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**TIME AND QUALITY IN CONSTRUCTION
PROJECTS IN IRAQ**

Zaid ALRIKABI

Master's Thesis

Supervisor

Assoc.Prof. Dr. Sepanta NAİMİ

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The thesis titled “TIME AND QUALITY IN CONSTRUCTION PROJECTS IN IRAQ” prepared by ZAID ALRIKABI and submitted on 22/08/2022 has been **accepted unanimously** for the degree of Master of Science in Civil Engineering.

Assoc.Prof. Dr. Sepanta NAİMİ

Supervisor

Thesis Defesce Committee Members:

Assoc.Prof. Dr. Sepanta NAİMİ

Faculty of Engineering and
Architecture,
Altınbaş University

Asst. Prof.Dr. Mohsen SEYEDİ

Faculty of Engineering and
Architecture,
Altınbaş University

Asst. Prof. Dr. Kaveh DEHGHANIAN

Faculty of Engineering,
Istanbul Aydin University

I hereby declare that this thesis meets all format and submission requirements of a Master’s thesis.

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Zaid ALRIKABI

Signature

DEDICATION

After completing this work, I thank Allah Almighty for His great success. I would like to extend my thanks and gratitude to the supervisor of this work, Assoc.Prof. Dr. Sepanta NAİMİ, for his kind assistance and support in completing this work. I also extend my thanks and appreciation to my family for their support, as well as to all my colleagues and the teaching and administrative staff at our university.



ABSTRACT

TIME AND QUALITY IN CONSTRUCTION PROJECTS IN IRAQ

Alrikabi, Zaid

M.Sc., Civil Engineering, Altınbaş University,

Supervisor: Assoc.Prof. Dr. Sepanta NAİMİ

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Most of the construction projects suffer from not being delivered within the specified schedule and within the required quality. The primary determinants impacting project quality in Iraq were investigated in this study by administering a questionnaire to a sample of engineers working in the Iraqi construction industry. The study featured a group of engineers from the public and commercial sectors who worked in a variety of engineering specialties, the majority of which were civil engineering. The research sample included 58 engineers from various disciplines who gave their opinions on the questions posed, which were divided into two main axes, the first being time management dimensions and the second being project implementation stages, and through statistical analysis of the data from this study, the most important results affecting project completion delays were discovered are the delay in the completion of engineering projects is due to the weakness of the financial funding by the institution within the time specified for each paragraph and the low understanding of the need of pre-planned time planning for the project causes delays in the execution of engineering projects.

Keywords: Project Management, Time Management, Quality Management, Construction Industry, Work Progress Schedule.

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ABBREVIATIONS

PMBOKG : The Project Management Body of Knowledge Guide

PMI : The Project Management Institute

DS : Descriptive analysis

QC : Quality Control

QM : Quality Management

SPSS : Statistical Package for the Social Sciences

1. INTRODUCTION

The construction industry is one of the oldest known industries of man. Since ancient times, it has prospered and achieved advanced degrees of discrimination in its products and methods of implementing these products. Administrative and engineering planning is considered one of the most important reasons for evaluating the contracting companies based on the lack of contracting companies and creating techniques, schedules, rules, and timetables required for the rational execution of these project stages. All lead to project delays, poor quality, and financial losses. The administrative and engineering planning process for each project involves rules, regulations, and indicators that must be followed in order to generate customized plans for each project based on the conditions, requirements, and priority level [1]. Administrative work is an endeavor that aims to achieve the goals in the light of the skills and circumstances that were developed to achieve the goals and is connected to a particular timetable and schedule. Who can only recognize success in achieving the required goals if they are within the required time, the project's specified cost, and the specifications and high quality? It is noticeable that the projects' delay constitutes huge losses for countries and individuals, a loss of investments, a failure of companies, and resorting to the judiciary to resolve disputes. This might be due to the contracting businesses' incorrect administrative practices, which are the result of bad organization and a lack of understanding of future possibilities, poor cost estimate, resource management weaknesses, and so on. Who may be regarded the external environment for construction enterprises, other from the owners' administrative policies. Whether followed by owners or contracting companies, administrative policies require rules and guidelines to control their mechanisms as a guide for executives to refer to in the face of difficulties that need quick and decisive decisions. The researcher in this study evaluates project management systems in contracting companies in the public and private sectors, including time and quality management systems for engineering projects. This is done by trying to find out the factors affecting the project management system in Iraq. Develop recommendations and suggest ways to address problems [2].

1.1 BACKGROUND

Because the building industry is one of the most significant economic sectors, this study was given a lot of weight. Absorption of employment, development of job prospects, and overlap with other economic sectors all contribute considerably to GDP in terms of activity rates [3].

- a) As the human need to build is an eternal need has evolved on the planet. • During the years, it was developed into a specialized craft for practitioners to learn, develop, and improve the right ways to practice this in the control area. (time - cost - quality).
- b) The construction industry is a vital indicator of peoples' development and a measure of the degree of their development, as it is considered.
- c) Project implementation time is a competitive indicator among developed countries to demonstrate the extent of their engineering capacity and development.
- d) And technology.

1.2 CONTEXT

Iraqi construction projects' actual experience with time and quality management is the focus of this study. It will compare Iraq's experience with global trends and scientific foundations for construction project time and quality management to develop a set of proposals and recommendations aimed at elevating the level of this industry and improving the actual experience with construction project time and quality management in Iraq. As Iraq's building industry struggles to meet deadlines and sees a decline in the quality of its work.

1.3 PURPOSE

Construction projects are inextricably linked to people's lives, therefore the study takes on further significance. Almost all commercial and industrial firms are included in the equation since building efforts affect all sectors and vice versa. As a result, whether providing supplies, equipment, money, or labor, the building business is a source of income for huge apartments. Furthermore, the completion of these projects is linked to society's growth and development, as delays in completing construction projects and poor quality, particularly those involving vital facilities, result in time waste, increased spending, and a waste of human energies that could be used in other projects. In addition, if the construction sector contributes to the growth of human

wealth and strives to build and enhance it by conducting infrastructure projects or strategic projects, it is a sign of the state's economy's high levels.

1.4 SIGNIFICANCE, SCOPE, AND DEFINITIONS

The researcher was able to see adequate administrative and engineering planning by learning about some of the building projects that had been completed. A lack of precise knowledge of both (the idea of planning and its phases, the relevance of planning, and the aspects of good planning) will lead to a loss of control over the components of control in the engineering project if proper planning is not implemented. Regarding implementation costs and delays caused by insufficient foresight during the planning stage, as well as research into how long it takes to complete building projects as a consequence. The issue of the study follows: To what extent construction contractors grasp the idea of project preparation, the extent of preparation and recognizing contractors for the specifications of each phase 4 (the stage of preparing the plan, the stage of approving the plan, the stage of implementing the plan, the follow-up phase of the plan).

- a) The understanding of the value of project preparation by building contracting firms was relevant in time the significance of coping efficiently with the technological and operational benefits of planning, the effectiveness of adopting the rules of engineering preparation in building projects, the significance of the reliance upon chance, the significance of future aspirations and market surprises. The extent of contracting companies' awareness of effective planning elements through understanding the elements of plan success, understanding the effectiveness of planning, and the role in project success.
- b) Shedding light on the administrative and engineering planning obstacles for the contracting companies, it is, in turn, a major reason for the companies' development and delays in completing their projects at that time Specific.

1.5 THESIS HYPOTHESES

The main hypotheses on which the research relied, and it was deduced from previous studies:

- a) The contracting companies' poor administrative and engineering planning is the key source of delays in executing its programs from the viewpoint of research researcher members of project managers and team managers in engineering project administration organizations.
- b) Insufficient commitment by the construction company management to make the required efforts to implement successful quality management.

1.6 THESIS OUTLINE

This research content of five main chapters is as follows:

- a) Chapter One: Introduction: this chapter shows the background, context, purpose, main objectives of the research, and the research problem.
- b) Chapter two: Literature review: this chapter shows a historical review of : a-previously studied to identify the main factors affecting the performance. b-Construction projects.
- c) Chapter three: Methodology: this chapter shows the methodology used in previous studies and the methodology used in this research to achieve the required objectives.
- d) Chapter four: Results analysis: this chapter shows analysis, discussion of research results.
- e) Chapter five: Conclusions and recommendations.
- f) Appendix
- g) References

1.7 SURVEY FORM

To collect the information required for analysis, a questionnaire will be used. The scope of the bid proposal for the completion of construction projects in Iraq will be distributed to some samples of project managers. These samples include the following categories:

- a) A selection of project managers in specialized project management companies as they are the competent authority.
- b) Monitoring and evaluating the implementation of the project from the administrative point of view to obtain the best quality at the lowest cost and reasonable time.

- c) The elite group of project managers in contracting companies is the closest party in the project to all those involved in its implementation. It pertains to all parties that may adversely affect the project planning process and then delay its implementation.

1.7.1 Statistical Methods Used in Analyzing Data for Analysis

SPSS statistical program to analyze the results of the questionnaire.

SPSS statistical program: It's a collection of lists and tools that let a scientist to collect data through surveys, interviews, or observations, and then evaluate it (statistical analysis). It's employed in various kinds of scientific study.

1.7.2 Statistical Methods Used in the Analysis for Analysis Data

The SPSS Statistical Program: It is a collection of lists and tools that allow a scientific researcher to submit data through questionnaires, interviews, or observations, and then analyze it (statistical analysis). The statistical system is based on digital data, and the software is distinguished by its high data processing capability. It comes with everything you need and can be used in any scientific research approach.

2. LITERATURE REVIEW

2.1 INTRODUCTION

Simply said, quality is what distinguishes the good from the terrible. Projects in the building business are always organized with the goal of reaching the maximum level of validity for any task that begins with involving standards. For any construction project, it is critical to analyze the condition of construction quality control and how construction validity is determined such that quality in construction means that a project is finished within the expected guidelines set out in the project scope[4]. Whenever it comes to determining the quality of a building project, it is vital to evaluate a number of characteristics, including the scenarios that can influence the overall project in terms of schedule, budget, and available cost strategy. Completing projects with a higher degree of quality can make it easier for managers to repeat work and safeguard the construction process from spending too much money[5].

Building project managers are increasingly concerned with quality assurance and safety. Expenses might skyrocket due to malfunctions or failures in built-in facilities. Even if the problems are small, re-construction may be required, and facility processing may be hampered. As a result, the amount of money has increased and there have been delays. Failures might result in significant harm or even death in the worst-case scenario. Accidents during the building process may result in severe injury or death, as well as significant financial losses. There has been a dramatic increase in the expenses of indirect costs like insurance and regulation due to an increase in direct costs. No catastrophic incidents should occur throughout the course of a construction project managed by a competent construction project manager [6].

Design and planning, rather than building, is when the most important judgements about a finished company's quality are made, much like the amount of money involved. Component design, material selection, and functional performance are all influenced by these fundamental procedures. The primary goal of quality control in construction is to ensure that the original design and planning choices are followed [7].

While quality control's major focus is on conforming to earlier business choices, there are a few exceptions to this norm. Starting with unexpected scenarios, faulty design decisions, or alterations requested with the support of a facility owner in the condition of operation, design-related choices may be required throughout construction. A concern for quality could lead to these changes, but they can also be used as opportunities for re-design with all the related objectives and restrictions. Another example is the need for well-informed and appropriate decisions to be made throughout the building of particular designs. Tunneling procedures that use observations of soil conditions made during excavation to determine how much shoring is needed, for example. As a consequence of these related choices, the facility may be able to produce a bigger number of cost-effective results [8].

The importance of specifying quality standards in the design and contract documents increases as a result of the focus on conformance as a quality metric throughout construction operations. To guarantee that all project participants understand and comply to the project's quality criteria, they must be clearly defined and verified. A construction project's safety depends heavily on the decisions made during the planning and design phase. It is impossible to achieve certain architectural or construction aims without risking serious injury, yet the same designs might considerably reduce the risk of an accident. Reduced accident rates may be achieved by isolating traffic from work zones during highway repair. After these design activities, safety is mostly dependent on education, constant awareness, and teamwork. In order for workers to be safe, they must always be aware of the potential for an accident[9].

2.2 FACTORS EFFECT QUALITY ON CONSTRUCTION:

The missed quality in construction project can be caused by the following troubles:

2.2.1 Damaged and Low-Quality Materials

Improper construction materials, such as cement, steel, and wood, can lead to substantial construction validity difficulties. Not only do the substances fail prematurely, but the materials themselves can cause safety problems in construction by reacting unpredictably throughout the construction process. In such instances, workers' chances of being injured are increased when sparks are generated or when a structure falls due to a lack of weight-bearing capacity. Make sure

to follow the regulations established by the most reputable building companies. Send a quality control officer by one of your crews to verify each shipment of materials on a regular basis. Performing all of these tasks may be the only way to validate a correctly submitted project [10].

