Percent %	Cumulative Percent
contractor	5	14.7	14.7
implementation engineer	11	32.4	47.1
supervising engineer	12	35.3	82.4
Designer	6	17.6	100.0
Total	34	100.0	

As for the scientific certificate of the sample taken, it was divided into four categories that include certificates (Diploma, Bachelor's, Master's, Doctorate) and none of the sample members had a doctorate, as shown in Table (4-4) and in Figure (4-4), through which it became clear that the highest percentage of scientific certificates was For the Bachelor's category, which amounted to about (52.9%), while the lowest percentage of scientific certificates was for holders of a Diploma degree, which amounted to about (2.9 %) as none of the sample members had obtained this certificate.

Table 4.4: The Academic Certificate of Samples.

	Frequency	Valid Percent %	Cumulative Percent
Diploma	1	2.9	2.9
Bachelors	18	52.9	55.9
Master's	12	35.3	91.2
Ph.D.	3	8.8	100.0
Total	34	100.0	

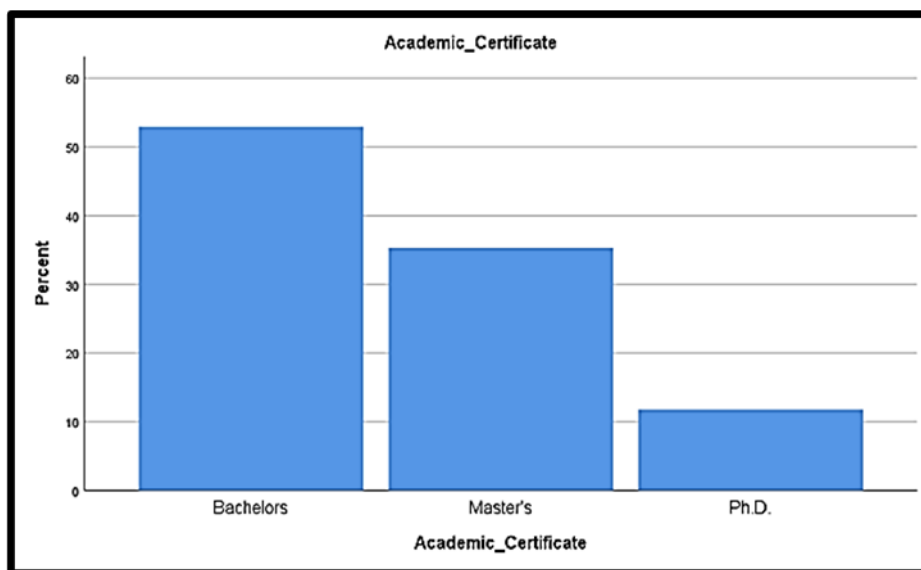


Figure 4.4 :The Academic Certificate of The Samples.

As for the years of work experience of the sample taken, it was divided into four categories that the Years of work experience (1 to5) (6 to 10) (11 to 15) and (more than 15) , , as shown in Table (4-5) and figure (4-5) through which it became clear that the highest percentage of the Years of work experience was for the category of (more than 15) , which amounted to about (32.4 %), while the lowest percentage of scientific certificates was for the category of (11 to 15 years),which amounted to about (11.8%) only.

Table 4.5: Years of Work Experience for Samples.

	Frequency	Valid Percent %	Cumulative Percent
1 to 5 years	9	26.5	26.5
6 to 10 years	10	29.4	55.9
11 to 15 years	4	11.8	67.6
more than 15	11	32.4	100.0
Total	34	100.0	

4.3 THE DIVIDED OF QUESTIONNAIRE QUESTIONS



Figure 4.5: The Years of Work Experience for Samples.

The questionnaire questions were divided into three groups, where the First Group includes a set of questions to (Evaluating the role of central and local administrations in managing and protecting infrastructure projects), while the Second Group includes a set of questions to (Evaluation of the efficiency of infrastructure projects in Salah al-Din Governorate), and finally the Third Group includes a set of questions to (Assessment of the impact of infrastructure projects on the local community in Salah al-Din Governorate).

4.3.1 The Questionnaire Questions for Group I

- a. Evaluating the role of central and local administrations in managing and protecting infrastructure projects

Q1: What is your assessment of the role of the engineering administration in developing infrastructure projects in Salah al-Din Governorate?

From the table (4-6) and figure (4-6) It is clear that the opinion of the largest percentage of the sample on this question was the answer (Weak) with the percentage about (58.8%) while the answer with (Acceptable) represented the least percentage with (41.2%) only.

Table 4.6 : The Answers for Question 1 (Group 1).

	Frequency	Valid Percent %	Cumulative Percent
Weak	20	58.8	58.8
Acceptable	14	41.2	100.0
Total	34	100.0	

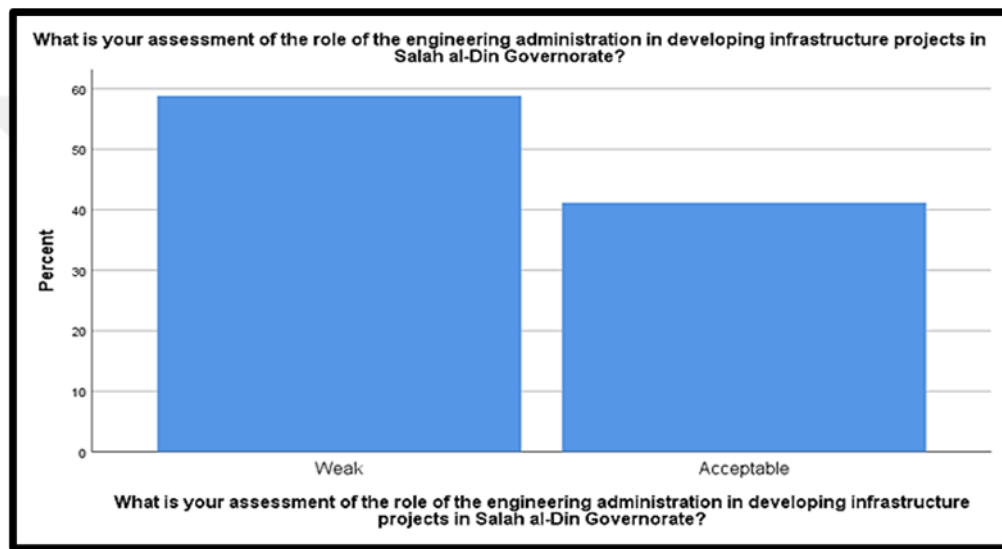


Figure 4.6: The Answers for Question 1 (Group I).

Q2: What is your assessment of the protection of infrastructure projects by the laws of the Iraqi state?

From the Table (4-7) and Figure (4-7) It is clear that the opinion of the largest percentage of the sample on this question was the answer (Weak) with the percentage about (58.8 %) while the answer with (Good) represented the least percentage with (8.8 %) only.

Table 4.7: The Answers for Question 2 (Group I).

	Frequency	Valid Percent %	Cumulative Percent
Weak	20	58.8	58.8
Acceptable	11	32.4	91.2
Good	3	8.8	100.0
Total	34	100.0	

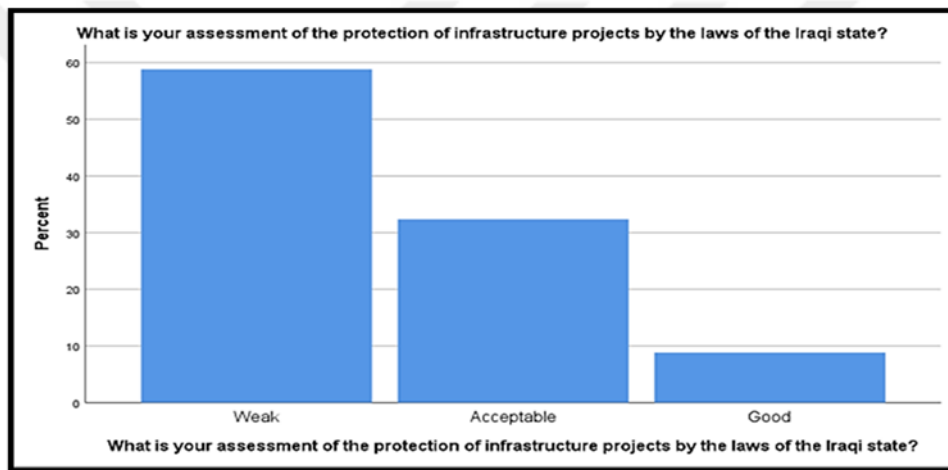


Figure 4.1: The Answers for Question 2 (Group 1).

Q 3: What is your acceptance of the role of the local government in the security protection of the infrastructure in Salah al-Din Governorate?

From the Table (4-8) and Figure (4-8) It is clear that the opinion of the largest percentage of the sample on this question was the answer (Weak) with the percentage about (55.9 %) while the answer with (Good) represented the least percentage with (14.7 %) only.

Table 4.8: The Answers for Question 3 (Group 1).