2.2.2 Supplier and Vendor Failures

Even though the construction materials are not to blame for any quality issues, difficulties related with vendors and suppliers can occur. If this is the case, it may reduce validity levels and, as a result, boost prices. Replacing some requested building supplies with non-brands that do not provide near to appropriate quality may result in a time-consuming difficulty [11].

2.2.3 Failure to Document Changes and Even Practices

Some quality issues are unrelated to a derived change or a specific error. It is principally responsible for the lack of documentation in which that particular alteration resulted. If the element is already in the process of being submitted for another with a variant replacement cycle and maintenance, failing to make final document revisions may result in improper management from the maintenance team. The use of construction project scheduling software in that can lead to simplification in tracking and upgrading in project documentation so that there is no cause to delay updates to anything as drawings and any other important files [12].

2.2.4 Uncontrolled Changes in Project Plan

When important features are still being considered and engineered throughout late stages of the construction process, last-minute alterations may result in some serious quality difficulties. For example, a last-minute alteration in a specific design produces a fatal collapse in one of the overall projects. It is a significant action that should be taken in that the setting deadlines in the place where designs cannot be changed any longer so that the state of ensuring the better arrangements of project facilities to extend the deadlines in additional and set aside adequate time to test and verify any changes to the existing designs [13].

2.2.5 Complexity of Designs

The high level of design complexity can be a major issue for the possibility of overlooking high-quality work. These issues may arise at some level in relation to the issue of complexity in cutting-edge structures, such as commercial building projects. Complexity can have an impact on the state of operation and simulation of a specific project, as well as the goals of time, quality, cost, and safety. Complexity can also influence the choice of an effective project organization form as well as the project management arrangement, including project managers' expertise and experience requirements [14].

2.2.6 Non-Sufficient Project Management Software

Inadequate project management software A cloud-based project management system could assist the project's stakeholders in determining the best intervals for testing the work completed thus far for omissions and errors. Without a thorough plan followed by a system for quality control and assurance, the matter of building may be delayed for an inordinate amount of time before the appropriate inspections on each work are carried out. Deploying more specialized related software based on mobile applications is regarded as a more efficient and adaptable method of bringing building projects under better management[15].

2.3 QUALITY ASSURANCE

A quality assurance system is defined as a consistent scheme that is implemented in a building in order to preserve the approved or valid status of the project in a reliable manner. A construction company's basic management system is quality assurance [16]. Companies in general can have a quality assurance chart that specifies several tests for the various levels. In general, a validity assurance plan in the future will include the following [17]:

- a) Training Programs in which for Workers and Employees
- b) Program including efficient Safety
- c) Active Procurement regime to obtain validity resources and suppliers
- d) . Reward scheme in which for innovative works

e) A competitive career performance scheme

2.4 QUALITY CONTROL

Quality assurance in construction is occasional inspection of construction operations and facilities to ensure that the contract's expected uniformity is met. Quality control is carried out by the team in charge of quality control or by specially trained teams. The soil density is used to determine the veracity of compaction operations performed in an instant for a roadway project. The slump test is used to determine the workability of concrete. Quality assurance procedures are a methodology for controlling construction operations, whereas quality management is a process that involves inspection or sample [18].

2.5 EFFECTS OF CONSTRUCTION DELAYS ON PROJECT TIME

Delays in the construction business are a global occurrence. Delays occur in the most recent building projects, regardless of project complexity. In the construction industry, a delay is defined as an extension of time in the project's completion. Delay indicates failing to complete the project within the timeframe and anticipated cost. Construction delays are regarded as a single state of substantial recurring problems in the construction business, and they frequently have a negative impact on project success in terms of time, quality, and cost. The impact that contractors and consultants have on the performance of a project is mostly responsible for the failure of projects in the majority of states. Delays are exceedingly expensive for everyone concerned, and they typically lead to cost overruns, disagreement, arbitration, complete project abandonment, and infeasibility in the future. All of these outcomes are extremely undesirable. Building is a risky sector, with concerns stemming from a variety of external and internal factors that influence the construction process [19]. Consultant design errors are one of the key factors creating time and cost overruns along the project's path. Typically, these flaws are only discovered during the construction process. As a result, the situation may necessitate additional time and money spent on addressing the errors. In addition, since the original prices were projected based on incorrect designs, design defects would lead to time and expenditure overruns. As a consequence, further steps might be taken, leading to more work or variation orders. Furthermore, the consultant's answer has been delayed, and the lack of coordination with the contractor contributes to the condition of delay. The most prevalent sources of design errors are derivation and specification

errors, insufficient field investigation, plan difficulties, design revisions, and so on. Good communication among the project team, including the owner, consultants, and contractors, Design faults may be reduced by using efficient project planning, controlling, and monitoring. The procurement and contract management strategy was found to be a key contributor to project delays and cost overruns. Contracts that are comprehensive are meant to include all facets of a commercial agreement, including price and payment terms as well as product or service offerings. As a result, a vague contract that does not explicitly define the full construction project scenario may result in a dispute among the project's stakeholders. If the scope of work is not clearly defined in the contract, the consultant may be dissatisfied with new scopes that were not included in the initial contract. This may lead to a dispute. In the event of a disagreement like this, talks, arbitration, and also mitigating measures are necessary, which results in a request for a contract review with new corresponding budgets and schedules that are unavoidable. Clearly, this will result in large-scale delays in the future, far exceeding the initial time and cost estimates. In addition, a project's success hinges on the choice of contractor. Due to the contractor's lack of forethought and readiness, the job will take longer than it would have otherwise. When it comes to making decisions, a lack of experience may cause delays and rework, both of which cost money [21].

The intricacy of the construction project may also be a factor in time and expense overruns. The amount of construction, diversity of stakeholders, and degree of scope changes can all be used to assess the complexity of a construction project. For example, most large construction projects have a somewhat extended implementation duration when compared to non-large projects. A longer construction duration increases the likelihood that the preliminary budget will be insufficient to complete the project. This could be due to inflation, changes of element prices, or changes in reciprocation rates. Any differences in scope during the construction period may result in an increase in the project's complexity. The project timeline and budget can be reviewed, which indicates that more time and reasons will be involved[22].

There are additional basic variables that would result in time and expense overruns throughout the post-construction stages. As the handover process drags on, unexpected delays and expenditures are typically caused by difficulties such as inadequate rectification actions, client acceptance and unanswered modification requests. Delays in paying consultants and contractors after the project has been finished will also cause a disagreement and a delay. These uncertainties would postpone

the dismissal of the building project crew, resulting in extra costs. Every step of the project's life cycle must be meticulously planned, regulated, and monitored in order to ensure its success. The construction project scope, milestones, situation actions, delivery time, stakeholders, and other significant components must be determined and integrated into the project planning by the project manager. Delays can be reduced by identifying the root reasons from the outset. Aside from having skilled and experienced consultants and contractors, the Project Manager must build a control mechanism to detect the recognized issues that are causing the delay. With everything a project's success depends heavily on the project team, the goals and scope must be clearly defined early on, so that the building company team has a clear understanding of which of its objectives it is pursuing, and only then will a better project team be built, accompanied by the project's success interest [23].

How to get the project back on track Construction can take less time relative to anyone in the industry than that which went without better progress for weeks, months, and years. Because there are so many moving pieces and people involved in completing a construction project, it is easy to understand how even the tiniest change can have a detrimental impact on a project's timetable. In certain circumstances, the reasons for delays are beyond a worker's control; for example, weather and natural catastrophes are examples of forms of delays that can be regulated to a high degree in order to avoid massive financial overruns. In such instances, project controls may not provide assurance against costly delays, but they will greatly raise the likelihood of avoiding them[24].

As with many challenges encountered during building operations, being proactive and preventive is the best way to deal with potential manual problems. Some of the most common types of building delays can be avoided or at least reduced by establishing communication and proper planning in advance, along with technology and appliances to help decrease risks and lead to an increase in ability. In brief, proper design reduces delays and assists construction groups in meeting more aggressive timetables, as well as providing these organizations with better budget management [25].

2.6 TYPES OF BUILDING DELAYS

2.6.1 Excusable Delays

Sometimes delays are beyond the predictability of the situation. These are classed as excusable delays in most states and include factors like bad weather and place or county matters that delay the job due to non-fault of the owner or homeowners who have been engaged to do the repair. Non-excusable delays, on the other hand, occur as a result of poor planning and rather issues such as poor work quality, defective equipment, and subcontractors failing to fulfill deadlines. In summary, these delays were averted, but there was no need for contractors to plan for them [26].

2.6.2 Critical Delays

Critical delay requires the most rapid attention of all delay categories. Essentially, a severe delay might halt the project and significantly limits the potential to complete the job within the original time frame. Regardless of who is to blame for the delays, they unavoidably cost time and money. If there are unanticipated delays, the project manager will be obliged to revise the project manual and budget. If the management encounters a significant delay, the necessary action may include conducting an additional risk assessment to guarantee that similar unstable delays do not occur in the future[27].

2.6.3 Compensable Delays

When a compensable delay occurs, a manager or owner must compensate contractors appropriately. Compensation able delays are often established in the initial building contract agreement and include errors and owner-directed adjustments. The factors that can contribute to those delays must be compensated for in order to keep the relationships between the owner and construction companies' fair. Some of these delays may be arguable and can be worked out, but if the original contract is ascertained in defining those delays and recompense, major disputes can be avoided for the most part. [28].

2.6.4 Concurrent Delays

If two or more delays occur at close to the same time, they frequently have an impact on the initial project timeline and are classed as concurrent delays. Building businesses who have difficulty

controlling one delay may discover that the state of other delays is accumulating and will need to be dealt with more forcefully in the future to keep the project going forward. Some concurrent delays can be more orderly than others. It is critical to understand how one delay may affect other construction difficulties so that they may be addressed as soon as they occur[29]. The hierarchy of the delays types was explained in figure (2.1):

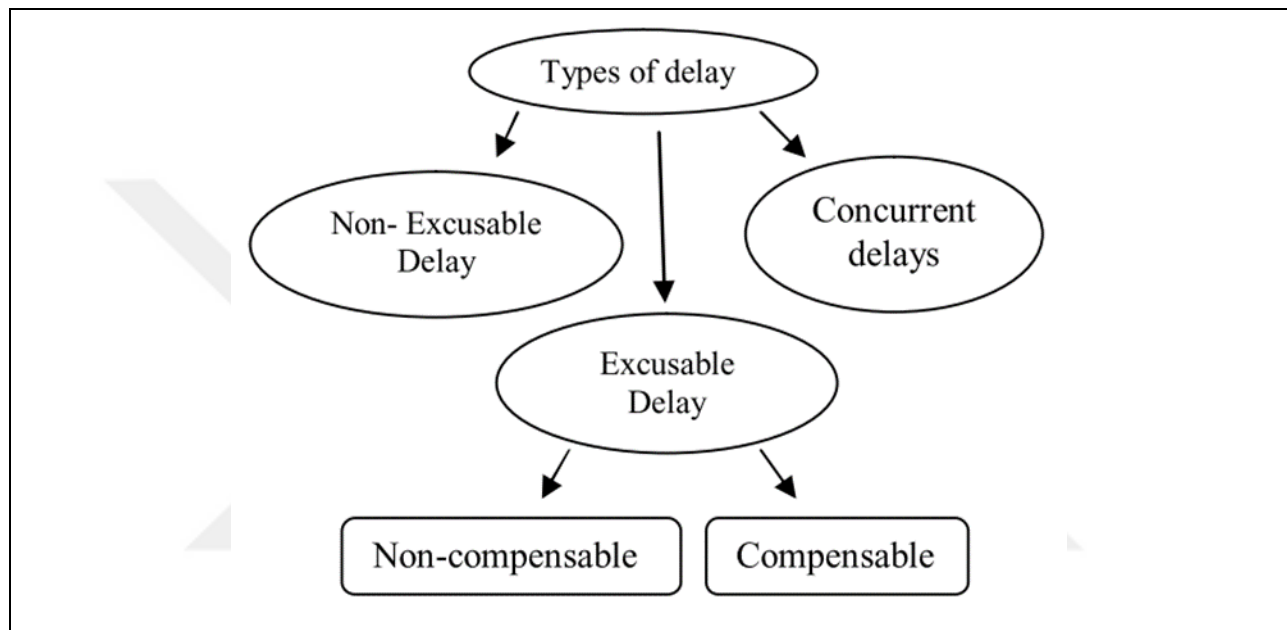


Figure 2.1: The hierarchy of the delays in construction project[29]

2.7 CHANGES OF THE PROJECT SCOPE

Unanticipated change orders and scope creep occur on a vast majority of projects, and with inaccurate scheduling, projects can be undervalued in a variety of ways from the start. When imprecision occurs from the start, it can make the matter of controlling the delay very difficult to catch or make the proper degree of changes to get the project completed in the time frame that was anticipated. Furthermore, completing a project ahead of schedule is not always a viable option, and the delays that result from underestimating have the potential to cast a negative light on the linked organization for future business [30].