	Frequency	Valid Percent %	Cumulative Percent
Weak	19	55.9	55.9
Acceptable	10	29.4	85.3
Good	5	14.7	100.0
Total	34	100.0	

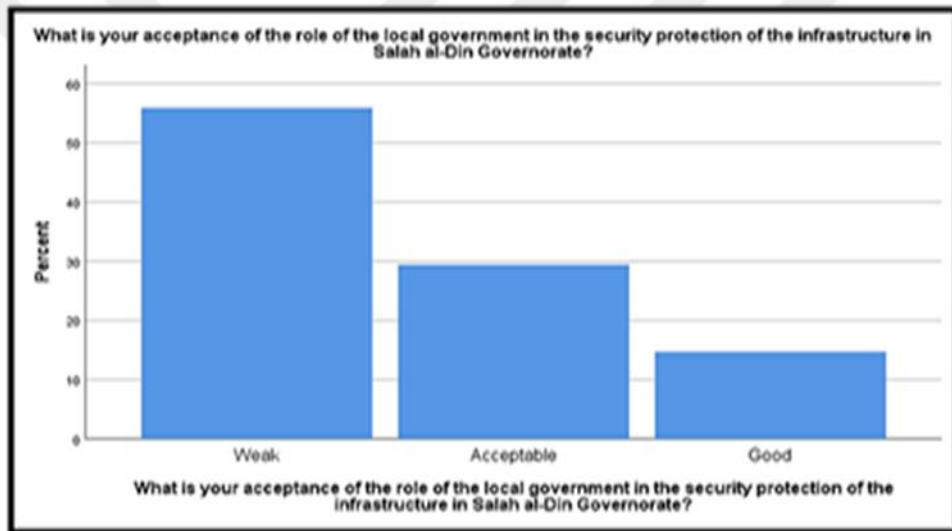


Figure 4.8: The Answers for Question 3 (Group I).

Q 4 : What is your assessment of the distribution of infrastructure projects in Salah al-Din Governorate?

From the Table (4-9) and Figure (4-9) It is clear that the opinion of the largest percentage of the sample on this question was the answer (Acceptable) with the percentage about (38.2 %) while the answer with (Good) represented the least percentage with (26.5 %) only.

Table 4.9: The Answers for Question 4 (Group I).

	Frequency	Valid Percent %	Cumulative Percent
Weak	12	35.3	35.3
Acceptable	13	38.2	73.5
Good	9	26.5	100.0
Total	34	100.0	

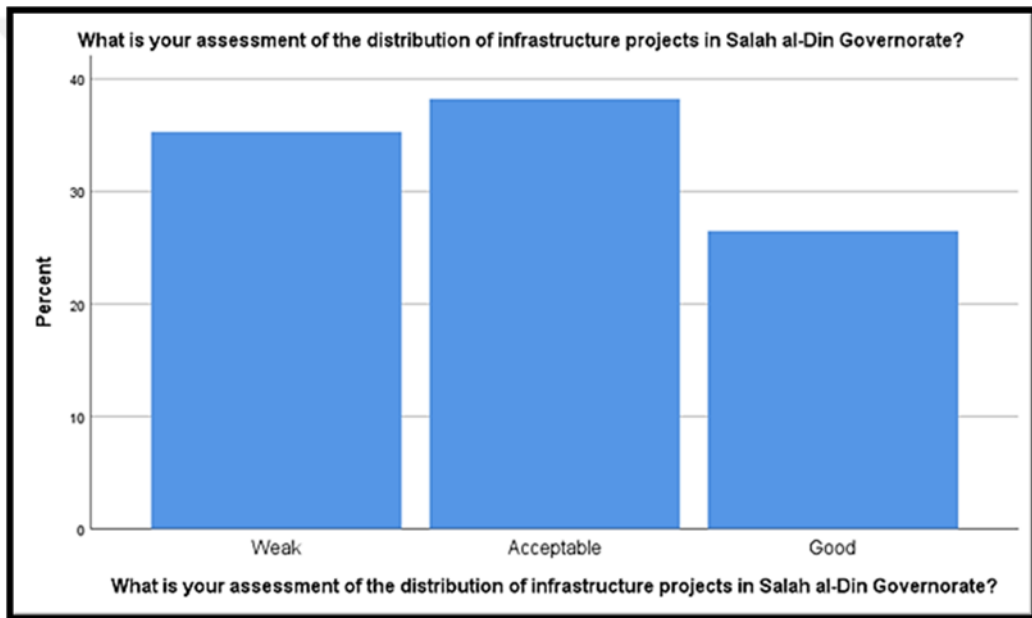


Figure 4.2: The Answers for Question 4 (Group 1).

Q 5: What is your assessment of the provision of public services to citizens through the infrastructure in Salah al-Din Governorate?

Table 4.10: The Answers for Question 5 (Group I).

	Frequency	Valid Percent %	Cumulative Percent
Weak	15	44.1	44.1
Acceptable	16	47.1	91.2
Good	3	8.8	100.0
Total	34	100.0	

From the Table (4.10) and Figure (4.10) It is clear that the opinion of the largest percentage of the sample on this question was the answer (Acceptable) with the percentage about (47.1%) while the answer with (Good) represented the least percentage with (8.8 %) only.

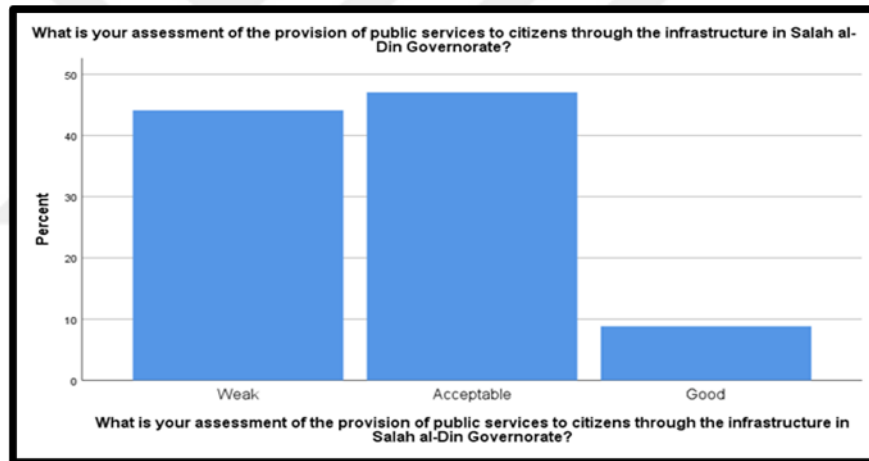


Figure 4.10 : The Answers for Question 5 (Group I).

Q 6 : What is your assessment of the availability of safety requirements for workers in infrastructure projects in Salah al-Din Governorate?

From the Table (4-11) and Figure (4-11) it is clear that the opinion of the largest percentage of the sample on this question was the answer (Weak) with the percentage about (47.1%) while the answer with (Good) represented the least percentage with (8.8 %) only.

Table 4.11: The Answers for Question 6 (Group I).

	Frequency	Valid Percent%	Cumulative Percent
Weak	16	47.1	47.1
Acceptable	15	44.1	91.2
Good	3	8.8	100.0
Total	34	100.0	



Figure 4.11: The Answers for Question 6 (Group I).

Q 7 : What is your assessment of the role of the local administration in accelerating the completion of infrastructure projects?

From the Table (4-12) and Figure (4-12) It is clear that the opinion of the largest percentage of the sample on this question was the answer (Weak) with the percentage about (55.9 %) while the answer with (Good) represented the least percentage with (2.9 %) only.

Table 4.12 : The Answers for Question 7 (Group I).

	Frequency	Valid Percent %	Cumulative Percent
Weak	19	55.9	55.9
Acceptable	14	41.2	97.1
Good	1	2.9	100.0
Total	34	100.0	

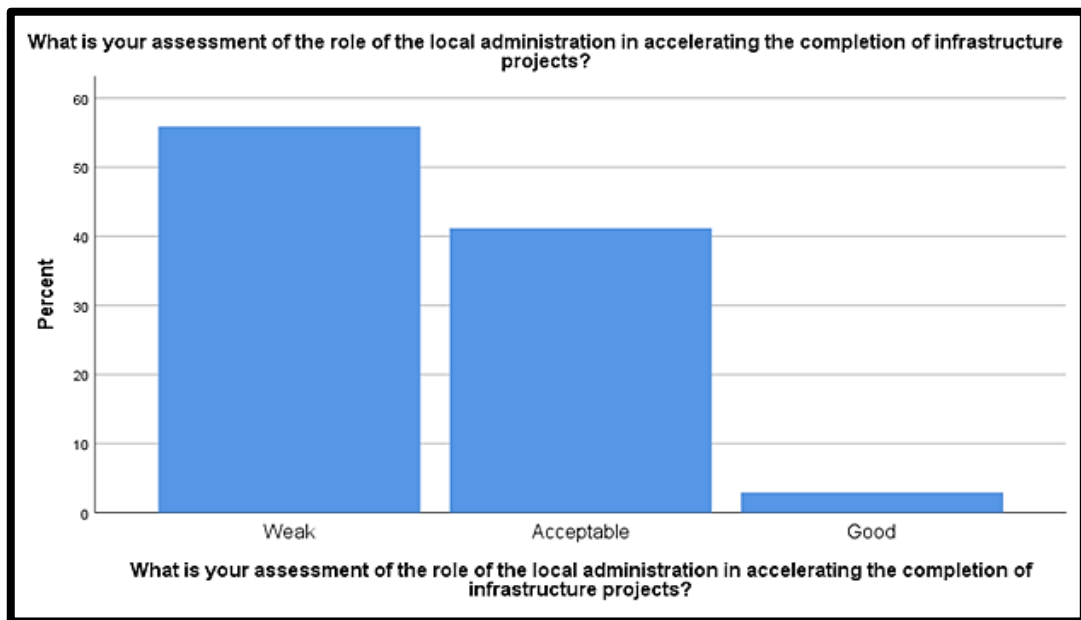


Figure 4.3: The Answers for Question 7 (Group I).