2.8 CODES AND CONSTRUCTION REGULATIONS

A construction project may be moving along beautifully until the city becomes involved, but if the city determines that building requirements are not being followed, the project may face significant delays. With the recognition of a wide-range of rules in the first place, the construction project can be more focused on ensuring that the available regulations or any building norms and standards are in accordance with the beginning. The construction project will be delayed if there is a lack of collective awareness of connected laws and regulations[31].

2.9 FINANCING AND BUDGET MATTERS

Financing is yet another common need that can be handled at the outset of the planning phase. Obviously, having finance in place and lined up before a project begins can help reduce budget concerns, but some projects may proceed with only partial financing. Because of the competitive bidding process, contractors may accept this requirement if they want to win the job. Budgetary adjustments, on the other hand, can be a severe issue for projects that overspend or are projected to take longer than expected. Investing in planning software is one approach to lessen the likelihood of running into financial troubles and subsequent delays. Using this type of software obviously reduces risk and aids in planning, but there is still a possibility that further delays will emerge due to financial concerns if they are not managed effectively over the life of the project [32].

2.10 CONSTRUCTION STAGE ISSUES

When a timetable that differs in its final state is properly predicted for the outline planning, critical site controlling procedures in the building phase are required to save a project from any causing of delay. The issue of human error must be handled at all stages of construction. Communication issues, in particular, can have a huge impact on a timetable, but they can be better organized with the help of technology[33].

2.10.1 An Inefficient Crew

When the crew for a building project is inefficient, these matters might lead to serious complications. The quality of the subs would vary substantially across organizations and also between individuals. Incompetent workers may take many more man-hours to do something, and when this becomes an issue, the building project falls behind and may cost more because more hours lead to more cost. Delay or disorganization due to a lack of personnel is a very serious concern for a construction project, resulting in significant delays and losses that can be difficult to recoup from. By preventing subcontractors and tracking which companies are delivering the most accepted employees, the job manager and contractor are able to make better decisions accordingly about which go-to team and making the most out of their work so effective[34].

2.10.2 Gaps in Communication

Collaboration and improved communication can help to improve project implementation performance. A communication gap or instability might generate problems for the project in the future, such as errors, rework, and delays. Using construction productivity software helps the project in that situation since it allows the project team to communicate with the relevant workforce and everyone else participating in the project. In the same way, it ensures that collaboration is simple, so the project can progress toward completion in a more efficient manner as the related management team is capable of holding discussions when they need to know something important about the construction project and its completion. Although communication does not guarantee that there will be no delays, it does reduce the odds and makes it easier to get more done in a shorter period of time, allowing the construction firm to meet deadlines and execute projects actively and successfully[35].

2.11 AVOIDING CONSTRUCTION DELAYS

Although works appear to be delayed more frequently than they are not, construction professionals should be aware of the various degrees of delay and what causes them, in order to avoid as many of them as possible. Some building delays are unavoidable, but the damage they cause can frequently be reduced with proper planning, communication, and related software applications. When construction businesses are prepared, delays become shorter and less frequent, allowing

them to complete projects on time and under budget. As a result, a larger number of successful projects are completed, and the construction project is completed in a better state. This approach boosts the company's chances of improving its position among competitors, and it can gain more time and resources to seek additional work[36].

A construction project is essentially a short-term, fixed-cost undertaking launched to generate a one-of-a-kind product, alternative, or result. They form a project team to work on that one special development in that one exact place, which will never happen again. Delays are common when undertakings of this scale are complicated and need a high degree of coordination among a wide range of stakeholders (permissions, people/suppliers, equipment/machinery, and materials). Furthermore, the advanced procedures and the owner's intended revisions make it much more difficult to save a project on time. This state's linked manager navigates through uncertainties in the financial, physical, and environmental aspects that most projects rely on. Delays in construction as a result of such conditions can make completing structures on time and on budget a challenging endeavor, frequently leading to demands for above-cost compensation and time extensions. Construction delays are essential because they represent a time lag in the completion of activities from the contract's stipulated time or can be well-defined as late completion or late start of activities to the baseline schedule, which directly impacts the determined cost. As a result of these circumstances, the future progress of project execution will include time extensions, cost increases owing to inflation, contract termination, court cases, and so on [37].

Building delays are frequently the result of events that have been poorly managed, and they can be seen as a risk for projects that can be mitigated or accepted if they are identified, investigated, and managed systematically from the beginning to produce some positive results and reduce the likelihood of further delays. Clients, employees, and consultants are adversely affected by building project delays, which may lead to increasing mistrust, lawsuits, and difficulties with cash flow. Until a construction project satisfies the budget, time, and quality goals that were established for it, it cannot be deemed a success. To see a construction fail in terms of money, timing, and quality is unpleasant in any situation. Preventing unplanned delays by using project management is a common practice, which helps alleviate the delays. Managing a construction project efficiently requires applying knowledge, expertise, tools, and methods to the various stages of the project. This is known as project management. [38].

2.12 MINIMIZING CONSTRUCTION DELAYS

There are several major sorts of issues that prohibit jobs from being completed on schedule. Those difficulties are known as delays. Better project managers will be able to identify each category in the future. Construction delays occur when objects do not go according to design. Because construction is frequently done in sequences, things that are not planned for frequently occur. To avoid delays, the contractor must plan meticulously[39].

2.12.1 Digital Progress Reporting

It is believed that workers working in building construction spend a significant amount of time waiting for updates, producing reports, or sitting in meetings. However, if the case proceeds to digitize the performance reporting, the relevant management teams will be able to avoid wasting time in meetings or searching for updates in several technologies to build a single report. When everyone can report the performance of the project construction in real-time from the field, management can stay on the same page. This enables the contractor to produce well-informed progress reports in a shorter period of time[40].

2.12.2 Improve Management Methods

Another aspect of the problem is mismanagement, which causes construction delays and, ultimately, failure.

Good managers develop construction project plans that include all of the necessary aspects and complete the full project by the deadline. Construction managers are responsible for assigning roles and tasks, as well as coordinating recruiting and materials to the job site, to ensure that jobs are completed on time. The greatest building managers can handle multiple components of a thorough construction project plan while avoiding delays and removing roadblocks to development. When a project is properly managed, money, time, and resources are never lost[41].

2.12.3 Planning Forward

Nothing can outweigh the importance of having a clear construction project plan when it comes to avoiding project delays. A construction project design that may be easily changed as the project progresses provides a figure of the project. It enables managers to swiftly assess critical concerns and rectify problems before they become costly delays. Unfortunately, many stakeholders begin projects of all sizes without a clear timeframe, finalized drawings, or previous discussion with important subcontractors. The project design ought to be comprehensive and include all of the elements needed to complete the project. It should take into account variables in the execution process that could cause delays. A successful future plan will also include contingencies for unanticipated scenarios and develop metaphorical standards for how the firm will respond to delays[42].

2.13 ASSIGN CLEAR ROLES AND RESPONSIBILITIES

Every construction firm has a plethora of employees, subcontractors, supervisors, and other staff who are directly involved in the completion of the construction. If someone does not have a clear knowledge of what their roles are in the construction, vital chores may be disregarded, resulting in significant project delays. People must be held accountable by establishing clear roles and duties. Establishing these roles is a critical component of developing a successful building company plan and timeframe. The state, which includes an awareness of what needs to be done and who will be held accountable for doing it. To ensure adherence to the building project plan, the contractor should verify that everyone involved in the project is present before beginning. The better approach to accomplish this is to gather all relevant key people in a room prior to the project to discuss it[43].

2.14 TIME-COST STRATEGY

Time and cost analysis are two of the most critical aspects to consider when planning and managing a construction project. Construction planners choose the sources and technology, such as materials, labor force, and processes, to use for the indefinite state of an activity. This selection method takes into account doubts and non-safety scenarios in building characteristics based on the region where the project is being carried out. In this state, the building project length and cost have been

determined based on the approach used in the context of regional characteristics[44]. The critical route method has been explored to control time and costs in building project planning as well as to control resources. In project planning, the trade-off between quality, time, and monetary magnitude is critical. The most important purpose of building management engineers in project planning is to define the optimum point between periods and cost using trade-off rates. However, the volume of money involved with building works is associated with the duration of labor, unpredictable variables such as weather conditions, employee productivity, and so on are affected. Methods for addressing construction concerns and the hazards connected with them are in the early stages of development. Because a solution cannot be launched in an analytical or non-numerical manner for each problem, it is necessary to discover the mathematical expression in which the problem is expressed. Numerical techniques, such as fuzzy logic, have been devised to be employed in situations where a problem cannot be represented mathematically. The evolutionary algorithm may be used to calculate the least amount of money that must be spent during the project's construction time, and the fuzzy logic approach is utilized to simulate the uncertainties in the task design using the network programming technique.

The mathematical and heuristic modeling developed for the construction projects time-cost situation are concentrated on deterministic situations. Non-deterministic methods are rarely taken of account in the time cost trade off problem [45].

Most project environments suffer from significant time waste, particularly in the early stages of the project. When resources are taxed to their non-artificial limitations, constructions accelerate towards critical milestones or the end. When it comes to the final testing of the product, residents anticipate it to be done today. Choosing a contractor would take months, but resources would be available around the clock to achieve the delivery date. When it comes to the first stages of the project, managers may tolerate a few days of delays in client approval, but they'd still have to put in additional effort to meet the finish target. People frequently catch up on jobs with incomplete preparation in order to make up for missed time, which results in a greater number of rework and poor quality[46].

If it is possible to minimize lost time in the early stages of the project, the pressure observed towards the end of the project will be greatly reduced in the future. The majority of budget, scope, and validity compromises result from the urgency to execute the building project on time [47].

Projects that actively use time will also produce more valid results. As a result, it is not unexpected that projects that are completed ahead of schedule are also completed under budget and with high quality. Despite the fact that hard data from project acts testifies to a relationship between validity and length, the widely held opinion is that a shorter amount of time equals low quality. The residential created the notion that time and quality are inversely related. It stems from their abilities to remember that whenever there was a time crunch, validity and scope were jeopardized, so it is an obvious assumption that adequate time leads to better quality. It is true in that when someone tries to do an action or task less than its touch periods or the net time quality is bound to suffer [48].

Technology is used not only to monitor operations on the job site, but also to ensure that the builders' manual is carefully followed by the entire crew. In building, time is of the essence. A one-day delay would result in a cost of thousands of dollars. This is an extremely unsatisfactory issue for a client, and it has the potential to harm the reputation of a construction company. Delays may have an impact on the finished product. First, if the controlling team decides to rush things up to avoid more delays, the construction may be conveyed with inadequate validity. Second, the linked client may suffer a significant loss as a result of the additional expenses incurred as a result of the delay. Third, litigation may be necessary if the client discovers that negligence was the cause of the delay. Fourth, the building business has the option of closing down if it loses credibility as a result of causing harm to its client's state[49].

Construction delays are unavoidable, especially when weather disturbances cause them. That is why careful planning is essential to consider these scenarios and arrange for contingencies early on. Previously, Concreting is one of the most critical aspects of construction, therefore I offered advice on how a contractor might keep going even if it was raining. While dealing with weather disturbances might be difficult, there are techniques to reduce the likelihood of them occurring by delaying operations when they do. Errors are other causes that lead to costly delays and reworks [50]. Controlling construction delays through strategic time management is important matter. The controlling can be throwing the following approaches:

2.15 IMPORTANCE OF TIME CONTROLLING IN CONSTRUCTION

To complete a building, a construction team or contractor will need many specialists and professional laborers. Salaries are one of the costliest components of a project since they are paid by the hour. Consequently, to keep within the project budget, the customer requires assurance that such resources are utilized properly on the construction site. Time management is one strategy for ensuring that individuals make the most of their leisure time.

Time management in construction entails scheduling operations and allocating certain time intervals to those activities. The primary goal of this technique is to improve workers' competency and productivity[51].