Q 8 : What is your assessment of the role of administrative and financial corruption in delaying the completion of infrastructure projects?

From the Table (4-13) and Figure (4-13) It is clear that the opinion of the largest percentage of the sample on this question was the answer (Excellent) with the percentage about (41.2%) while the answer with (Acceptable) represented the least percentage with (5.9 %) only.

Table 4.13: The Answers for Question 8 (Group I).

	Frequency	Valid Percent %	Cumulative Percent
Weak	2	6	5.9
Acceptable	2	5.9	11.8
Good	4	11.8	23.5
Very Good	12	35.3	58.8
Excellent	14	41.2	100.0
Total	34	100.0	

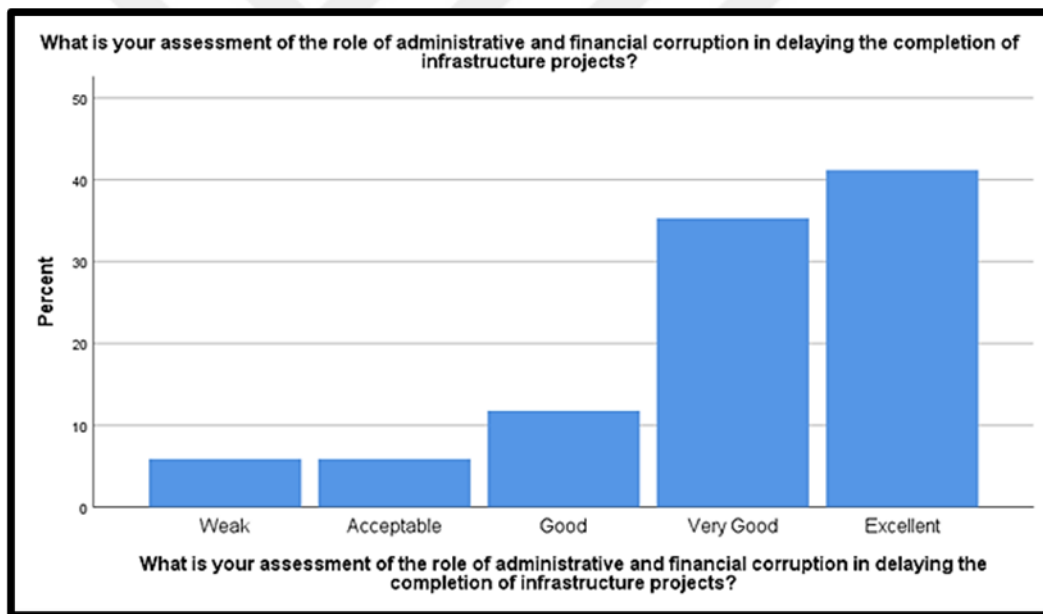


Figure 4.13: The Answers for Question 8 (Group I).

Q 9 : What is your assessment of the role of administrative and financial corruption in the size and quality of completed infrastructure projects?

From the Table (4-14) and Figure (4-14) It is clear that the opinion of the largest percentage of the sample on this question was the answer (Excellent) with the percentage about (41.2%) while the answer with (Good) represented the least percentage with (14.7%) only.

Table 4.14: The Answers for Question 9 (Group I).

	Frequency	Valid Percent %	Cumulative Percent
Acceptable	4	11.8	11.8
Good	5	14.7	26.5
Very Good	11	32.4	58.8
Excellent	14	41.2	100.0
Total	34	100.0	

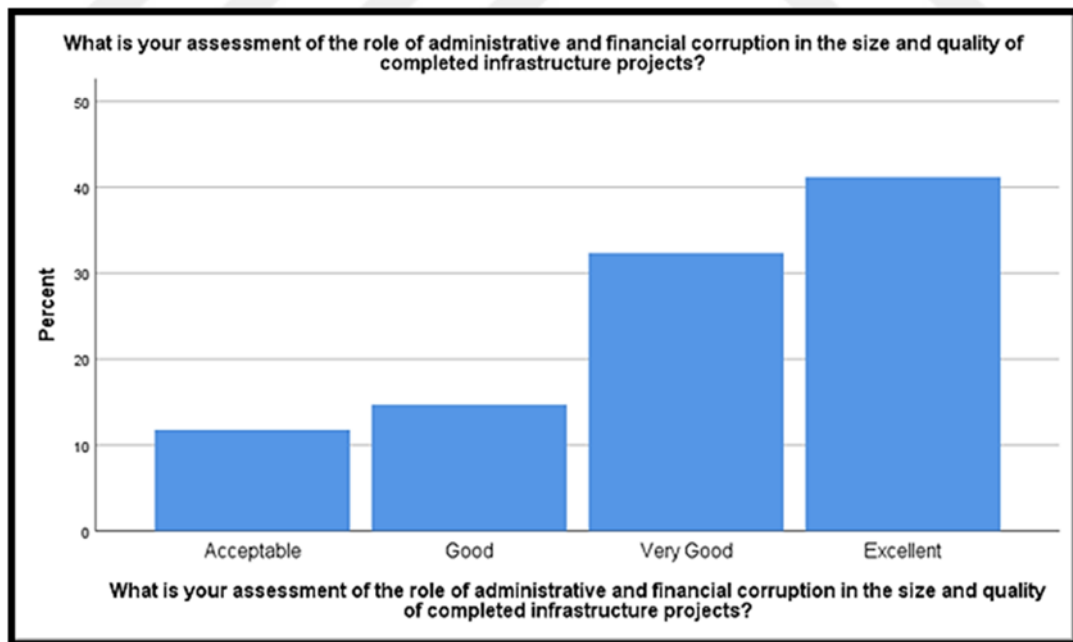


Figure 4.14: The Answers for Question 9 (Group I).

Q 10 : What is your assessment of the role of government red tape in delaying the completion of infrastructure projects?

From the Table (4-15) and Figure (4-15) It is clear that the opinion of the largest percentage of the sample on this question was the answer (Excellent) with the percentage about (38.2 %) while the answer with (Acceptable) represented the least percentage with (8.8 %) only.

Table 4.15: The Answers for Question 10 (Group I).

	Frequency	Valid Percent %	Cumulative Percent
Acceptable	3	8.8	8.8
Good	11	32.4	41.2
Very Good	7	20.6	61.8
Excellent	13	38.2	100.0
Total	34	100.0	

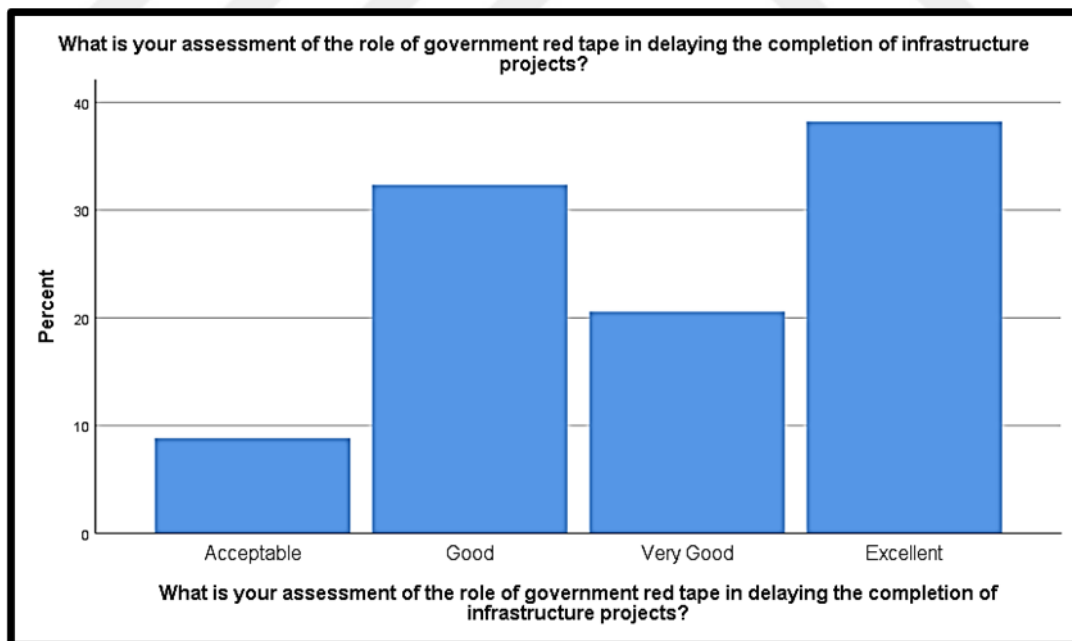


Figure 4.15: The Answers for Question 10 (Group I).

By analyzing the answers to the questionnaire for the first group, it is clear to us that all the answers to the ten questions that came in the questionnaire about the role of central and local administrations, indicates a clear weakness in the role of central and local administrations in managing and protecting infrastructure projects in Salah al-Din Governorate.

4.3.2 The Questionnaire Questions for Group II

Evaluation of the efficiency of infrastructure projects in Salah al-Din Governorate

Q 1 : What is your assessment of the number of new infrastructure projects in Salah al-Din Governorate?

From the Table (4-16) and Figure (4-16) It is clear that the opinion of the largest percentage of the sample on this question was the answer (Weak) with the percentage about (50 %) while the answer with (Very Good) represented the least percentage with (8.8 %) only.

Table 4.16: The Answers for Question 1 (Group II).

	Frequency	Valid Percent %	Cumulative Percent
Weak	17	50.0	50.0
Acceptable	9	26.5	76.5
Good	5	14.7	91.2
Very Good	3	8.8	100.0
Total	34	100.0	

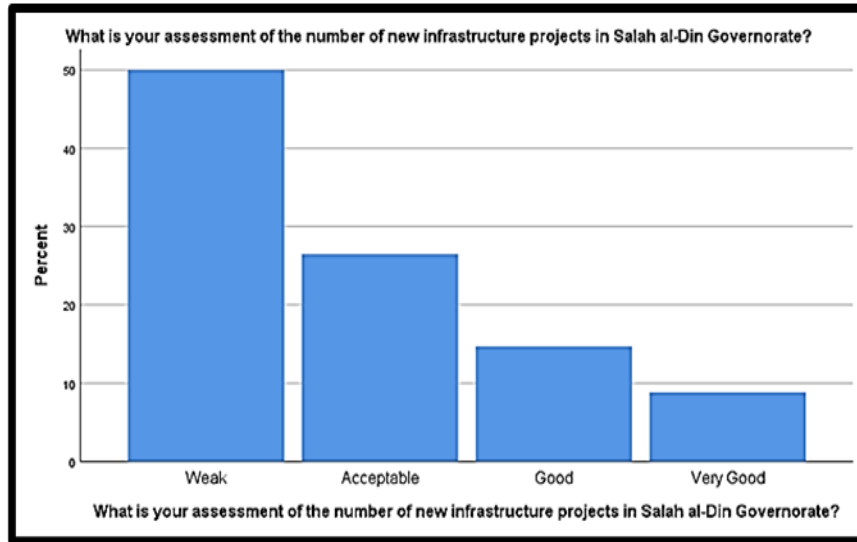


Figure 4.16: The Answers for Question 1 (Group II).

Q 2: What is your assessment of the quality of new infrastructure projects in Salah al-Din Governorate?

From the Table (4.17) and Figure (4.17) It is clear that the opinion of the largest percentage of the sample on this question was the answer (Weak) with the percentage about (50 %) while the answer with (Very Good) represented the least percentage with (5.9 %) only.

Table 4.17: The Answers for Question 2 (Group II).

	Frequency	Valid Percent%	Cumulative Percent
Weak	17	50.0	50.0
Acceptable	8	23.5	73.5
Good	7	20.6	94.1
Very Good	2	5.9	100.0
Total	34	100.0	

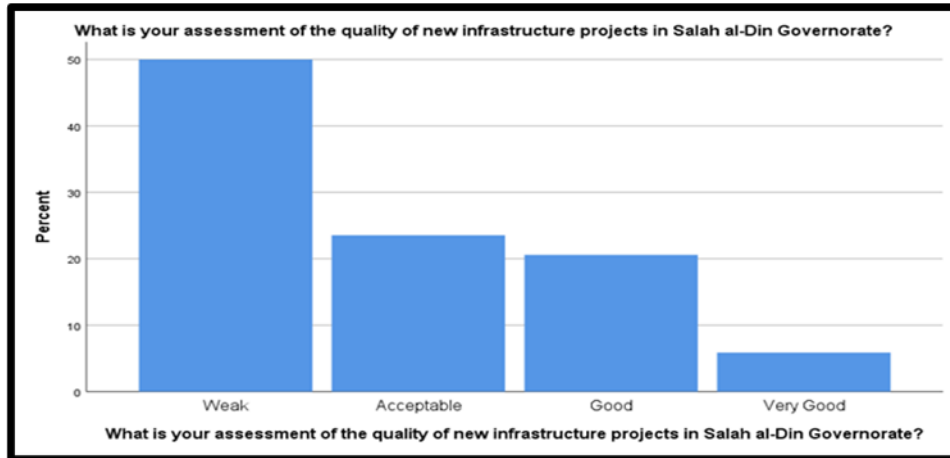


Figure 4.17: The Answers for Question 2 (Group II).

Q 3 : What is your assessment of the previously existing infrastructure projects in Salah al-Din Governorate?

From the Table (4-18) and Figure (4-18) It is clear that the opinion of the largest percentage of the sample on this question was the answer (Acceptable) with the percentage about (52.9 %) while the answer with (Good) represented the least percentage with (11.8 %) only.

Table 4.18: The Answers for Question 3 (Group II).

	Frequency	Valid Percent %	Cumulative Percent
Weak	12	35.3	35.3
Acceptable	18	52.9	88.2
Good	4	11.8	100.0
Total	34	100.0	

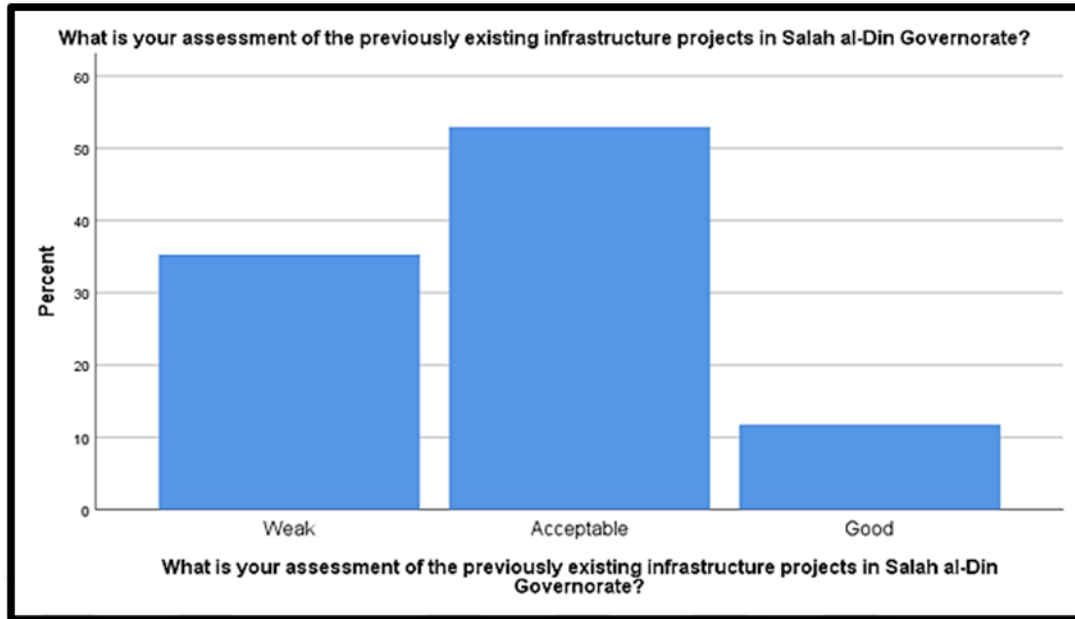


Figure 4.18: The Answers for Question 3 (Group II).

Q 4 : What is your assessment of the existence of periodic maintenance works for infrastructure in Salah El-Din Governorate?

From the Table (4-19) and Figure (4-19).It is clear that the opinion of the largest percentage of the sample on this question was the answer (Weak) with the percentage about (64.7 %) while the answer with (Good) represented the least percentage with (5.9 %) only.

Table 4.19 : The Answers for Question 4 (Group II).