While employees might strategize about their time, the project manager must take the lead in assigning any of the members' schedules. There is a means to guarantee that all actions are aligned with the overarching plan and that the daily operations are well-organized.. Time management is one of the key responsibilities of a project manager in the construction industry, though. Keep everyone productive may be tough with so many people working on the site. Finding time management approaches and tools, as well as a project management program, is a very effective subject that may be accomplished through management. Furthermore, the contractor can push the operation's alignment with the builder's timeline and the client's objectives. Intelligent strategizing is very important in planning, planning, and prioritization in executing time management for a wide range of construction operations. [52].

2.15.1 The Significance of Time Controlling in Construction.

Effective time management is being attempted to lower overall construction expenses by allocating employees to achievable daily and time limits. This is done in the same manner to ensure that their energy and billing hours are used efficiently. Time management organizes the allowed time frame with the use of milestone plans from the customer to meet or even beat the deadline. While time management helps to ensure a contractor's profitability, delays might result in a partial loss of profit or contract cancellation. Because time management tactics may assist in completing a project on time, they can impress the linked client, causing him to provide a positive testimonial for the construction business, which will be advantageous when a new project is received. It may even

earn the client's confidence by convincing him to give the winning firm a new building project. To stay within the budget and meet the contractor's deadlines, effective time management is essential. It's more than simply a tool for keeping work organized in the field; it's the situation that will lead to the expected profits. [53].

2.16 STRATEGIES FOR EFFECTIVE TIME MANAGEMENT

Planning the project is a critical stage that must be accomplished before the actual building begins; similarly, planning must be done before activities continue every day. This is due to complete control over what can be accomplished in a day. A manual but unanticipated difficulty may develop, causing the schedule to be altered.

2.16.1 Avoiding Distractions

To the project manager and the members of his team, this is particularly crucial for the project manager who has to deal with a wide range of challenges in a short amount of time. However, they cannot be distracted by trivial responsibilities in order to concentrate on the more significant tasks. The day's work should begin with a clear understanding of what the top priorities are. Start with the most important chores and work your way down to the less important ones[54].

2.16.2 Organizing Data

A construction project management software can cooperate on a variety of information via the cloud. Documents can be efficiently grouped in folders corresponding to the specified categories, ensuring that the desired document is easily accessible. It is also necessary for busy crew members to ease the management of project facilities, appliances, and equipment. There is a plethora of related applications that may be used to arrange staff schedules. The use of construction manual software can contribute to the acceleration of some main operations such as joining and communication[55] .

2.16.3 Take Notes

With so many activities on the management team's agenda, it is entirely possible that they will overlook a task in the project control activity. Taking notes on each activity can help you remember the priorities in the future. They can enter tasks into the construction project management software on a daily basis, and preset notifications for that state will be effective. Crossing off completed activities can also save time from looking over the chores list and may even provide a sense of satisfaction for further encouragement to work a larger quantity meticulously. [56].

2.17 CURRENT WORK

This study aimed to examine the matter of reality of time and quality management in the sector of construction projects in Iraq and determine this reality in the light that related to global trends and light of the scientific foundations in which for time and validity management in the construction industry. The study routed the required data that can be used in the matter of analyzing the construction quality and the problem of project delay in Iraq to achieve a fix to that matter by scientific explanation of the problem from causing to resolving. The study aimed to advance this industry to a better level. The study moved in its outline to reach the state of developing for the reality of management and validity in the building sector and enhancing it in Iraq. As the building sector in Iraq suffers from the matter of decreasing in quality and the troubles in completing the project on predicted periods of time.

2.18 LITERATURE SURVEY

This study analyzed theoretically, there is a probability of creating a conceptual framework in which to consider quality elements in the project's location. The study showed various criteria in the state of highest and lowest quality characteristics with business involving the housing sector. The study highlighted the situation in which architects and stakeholders evaluated the most and least significant aspects influencing validity with no worth difference. The study revealed the consequences for building industry managers and policymakers. The study found that potential developments and strategies should be as base of the recent developing quality in the housing sector. The study found that construction projects could prepare quality plans for all levels. Managers could learn from the experience of the top performers in the service and public utility

sectors. The study explained the pathways for better quality in construction involving contractors' actions by organizing their workers' resources, materials, methods, and money in each construction project. Construction organizations could realize that outcomes cannot be reached and gained without sufficient time the used to adapt project facilities [17].

The study analyzation based on the quality management system, construction companies were going to establish a flexible and beneficial organizational development method through a quality controlling system for anybody involved in the building industry. As part of the study, auditing was carried out by conducting interviews with the owner of the construction, the project controlling consultant, the entrepreneur, other consultants, and contractors. The study employed an approach of construction quality rating that was assigned by the contractor, stakeholder, and occupants of the construction. The study examined all relevant data gathered through interviews and questionnaires. The study also explored the prerequisites for higher quality management design, explaining how that topic is crucial with the assistance of suppliers, rather than a state of physical testing on-site. The study found that site satisfaction resulted in all project participants being satisfied. The study reached the routing concluding to the results that it is so important situation that been considered which is the better understanding on the matter of quality control procedure and suitable quality control ways for the construction [57].

The objective of the study was the investigation of the elements influencing construction validity. The study defined quality as it relates to the country's economy and is commonly described as the ratio that specifies expectation to action. The study examined the construction quality by comparing how the things were completed to the design specifications and standards. According to the report, quality is very important in construction. Such quality is determined by a variety of elements both before and after construction. These elements influencing quality in construction implementation were derived codes and standards, customer satisfaction, financial concerns planning, materials, inspection, risks, methods of execution, and coordination. The study discovered that it is not a difficult matter to considerably boost project validity by detecting at the job site during each pattern of construction. Appointing a quality designer in construction lines in a project and assigning tasks can lead to the elimination of problems and, as a result, boost the productivity level in the organization businesses[58].

The study focus on the quality as it the critical parameters in the success of construction sector in Pakistan. The study evaluated the improvement in the validity of structures in conjunction with quality management in the project in the method of life cycle. According to the study, validity management is vital at all stages of the construction project life cycle, and quality management for the design and construction stages leads to significantly superior quality outcomes in which of construction projects. As a result, the study emphasizes the bulk of the benefits acquired by quality management during the design and construction phases. Two major cities in Pakistan were involved of proactive initiatives to increase through quality in the design and implementation phases of building projects. The auditing results clearly show that both consultants recognize the relevance of managerial validity in the design and building phases of construction such that quality is affected by design. The amount of money provided for project maintenance and servicing is influenced by the level of low quality in development and construction[59].

The study aimed to identify crucial quality-related factors in building project management and also the state of finding the relations in between them, to assist other researchers and construction project managers with better respond to quality issues. The study explained the pathways of previous studies and used them to determine the situation of quality-related factors. The study relied on quantitative analysis to identify quality-related metrics connected to project operations, structural and organizational processes, and the validity of outcomes, all of which contribute to the overall quality of the building project. The study's findings included the identification of quality-related indicators that may be studied further, as well as the planning and execution of buildings. The research found that the planning courses' framework may assist construction project managers, sponsors, and management committees in avoiding or minimizing quality-related issues. Furthermore, the researchers discovered that the validity of an organization's procedures and quality is prioritized via the ultimate product quality. The structural equation model was used to develop a model that would serve as the foundation for future study into building quality techniques[60].

The study constructed above the matter of defects that the respective projects and also the poor quality as it lead to spend more amounts of money. In same manner the study showed the defective situation in building construction and how that matter contributes to added more cost of the construction project. This study proposed to analysis variability extra cost and work that occur

after the concrete cycle. The data were gathered using standardized information collection scheme. The study described the validity at each class or quality of product that may be achieved by a proper control procedure for a tiny cost when compared to the whole magnitude of money that was estimated as construction cost. The building specification in a condition of near-adequate project execution to be carried out in the near future should be updated during the validity control done above prior projects. The study explained that the quality of work is mostly determined by the quality of the chemicals to be used and the workmanship. The matter of relevant specification related to materials be severely adhered for accomplishment of desired quality assurance and quality control. The study showed that the quality management should be trained at diverse stages such as pre-construction, through construction and in the stage of post-construction [61].

The study instigated the matter of the quality in construction related to contractors approach that effected by quality planning in Sri Lanka. It was the study's primary objective to determine the degree to which construction stakeholders are capable of implementing quality design and strategic authenticity planning. Qualitative case studies were employed in accordance with the study's parameters to represent three key stakeholders in Sri Lanka. The ISO 9000 standard code is the most often utilized quality control system among Sri Lankan construction contractors, according to a recent poll. Barriers to implementing strategic quality design are holding back stakeholders at this point. As a result of this case study, there are a number of preconditions for the successful implementation of strategic quality planning that contractors operating in comparable circumstances may benefit from. The study's goal was to discover how Sri Lankan building contractors approach validity planning. According to the findings of the study, the majority of firms are hesitant to modify their current practices due to clients who are not driving quality-based contractor operations. The study's empirical foundation revealed that economic emergency scenarios can divert attention away from the expansion of a strategic quality strategy [62].

The research looked at the elements that affect the quality of building project processes in Bosnia and Herzegovina and Croatia. The research looked at examples when investors, contractors, and building project managers refused to accept them. Coordination via participation, communication, expertise state of knowledge, and designing with control were the factors. In the middle of the specified participants, these primary factors were explored along with various priorities. The study highlighted the significance of distinct quality metrics that vary during different phases of building

projects based on various management perspectives. The study found that there was a significant variation in validity variables between project participants in Bosnia & Herzegovina and Croatia. On the other hand, the study found that planning and controlling were not in appropriate order in the analyzed locations. In the nations where the analysis was conducted, the variation in comprehending the importance of parameters is fairly minor. The majority that was obtained for assessing the status of the quality parameter inside the patterns of the construction project was not excessively different in manner between respondents from Bosnia and Herzegovina and Croatia, and they shared nearly the same opinion regarding these criteria[63].

The study based on total operation management in the execution and barriers in that need to be overcome due to the differences between societal cultures. A case study was chosen for analysis in the Libyan construction sector, where the management technique confirmed by the study is increasingly being used to overcome quality concerns in the construction industry. The study investigated and described the impediments that arose and functioned to postpone the implementation of complete operation management methods involving in-depth auditing of Libyan construction enterprises. The study presented as a conceptual framework in which it was proactive measure that may be designed to improve the state of total operation management adoption and that may also act as a directory for different studies in coming time. The study applied the strategy of qualitative and quantitative process in which to style primary and secondary information for the matter of total operation management model framework which was successfully tried using a self-assessment case analysis of companies [64].

The study made reviewing on previous studies on causes through delay in variant types of building. The most popular methods adopted with the help of researchers for causes of delay determination were explained by the study. The study showed the reasons for delay that based on the source in the state of delay. Within the investigation, the levels of delay metrics associated to stakeholder and consultant were depicted. The study found that the questionnaire and the situation of relative importance index were the least stable techniques for gathering data and ranking delay reasons. The study awarded the most successful groups for delay categorization to the contractor and consultant. Furthermore, the causes of the state of delay associated to the contractor are critical. The research looks at several types of construction, such as highways, residential structures, roadways, transportation, and general building[65].

The study analyzed the state of construction through the evaluation of gaps in theory and practice associated with takes less time in the completion of constructions. The major pathway that taken by this analysis was to determine the most major factors that can lead delay the completion of construction projects, by gaining a representative sample from each engineering offices and the contractors with the help of distribution questionnaire contain several causes that related to the matter of delay to a representative sample to understand delays reasons in Iraqi building projects from the opinion of construction project participant, and after that analyze the outputs. Inappropriate bid pricing and insufficient cost for project execution were identified as the key reasons of construction project delays from the perspective of project participants. The study highlighted the detrimental impact when the contractor fails to control the construction's cash flow. The study demonstrated the delay caused by the inability to provide money for the required equipment at the time demanded or the delayed availability behind schedule, as well as the kind tenders in that the selection methods to negotiate small pricing or any other criterion[66].

3. RESEARCH DESIGN

3.1 METHODOLOGY AND RESEARCH DESIGN

In this chapter, a questionnaire was prepared and submitted to a group of engineers and experts working in the public and private sectors. Where an electronic questionnaire form was designed, the questionnaire was distributed to many workers in this field (engineers, contractors, administrators, etc.) to know their views on the questions asked in the questionnaire at each stage of the project construction. The questionnaire was divided into two axes:

- a) The first axis is the dimensions of time management
- b) The second axis is the stages of completion of the project

The goal of selecting a questionnaire study is to identify the content of the research that meets its goals and proves its hypotheses by defining and collecting the study's contents and information sources.