	Frequency	Valid Percent %	Cumulative Percent
Weak	22	64.7	64.7
Acceptable	10	29.4	94.1
Good	2	5.9	100.0
Total	34	100.0	

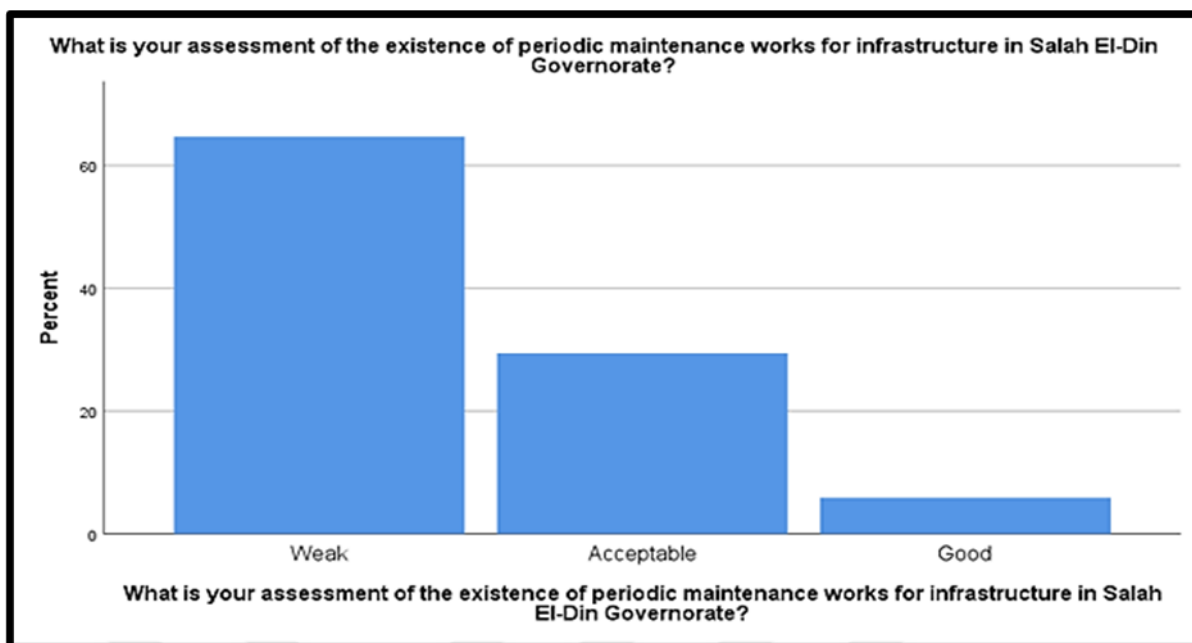


Figure 4.19 : The Answers for Question 4 (Group II).

Q 5: that is your assessment of the development of the equipment used in the construction of infrastructure projects?

From the Table (4-20) and Figure (4-20). It is clear that the opinion of the largest percentage of the sample on this question was the answer (Acceptable) with the percentage about (47.1 %) while the answer with (Good) represented the least percentage with (20.6 %) only.

Table 4.20 : The Answers for Question 5 (Group II).

	Frequency	Valid Percent %	Cumulative Percent
Weak	11	32.4	32.4
Acceptable	16	47.1	79.4
Good	7	20.6	100.0
Total	34	100.0	

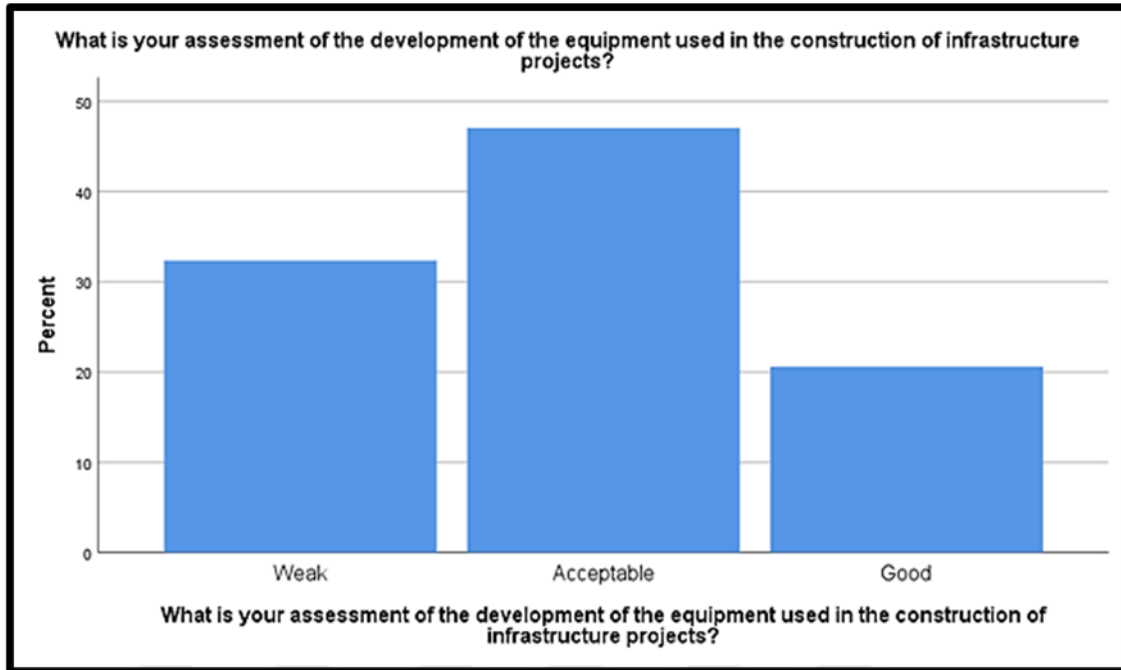


Figure 4.20 : The Answers for Question 5 (Group II).

Q 6: What is your assessment of the amount of advanced construction technology in infrastructure works in Salah al-Din Governorate?

From the Table (4-21) and Figure (4-21) It is clear that the opinion of the largest percentage of the sample on this question was the answer (Acceptable) with the percentage about (44.2%) while the answer with (Good) represented the least percentage with (11.8 %) only.

Table 4.21: The Answers for Question 6 (Group II).

	Frequency	Valid Percent%	Cumulative Percent
Weak	15	44	44.1
Acceptable	15	44.2	88.2
Good	4	11.8	100.0
Total	34	100.0	

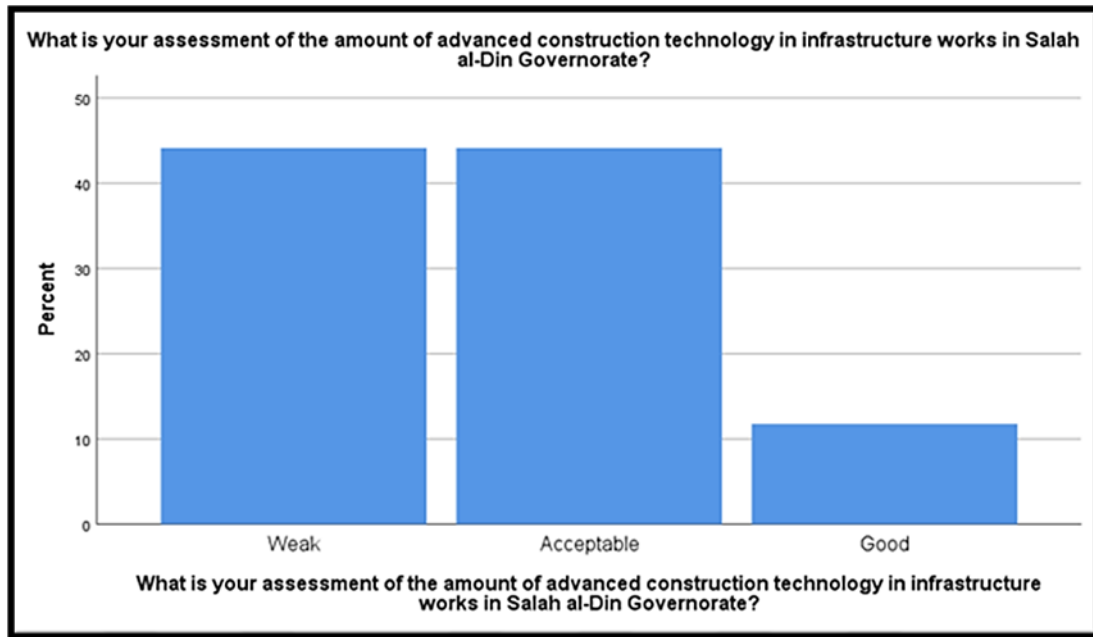


Figure 4.21:The Answers for Question 6 (Group II).

Q 7 : What is your assessment of the efficiency of the manpower employed in the completion of infrastructure projects in Salah al-Din Governorate?

From the Table (4-22) and Figure (4-22) It is clear that the opinion of the largest percentage of the sample on this question was the answer (Acceptable) with the percentage about (47.2 %) while the answer with (Good) represented the least percentage with (26.4 %) only.

Table 4.22: The Answers for Question 7 (Group II).

	Frequency	Valid Percent%	Cumulative Percent
Weak	9	26.5	26.5
Acceptable	16	47.2	73.5
Good	9	26.4	100.0
Total	34	100.0	

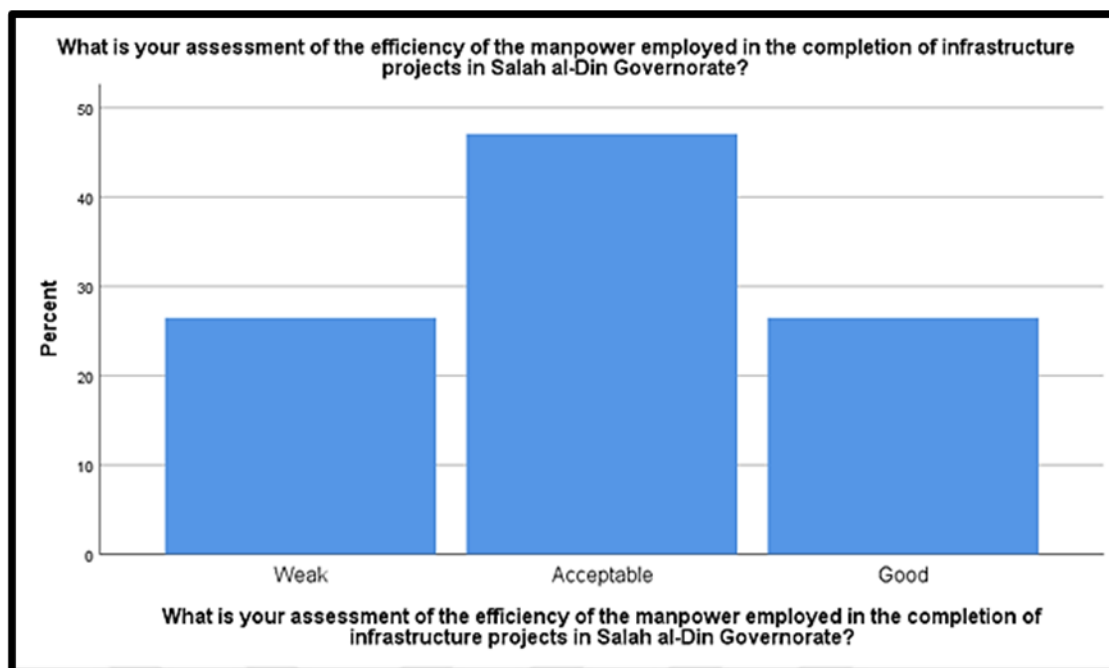


Figure 4.22: The Answers for Question 7 (Group II)

Q 8: What is your assessment of the efficiency of the completion of infrastructure projects in terms of quality?

From the Table (4-23) and Figure (4-23) It is clear that the opinion of the largest percentage of the sample on this question was the answer (Acceptable) with the percentage about (41.2 %) while the answer with (Very Good) represented the least percentage with (2.9 %) only.

Table 4.23: The Answers for Question 8 (Group II).

	Frequency	Valid Percent %	Cumulative Percent
Weak	13	38.2	38.2
Acceptable	14	41.2	79.4
Good	6	17.6	97.1
Very Good	1	2.9	100.0
Total	34	100.0	

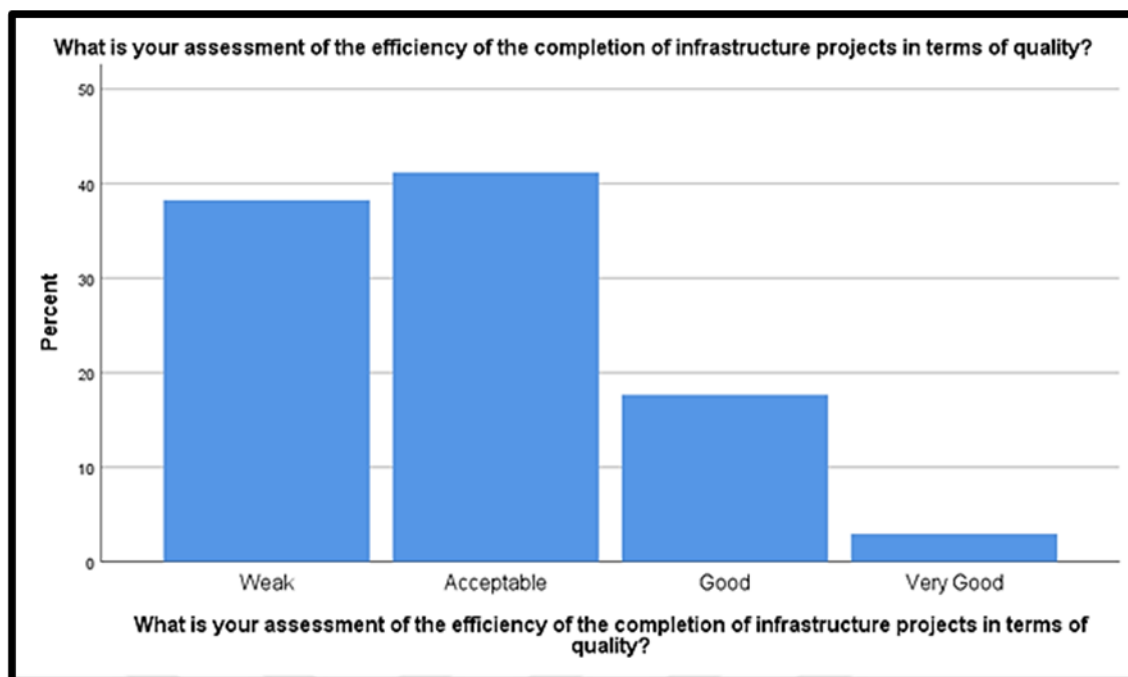


Figure 4.23: The Answers for Question 8 (Group II).

By analyzing the answers of the sample to the questionnaire for the second group, it is clear to us that most the answers to the eight questions that came in the questionnaire about the efficiency of infrastructure projects in Salah al-Din Governorate, indicates a clear reasonable acceptance on this subject.

4.3.3 The Questionnaire Questions for Group III

Assessment of the impact of infrastructure projects on the local community in Salah al-Din Governorate

Q 1 : What is your assessment of the behavior, culture and awareness of citizens in preserving public properties (including infrastructure projects)?

From the Table (4-24) and Figure (4-24) It is clear that the opinion of the largest percentage of the sample on this question was the answer (Weak) with the percentage about (52.9 %) while the answer with (Acceptable) represented the least percentage with (47.1 %) only.

Table 4.24 : The Answers for Question 8 (Group III).

	Frequency	Valid Percent %	Cumulative Percent
Weak	18	52.9	52.9
Acceptable	16	47.1	100.0
Total	34	100.0	

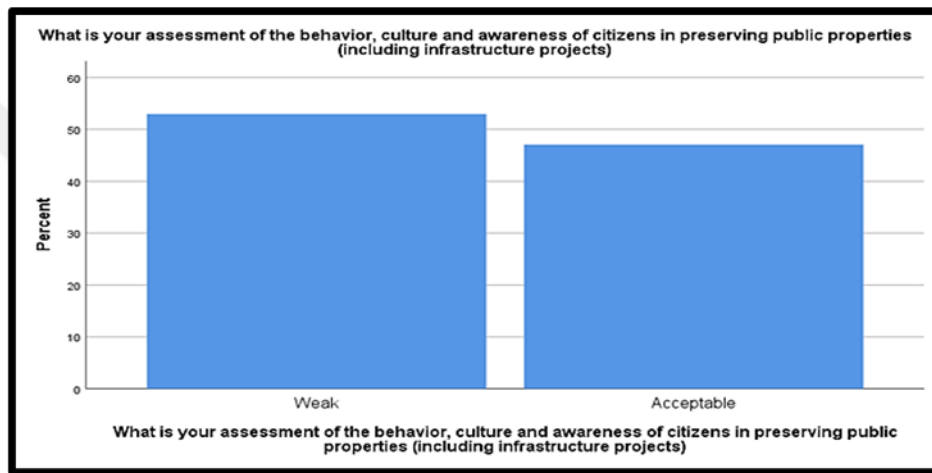


Figure 4.24: The Answers for Question 8 (Group III).

Q 2 : What is your assessment of the infrastructure services and their alignment with the population and covering their functional performance in Salah al-Din Governorate?

From the Table (4-25) and Figure (4-25) It is clear that the opinion of the largest percentage of the sample on this question was the answer (Weak) with the percentage about (52.9 %) while the answer with (Good) represented the least percentage with (2.9%) only.

Table 4.25 : The Answers for Question 2 (Group III).

	Frequency	Valid Percent%	Cumulative Percent
Weak	18	52.9	52.9
Acceptable	15	44.1	97.1
Good	1	2.9	100.0
Total	34	100.0	

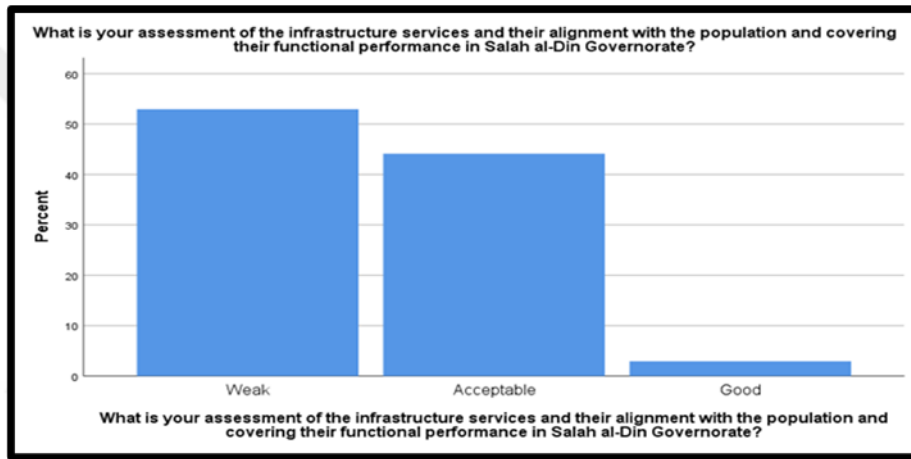


Figure 4.25: The Answers for Question 2 (Group III).

Q 3 : What is your assessment of the role of infrastructure projects in reducing unemployment in Salah al-Din Governorate?