3.2 THE COMMUNITY OF THE STUDY

The research community can be defined as a specific group of individuals or things that have standard features and characteristics that can give a decision in the questions presented to them. The research covers a group of engineers working in the construction sector (public and private).

3.3 THE SAMPLE OF THE STUDY

The researcher relied on sending the electronic questionnaire to the largest number of workers in the study community to obtain the required data. The example includes project managers in consulting offices and engineers from various disciplines and in different years of experience.

Some of the engineers were interviewed at some of the work sites and company headquarters; The study population includes engineering consultancy offices in Iraqi universities and public and private sector companies working in construction projects in different disciplines, whether construction, roads, sewage, water or electrical works. The questionnaire was also distributed to a segment of engineer's members of the Iraqi Society of Engineers.

3.4 EXCLUSION CRITERIA

Exclusion criteria are some of the features and characteristics that some responding engineers lack to be included in the study [67]. Through our questionnaire, a segment of newly graduated engineers was excluded due to insufficient experience to answer the questions of the questionnaire in order to ensure the reliability of the results.

3.5 DESIGNING THE QUESTIONNAIRE

To obtain the information and data for this study, an electronic questionnaire was designed to assess the factors that cause delays in construction projects in Iraq and the factors that affect the quality of construction projects for companies operating in the public and private sectors.

The questionnaire is one of the standard methods of data collection. It is characterized by the possibility of collecting information from a wide range of people in the study sample and analyzing it to obtain clear and specific results.

The steps that the researcher followed during the study process are:

Reviewing the literature related to the subject of the study and indicating the regulatory factors that affect the quality of construction projects.

The researcher made some paragraphs:

- a) Editing and reformulating some paragraphs to make the meaning understandable.
- b) The researcher tried to consider the educational and cultural level of the participants in the study by avoiding embarrassing questions.

With reference to the above, the questionnaire was modified to suit the study population and the study sample, and then the questionnaire was built in its final form. It was also written in two languages, Arabic and English, and the questionnaire was distributed in the Arabic version to be easier and faster for the recipient because the country of study is an Arab country.

3.6 THE QUESTIONNAIRE

3.6.1 The First Part (Dimensions of Time Management)

A: time planning

- a) Daily performance falls within a list of tasks I want to accomplish daily, according to paragraphs arranged according to priorities.
- b) Defining project activities according to a schedule to define and document the planned work
- c) Implementation of the project according to a realistic schedule.
- d) Adjusting the project's daily schedule as part of the integrated control process by the project's senior management.
- e) Scheduling daily activities play a major role in the speedy completion of planned projects.

B: Setting goals and priorities

- a) The Foundation sets priorities for the completion of projects to be consistent with its strategic goals.
- b) The institution sets a timetable for achieving the project goals, which helps speed their achievement.
- c) Delegating powers is one of the priorities of the institution's work in completing its projects.
- d) Executing projects on time is one of the priorities of the Foundation's work.
- e) The institution's keenness to adhere to the deadlines for the completion of projects and considers them among the main priorities.

C: Avoid wasting time

- a) Clarity of responsibilities within the institution despite the overlap in powers.
- b) The company works in a team spirit.
- c) Highly qualified staff work in the institution.

- d) The company is able to provide financial resources in a timely manner.
- e) The presence of multiple supervisors within the same project.
- f) People in the organization depend on the method of self-monitoring.
- g) There is a serious interest in preparing project implementation follow-up reports.
- h) The organization's communication system with the relevant authorities is effective.
- i) Decisions made in the organization are carefully considered.

3.6.2 The Second Part (Project Completion Stages)

A: Project start

- a) The project management obtains information from multiple parties for the purposes of the feasibility study.
- b) The project management is keen on defining the activities and scheduling the financial resources for the project.
- c) The project team includes experienced and qualified individuals.
- d) Establishing a project office for the purpose of listening to the opinions of project workers.
- e) Follow-up by the project management for changes in the project.

B: Project planning

- a) The project management prepares the project phases within a specified time schedule.
- b) The project management determines the start and end date of each project activity.
- c) Project management has the ability to provide resources in the required time and quantity.
- d) When setting the project schedule, the project management takes into account the environmental changes that have occurred.
- e) The project management is keen to develop an effective risk management plan.

C: Project execution

- a) The project management is keen to apply international standards and use modern methods to improve the quality of the project.
- b) The project activities are carried out according to the schedule prepared in advance for the project.
- c) Project management has the ability to deal with unexpected crises.
- d) Project management follows the method of external control in the project implementation process.
- e) The project management conducts sudden checks to ensure the quality of work on the project.

D: Close and terminate the project

- a) The project plan is matched with what has been accomplished, and the results are determined and matched.
- b) The project management has high confidence in the performance of its workers.
- c) The project management seeks to enhance trust with the project beneficiary.
- d) The project management seeks to create a good reputation among its competitors through its achievements.

4. RESEARCH RESULTS

The questionnaire was delivered to 80 target respondents. A total of 58 questionnaires were returned from the respondents, bringing the overall response rate to 73%. As a result, a total of 58 questionnaires were fully completed and recognized as valid according to the quantitative analysis.

The questionnaire consists of two parts, the first section is concerned with the dimensions of time management and includes questions divided according to three paragraphs, namely (time planning - setting goals and priorities - avoiding wasting time). The second section is concerned with the Project Completion Stages and includes questions divided according to three paragraphs, namely (project start – project planning – project execution - project closure and termination) where respondents were asked to rate their agreement with each statement using a 7-point Likert scale, which ranges from totally agreed to not at all. The 58 responses to satisfactorily completed questionnaires were assigned numerical codes (1 = fully agree, 2 = agreed, 3 = somewhat agreed, 4 = not sure, 5 = somewhat disagree 6 = disagree 7 = disagree at all) and Analyze it using descriptive statistics. Details of these statistical analyzes are provided in the next section (Testing the reliability and adequacy of the results and Cronbach's alpha reliability test.

Cronbach's Alpha was used to analyze data reliability and to ensure that the questionnaire was appropriate for data collection. The value of Cronbach's alpha coefficient ranges between 0 and 1. Reliability and internal consistency increase with the increase in the value of this coefficient. Cronbach's alpha coefficient was calculated as 0.875, as shown in Table 3.1. Since these values are greater than 0.80, it is considered a 'good scale' G. D. Garson, VALIDITY AND RELIABILITY 2013 Edition. 2013. Thus, it shows that the values of the questionnaire parameter are considered reliable.

Table 4.1: Reliability Statistics

Cronbach's Alpha	N of Items
0.875	58

4.1 STATISTICS FOR RESPONDENTS TO THE SURVEY

All the questions were answered by the respondents, as shown below:

4.1.1 The First Part (The Dimensions of Time Management)

A: time planning

- a) Daily performance falls within a list of tasks that I want to accomplish daily, according to paragraphs arranged according to priorities

The proportions of the answer are as shown in the figure 4.1 below

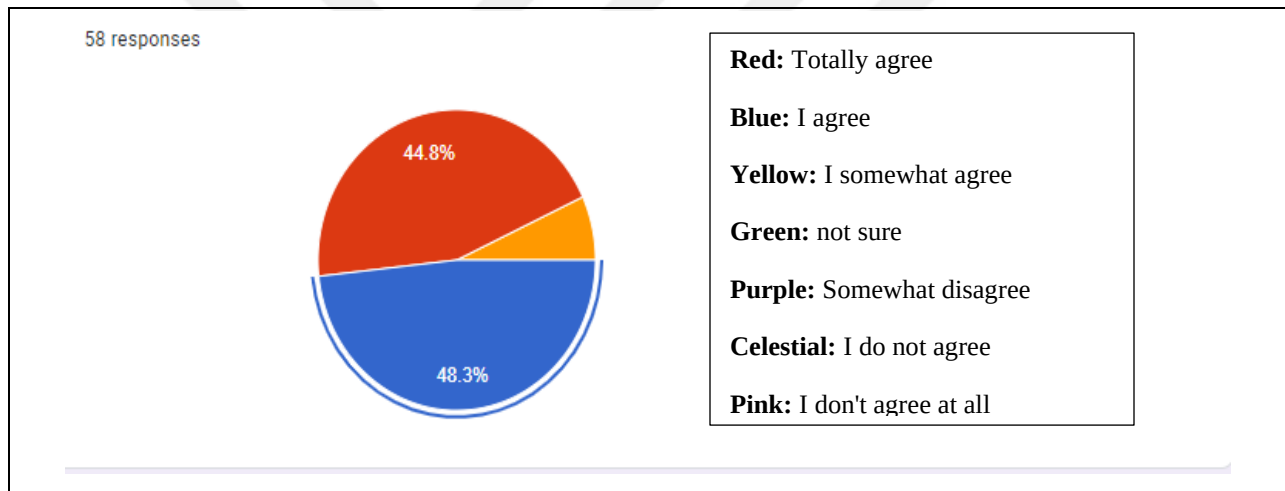


Figure 4.1: The Proportions of the Answer to the First Question in the part1

a) Defining project activities according to a schedule to define and document the planned work.

The proportions of the answer are as shown in the figure 4.2 below:

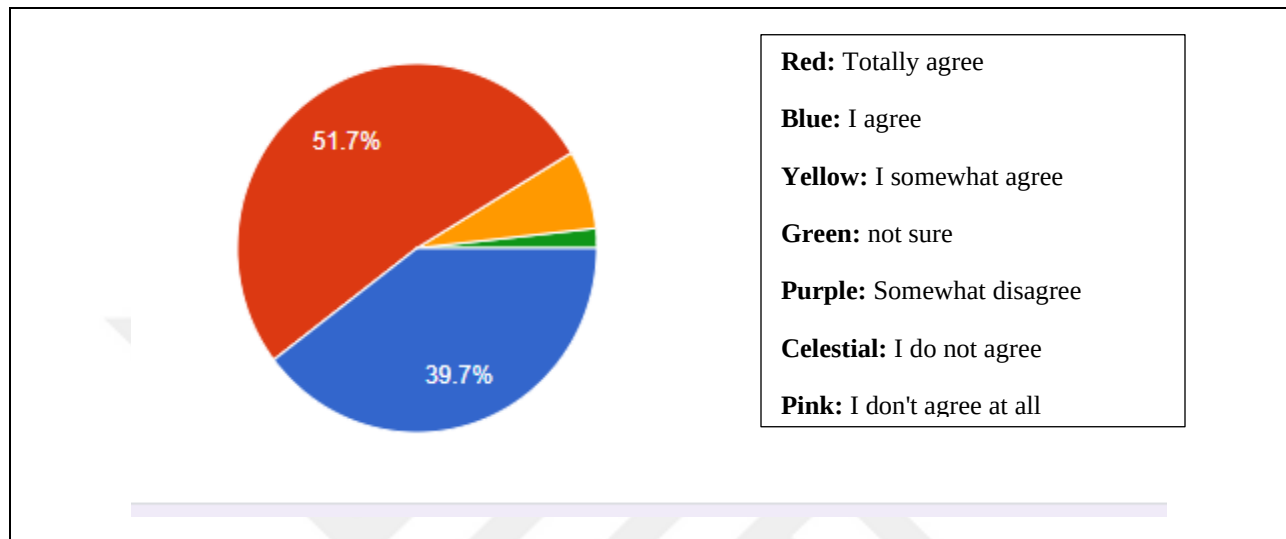


Figure 4.2: The proportions of the answer to the second question in the part1

b) Implementation of the project according to a realistic time schedule

The proportions of the answer are as shown in the figure 4.3 below:

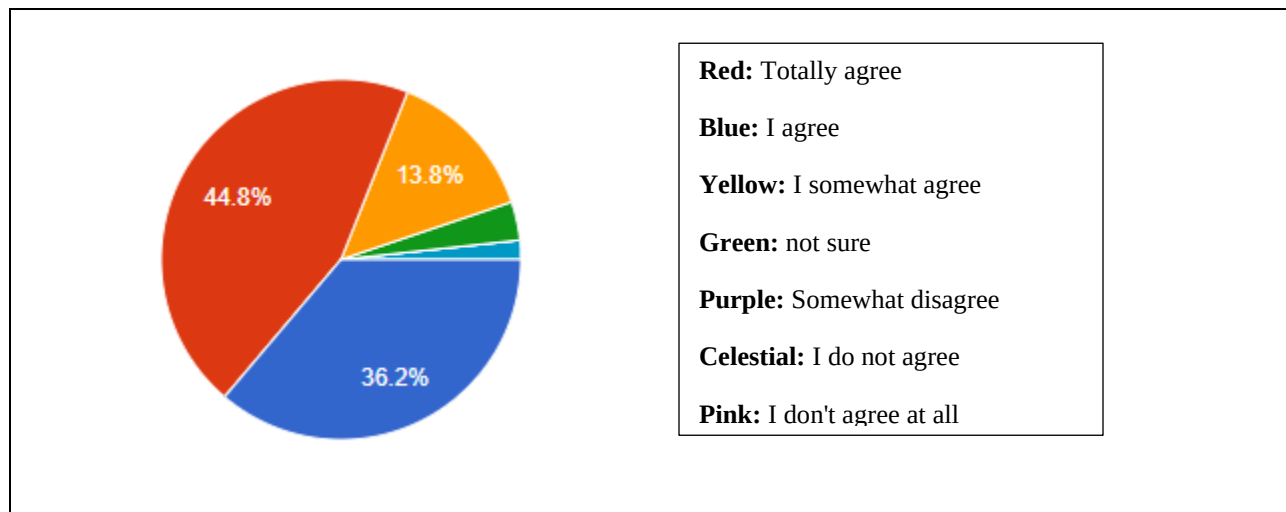


Figure 4.3: The proportions of the answer to the third question in the part1

- c) Adjusting the project's daily schedule as part of the integrated control process by the project's senior management