From the Table (4-26) and Figure (4-26) It is clear that the opinion of the largest percentage of the sample on this question was the answer (Acceptable) with the percentage about (50.0 %) while the answer with (Weak) represented the least percentage with (23.5 %) only.

Table 4.26:The Answers for Question 3 (Group III).

	Frequency	Valid Percent%	Cumulative Percent
Weak	8	23.5	23.5
Acceptable	17	50.0	73.5
Good	9	26.5	100.0
Total	34	100.0	

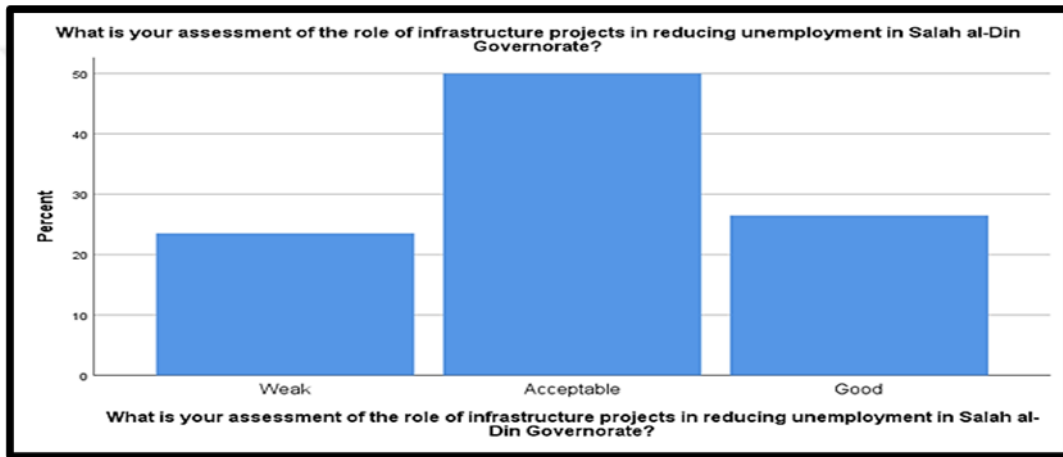


Figure 4.26: The Answers for Question 3 (Group III).

Q 4 : What is your assessment of the impact of infrastructure projects on raising the annual income of citizens in Salah al-Din Governorate?

From the Table (4-27) and Figure (4-27) It is clear that the opinion of the largest percentage of the sample on this question was the answer (Weak) with the percentage about (35.4 %) while the answer with (Excellent) represented the least percentage with (2.9%) only.

Table 4.27 : The Answers for Question 4 (Group III).

	Frequency	Valid Percent %	Cumulative Percent
Weak	12	35.4	35.3
Acceptable	12	35.2	70.6
Good	6	17.6	88.2
Very Good	3	8.8	97.1
Excellent	1	2.9	100.0
Total	34	100.0	

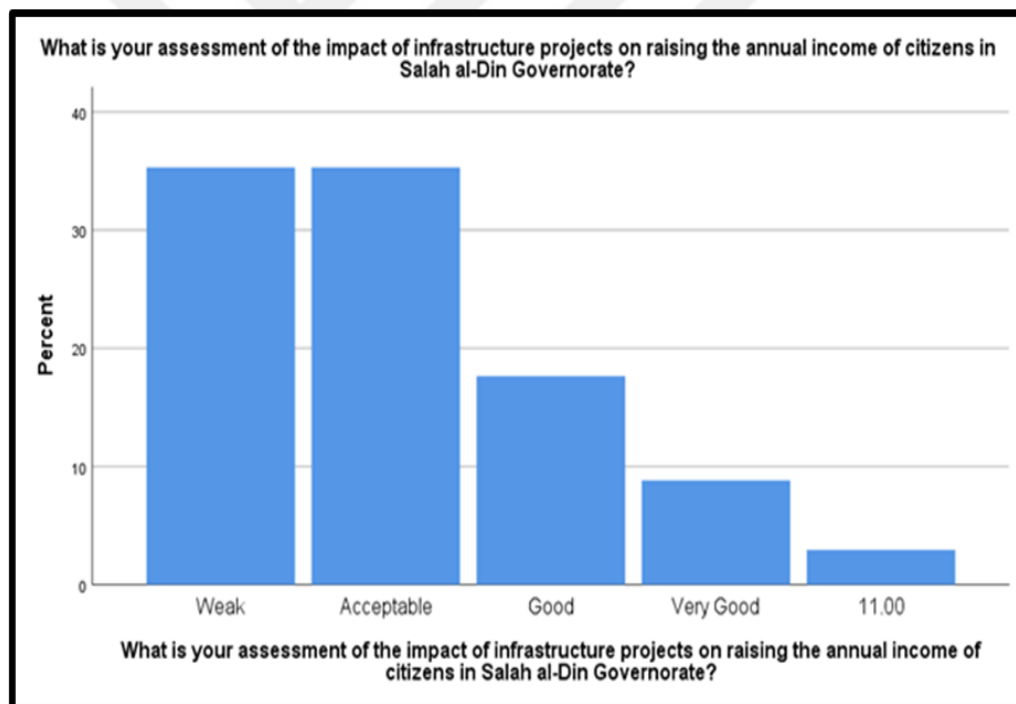


Figure 4.27: The Answers for Question 4 (Group III).

Q 5 : What is your assessment of the impact of infrastructure projects on the local environment?

From the Table (4-28) and Figure (4-28) It is clear that the opinion of the largest percentage of the sample on this question was the answer (Weak) with the percentage about (38.2 %) while the answer with (Excellent) represented the least percentage with (2.9%) only.

Table 4.28 : The Answers for Question 5 (Group III).

	Frequency	Valid Percent %	Cumulative Percent
Weak	13	38.2	38.2
Acceptable	10	29.4	67.6
Good	10	29.4	97.1
Excellent	1	2.9	100.0
Total	34	100.0	

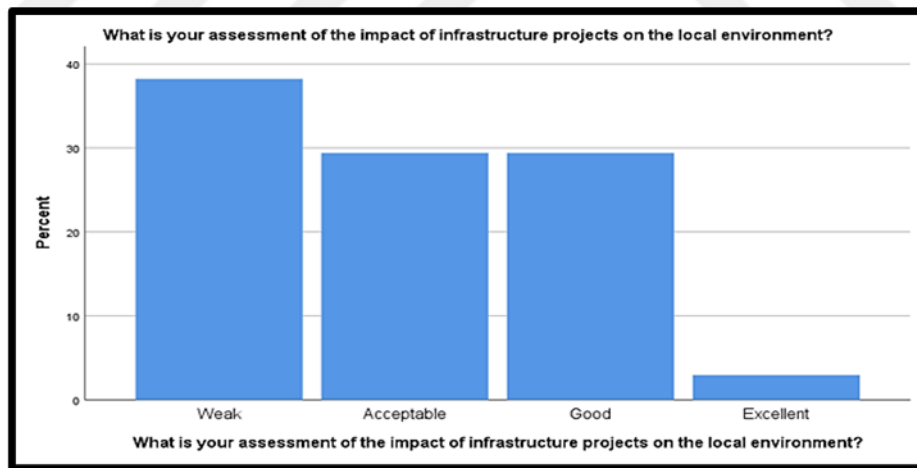


Figure 4.28: The Answers for Question 5 (Group III).

Q 6 : What is your assessment of the extent of citizens' satisfaction with the infrastructure projects that have been completed in the recent past?

From the Table (4-29) and Figure (4-29) It is clear that the opinion of the largest percentage of the sample on this question was the answer (Weak) with the percentage about (67.6 %) while the answer with (Acceptable) represented the least percentage with (32.4 %) only.

Table 4.29: The Answers for Question 6 (Group III).

	Frequency	Valid Percent %	Cumulative Percent
Weak	23	67.6	67.6
Acceptable	11	32.4	100.0
Total	34	100.0	

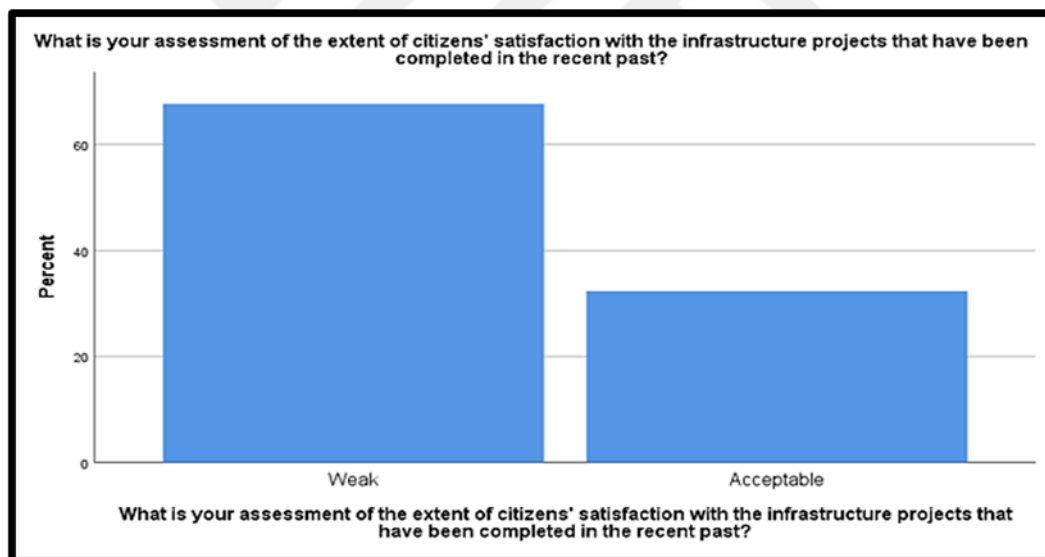


Figure 4.29: The Answers for Question 6 (Group III).

Q 7 : What is your assessment of the extent to which the citizen benefits from the recently completed infrastructure projects or which are in their final stages?

From the Table (4-30) and Figure (4-31) It is clear that the opinion of the largest percentage of the sample on this question was the answer (Weak) with the percentage about (58.8%) while the answer with (Good) represented the least percentage with (5.9%) only.

Table 4.32 : The Answers for Question 7 (Group III).

	Frequency	Valid Percent %	Cumulative Percent
Weak	20	58.8	58.8
Acceptable	12	35.3	94.1
Good	2	5.9	100.0
Total	34	100.0	

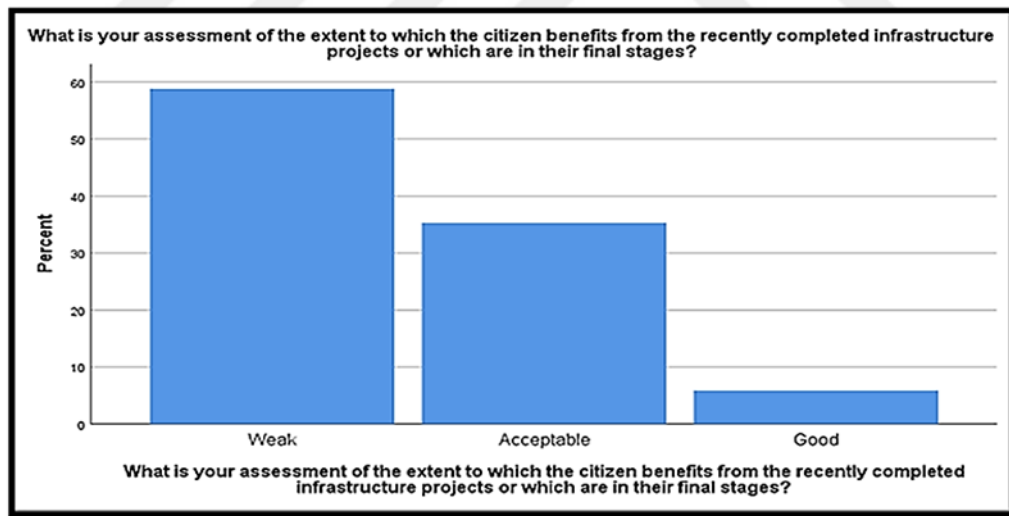


Figure 4.30 : The Answers for Question 7 (Group III).

Q 8 :What is your assessment of the control and auditing processes of the infrastructure sites in the construction project in Salah al-Din Governorate?

From the Table (4-31) and Figure (4-31) It is clear that the opinion of the largest percentage of the sample on this question was the answer (Weak) with the percentage about (52.9 %) while the answer with (Good) represented the least percentage with (17.6 %) only.

Table 4.33: The Answers for Question 8 (Group III).

	Frequency	Valid Percent	Cumulative Percent
Weak	18	52.9	52.9
Acceptable	10	29.4	82.4
Good	6	17.6	100.0
Total	34	100.0	

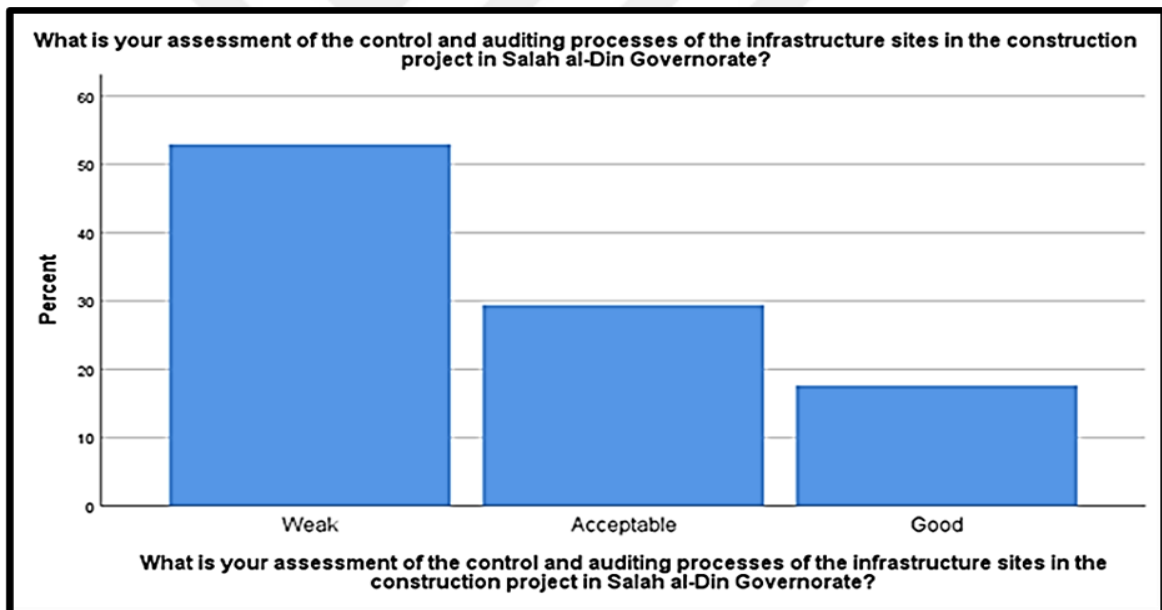


Figure 4.31: The Answers for Question 8 (Group III).

By analyzing the answers to the questionnaire for the third group, it is clear to us that all the answers to the eight questions that came in the questionnaire about the impact of infrastructure projects on the local community in Salah al-Din Governorate, indicates a clear weakness in the role of the present infrastructure projects in the local community in Salah al-Din Governorate.

5. CONCLUSIONS AND RECOMMENDATIONS

5.1 CONCLUSIONS

The results and conclusions of this research are summarized in this chapter, along with the implications of the study's key findings. Finally, towards the conclusion of this chapter, we discuss some future directions for study in this field.

- a. Since many government projects are slow in planning and implementation, this criterion is considered the important part for preparing the infrastructure rehabilitation plan, since the planning and implementation processes are the main driver for the completion of all activities in the project, as these two processes interact with each other, and all supervision and follow-up of the project are considered complementary to the other.
- b. When starting to prepare the plan, responsibilities and tasks must be defined and distributed among all project workers, and the plan should be defined within levels starting from the preparation of the master plan and ending with the daily work plan.
- c. The results related to the study showed that the lack of a role for the engineering administration in preparing a plan to rehabilitate the infrastructure in Salah al-Din Governorate is a major reason for delaying projects.
- d. By analyzing the answers to the questionnaire for the first group, it is clear to us that all the answers to the ten questions that came in the questionnaire about the role of central and local administrations, indicates a clear weakness in the role of central and local administrations in managing and protecting infrastructure projects in Salah al-Din Governorate.
- e. By analyzing the answers of the sample to the questionnaire for the second group, it is clear to us that most the answers to the eight questions that came in the questionnaire about the efficiency of infrastructure projects in Salah al-Din Governorate, indicates a clear reasonable acceptance on this subject.
- f. By analyzing the answers to the questionnaire for the third group, it is clear to us that all the answers to the eight questions that came in the questionnaire about the impact of infrastructure projects on the local community in Salah al-Din Governorate, indicates a

clear weakness in the role of the present infrastructure projects in the local community in Salah al-Din Governorate Salah al-Din Governorate.

5.2 RECOMMENDATIONS

Based on the results that have been reached and in order to address the reasons for the delay in completion on time, the following recommendations were reached:

- a. Develop a strategic plan for future projects and implement them according to priority.
- b. Develop a well-studied plan to manage the financing of the projects that will be referred or assigned for implementation.
- c. Adopt specific criteria to qualify companies and contractors and determine who is the best Among them technically.
- d. iv. Companies classified in terms of specialization and degree level should be sought and not to nominate incompetent subcontractors.
- e. Committing contractors to public safety standards when implementing government projects
- f. Emphasizing the need to include contracts for the implementation of projects, according to the nature of each A project on paragraphs that obliges the contractor to prepare a detailed program for the implementation of the project.
- g. Emphasis on the need to follow up on the implementation of projects and pay attention to the reports submitted by Before the engineers and be quick to respond to address deviations.
- h. Adopt strict measures against the contractor who causes delay in completion Projects
- i. Paying attention to the issue of project management by raising the level of awareness and interest the time, cost and quality of the projects and how to coordinate between them.
- j. Work in the spirit of one team and achieve integration and work to solve all Project problems and obstacles as soon as possible to avoid project deviation from its goals.

It is necessary to manage projects using programs concerned with project management, such as primavera and other programs



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