The proportions of the answer are as shown in the figure 4.4 below:

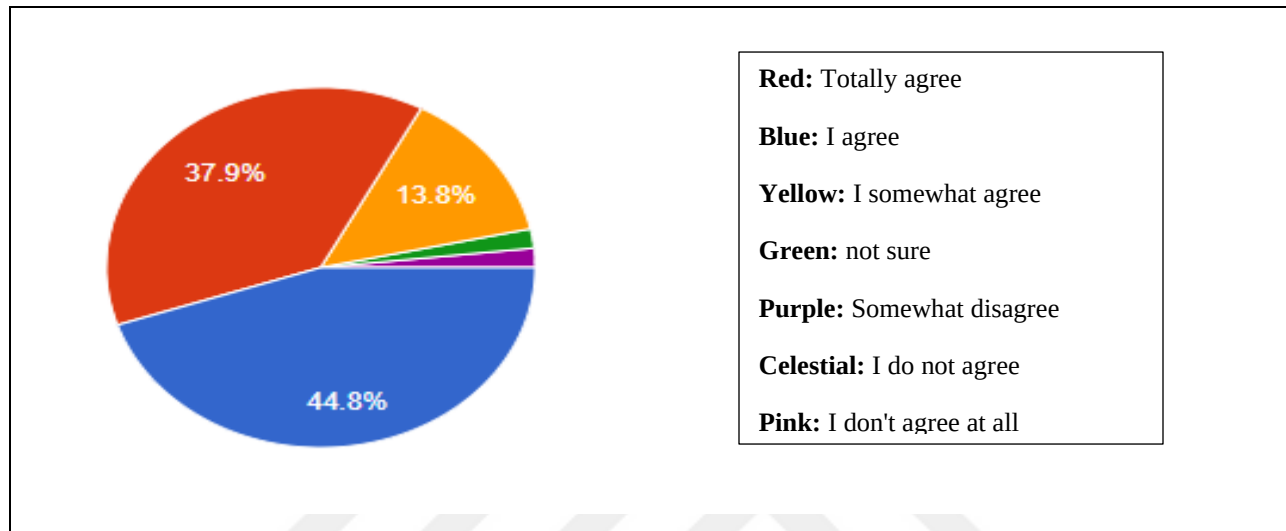


Figure 4.4: The proportions of the answer to the fourth question in the part1

- d) Scheduling daily activities plays a major role in the speedy completion of planned projects

The proportions of the answer are as shown in the figure 4.5 below:

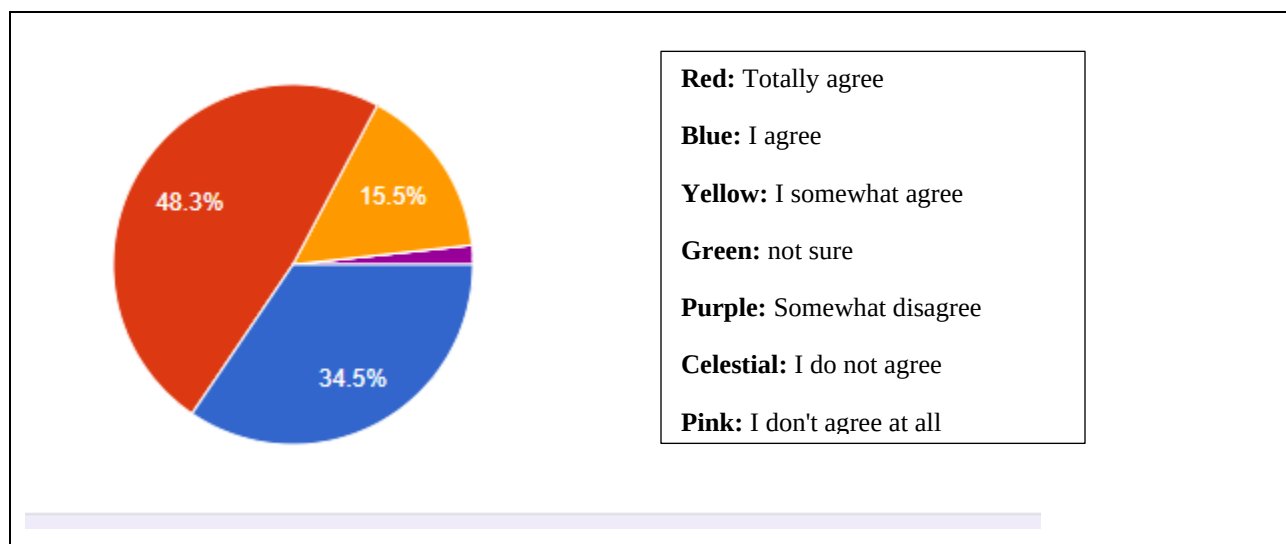


Figure 4.5: The proportions of the answer to the fifth question in the part1

B: Setting goals and priorities

- a) The Foundation sets priorities for the completion of projects to be consistent with its strategic goals.

The proportions of the answer are as shown in the figure 4.6 below:

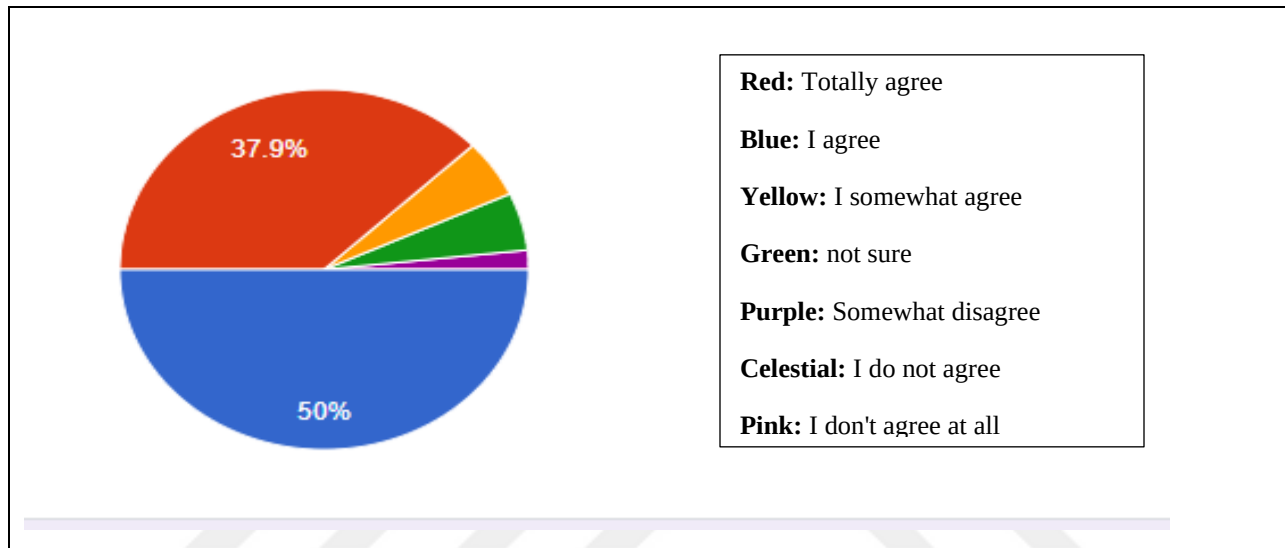


Figure 4.6: The Proportions of the Answer to the First Question in the part2

- b) The institution sets a timetable for achieving the project goals, which helps in the speed of their achievement

The proportions of the answer are as shown in the figure 4.7 below:

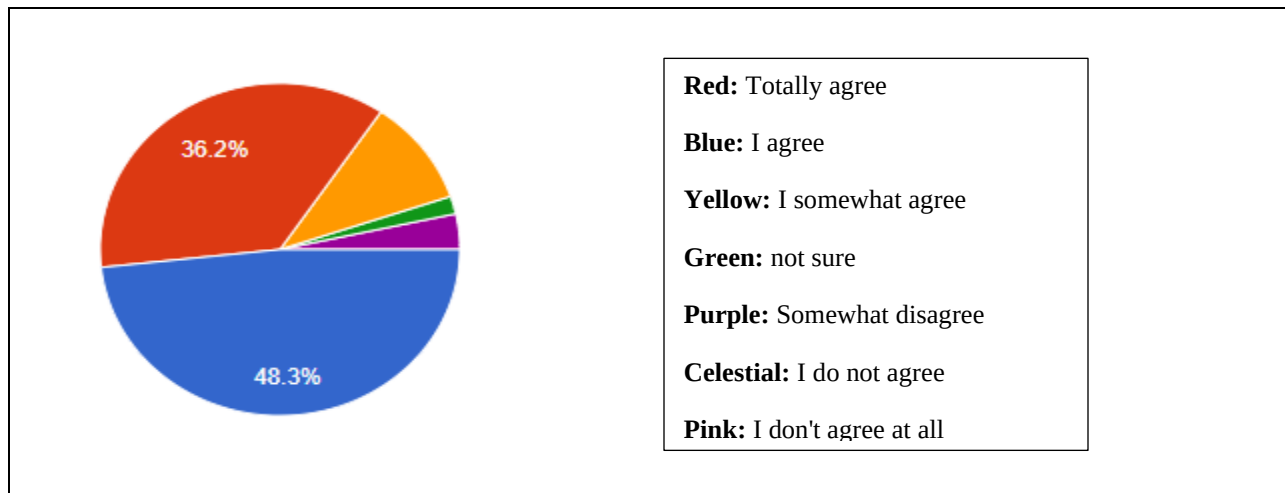


Figure 4.7: The Proportions of the Answer to the Second Question in the Part2

c) Delegating powers is one of the priorities of the institution's work in completing its projects

The proportions of the answer are as shown in the figure 4.8 below:

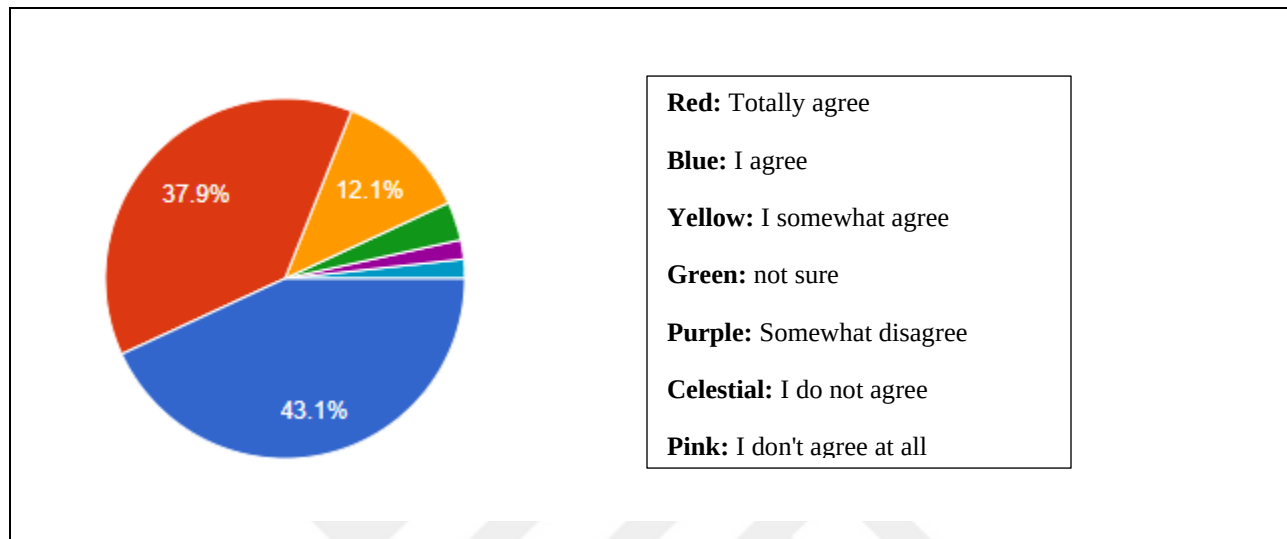


Figure 4.8: The Proportions of the Answer to the Third Question in the Part2

d) Executing projects on time is one of the priorities of the Foundation's work

The proportions of the answer are as shown in the figure 4.9 below:

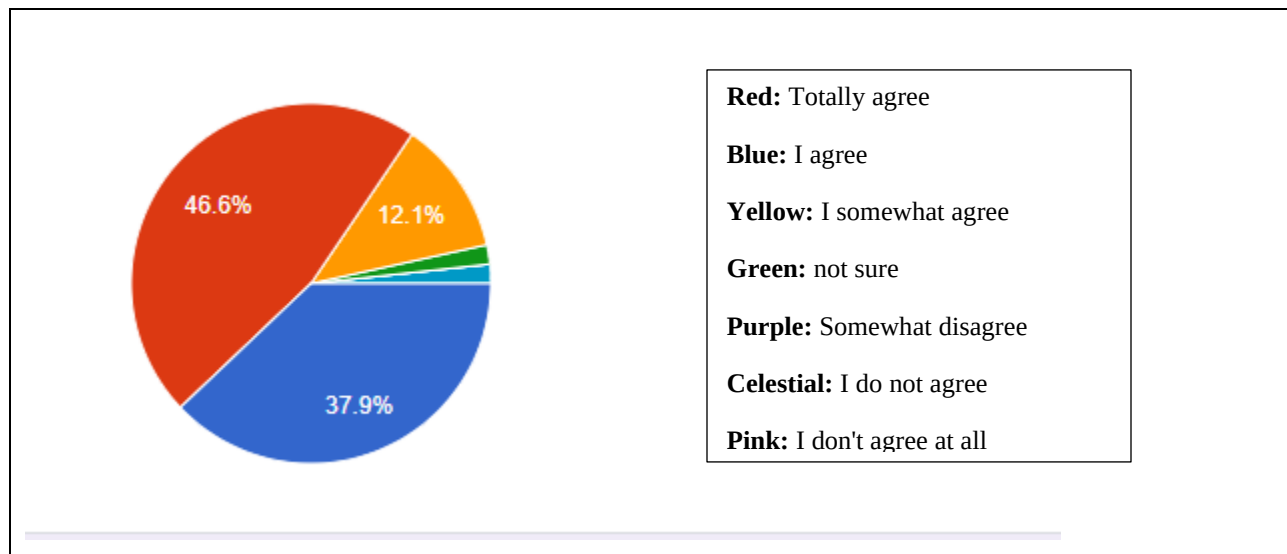


Figure 4.9: The Proportions of the Answer to the Fourth Question in the Part2

- e) The institution's keenness to adhere to the deadlines for the completion of projects and considers them among the main priorities

The proportions of the answer are as shown in the figure 4.10 below:

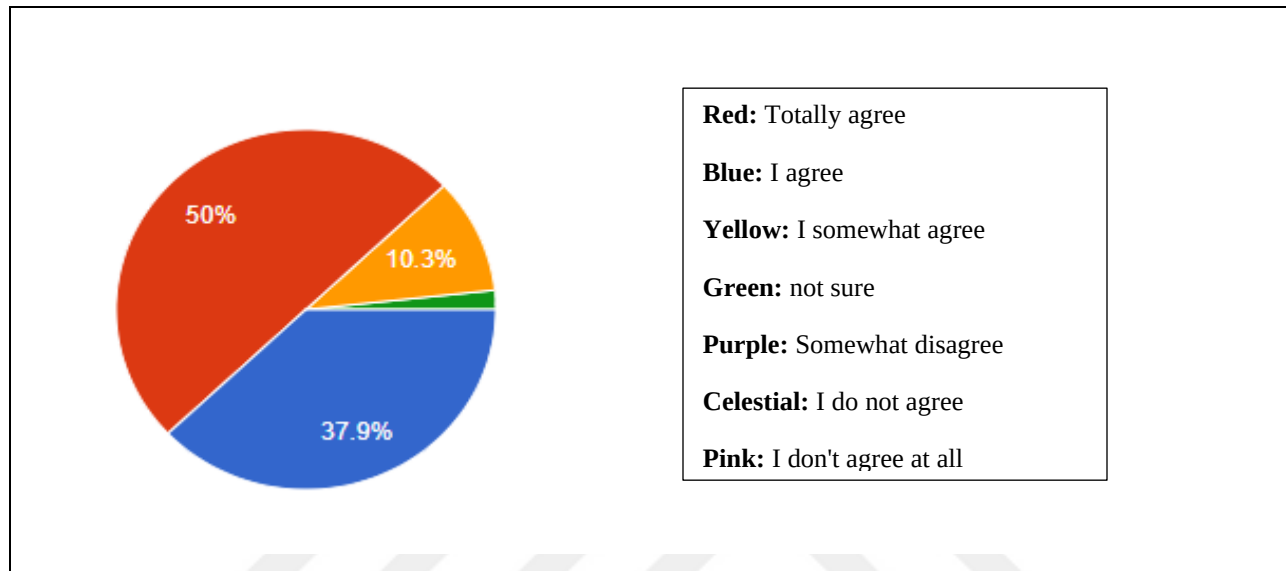


Figure 4.10: The Proportions of the Answer to the Fifth Question in the Part2

C: Avoid wasting time

- a) Clarity of responsibilities within the institution despite the overlap in powers

The proportions of the answer are as shown in the figure 4.11 below:

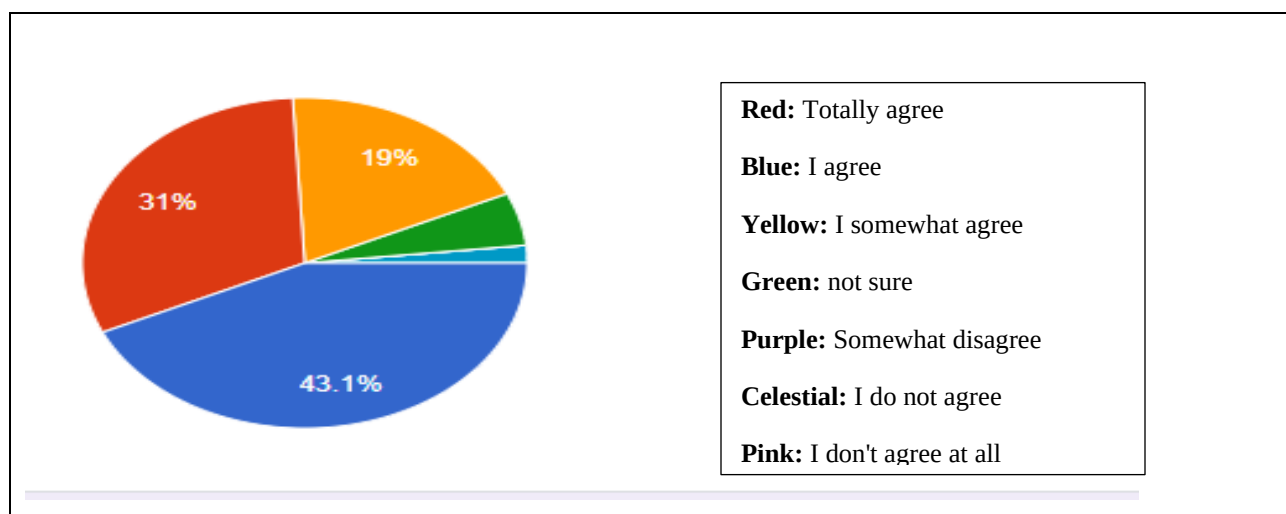


Figure 4.11: The Proportions of the Answer to the First Question in the Part3

b) The company works in a team spirit

The proportions of the answer are as shown in the figure 4.12 below:

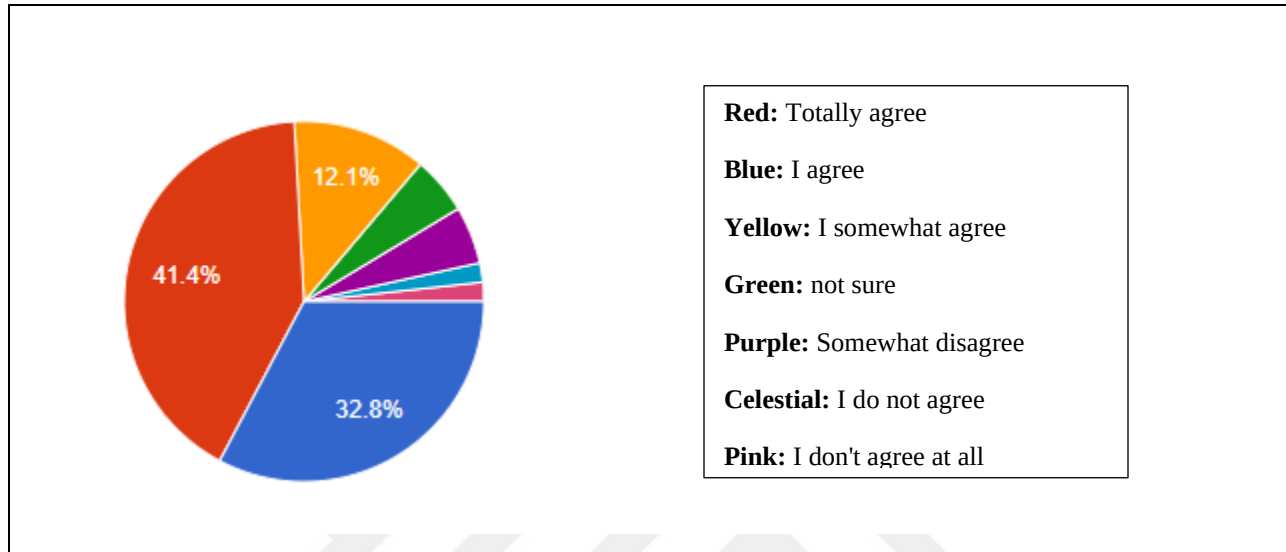


Figure 4.12: The Proportions of the Answer to the Second Question in The Part3

c) Highly qualified staff work in the institution

The proportions of the answer are as shown in the figure 4.13 below:

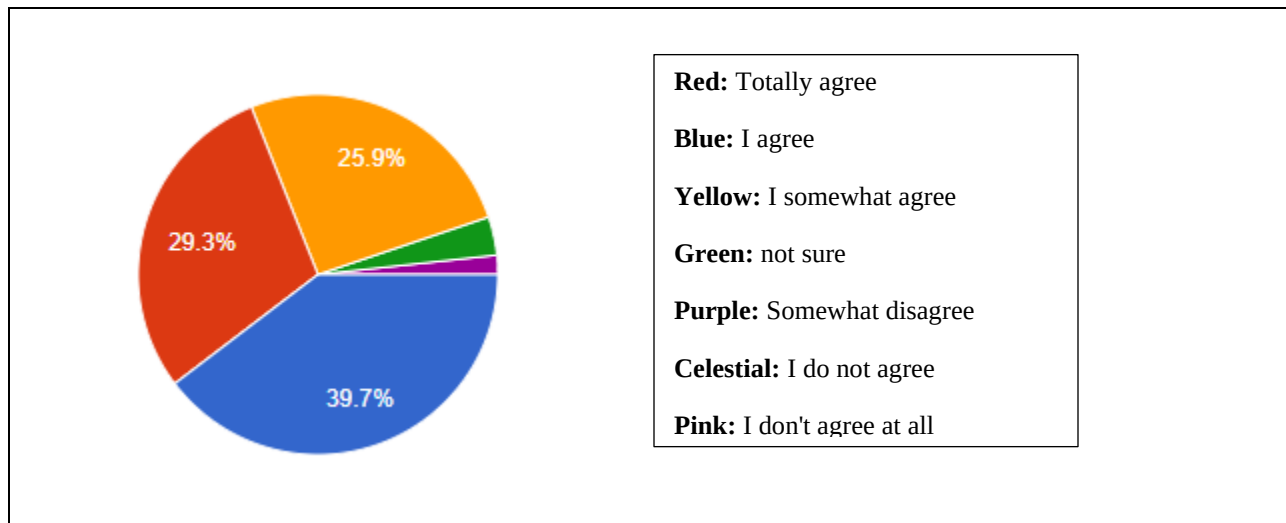


Figure 4.13: The Proportions of the Answer to the Third Question in the Part3

d) The company is able to provide financial resources in a timely manner

The proportions of the answer are as shown in the figure 4.14below:

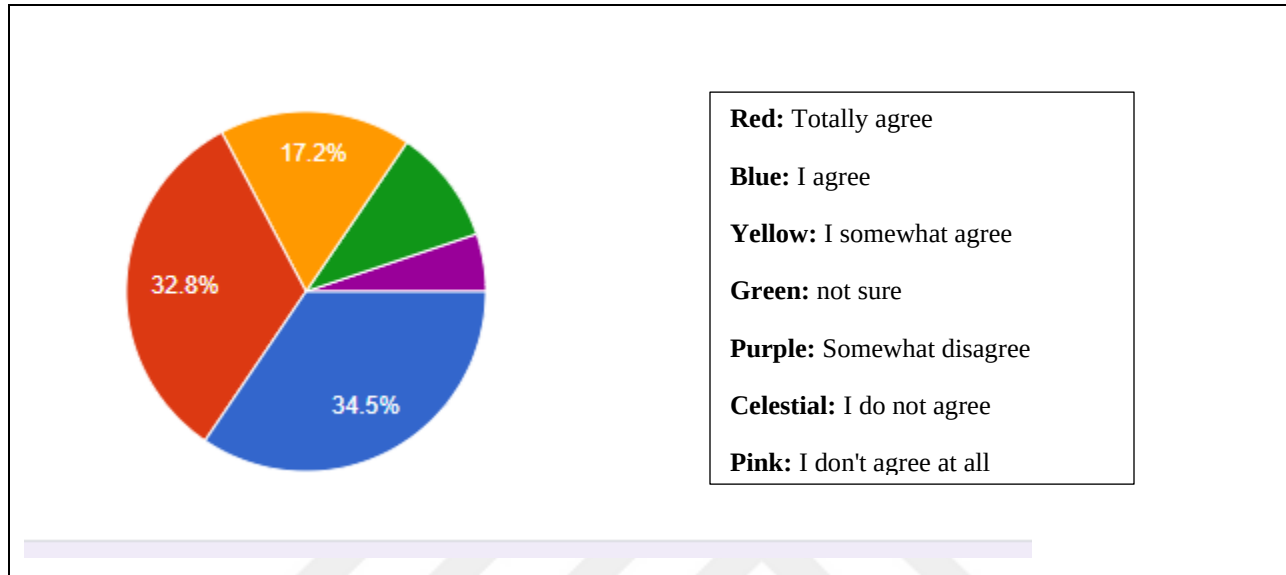


Figure 4.14: The Proportions of the Answer to the Fourth Question in the Part3

e) The presence of multiple supervisors within the same project

The proportions of the answer are as shown in the figure 4.15 below:

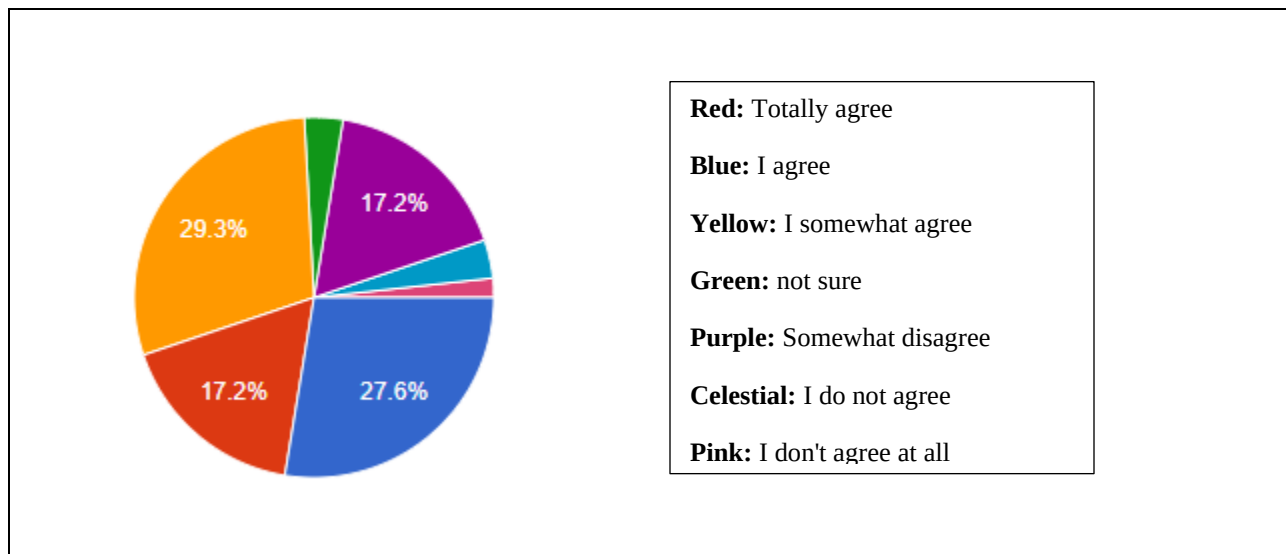


Figure 4.15: The Proportions of the Answer to the Fifth Question in the Part3

f) People in the organization depend on the method of self-monitoring

The proportions of the answer are as shown in the figure 4.16 below:

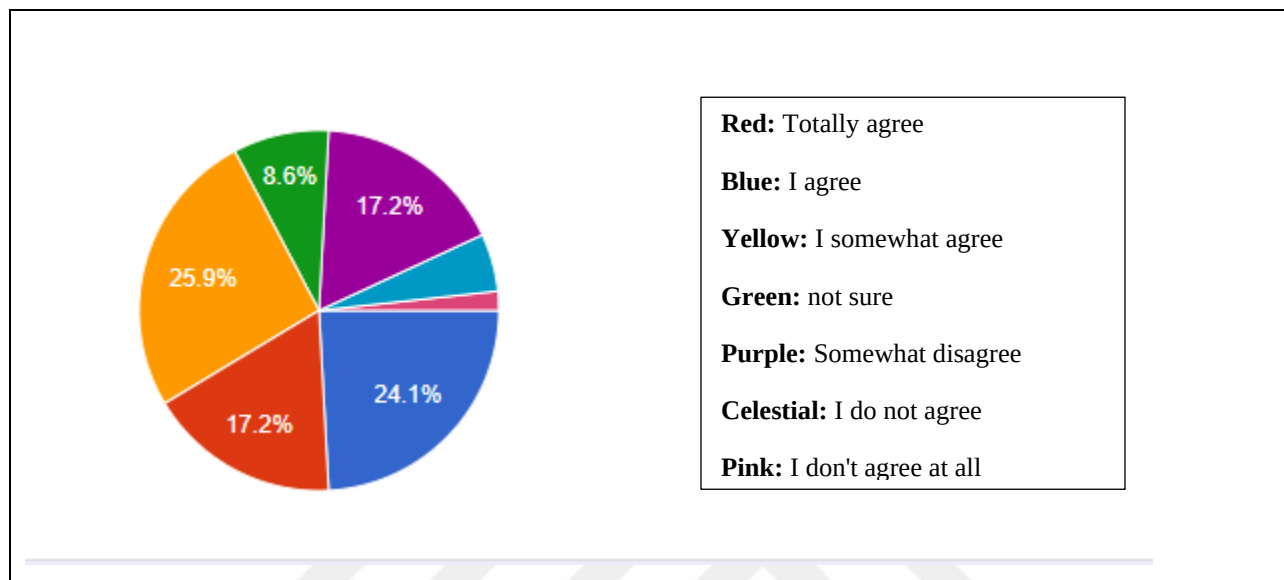


Figure 4.16: The Proportions of the Answer to the VI Question in the Part3

g) There is a serious interest in preparing project implementation follow-up reports

The proportions of the answer are as shown in the figure 4.17 below:

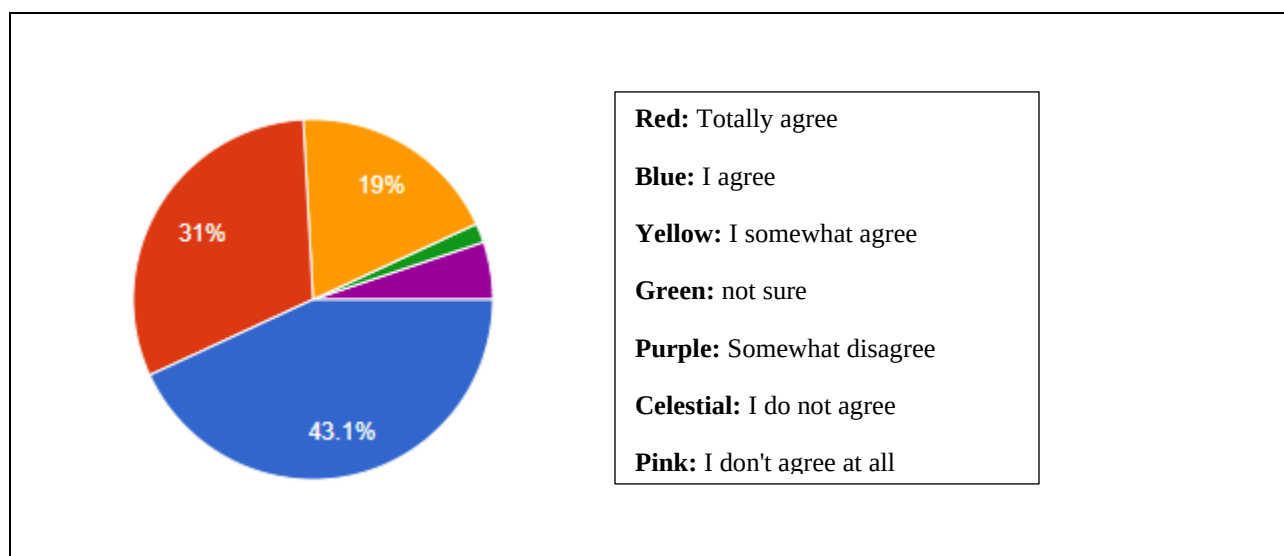


Figure 4.17: The Proportions of the Answer to the Seventh Question in the Part3

h) The organization's communication system with the relevant authorities is effective

The proportions of the answer are as shown in the figure 4.18 below:

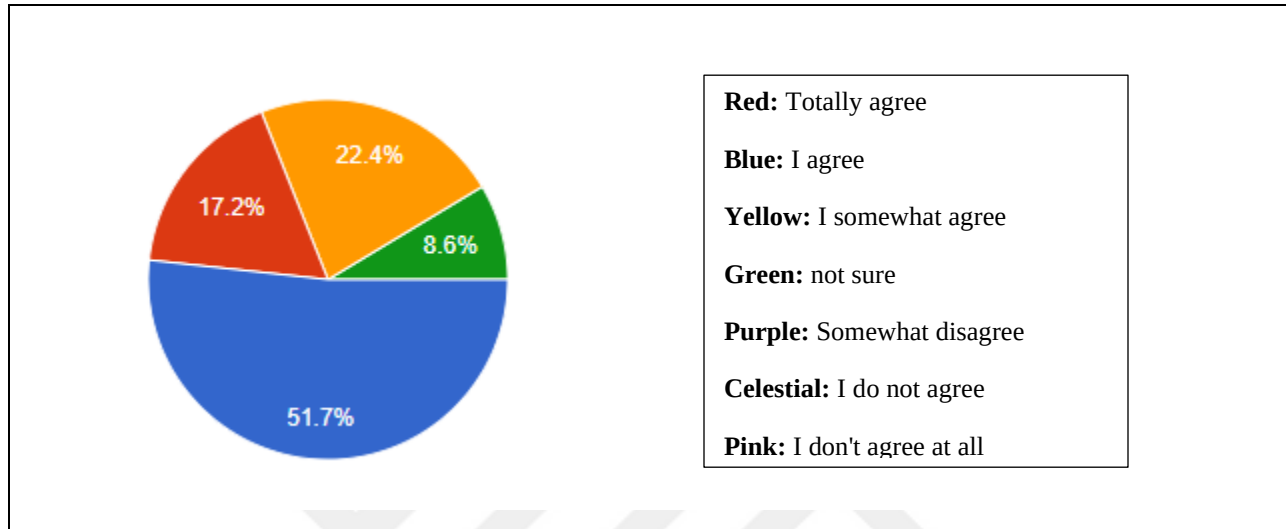


Figure 4.18: The Proportions of the Answer to the VIII Question in the Part3

i) Decisions made in the organization are carefully considered

The proportions of the answer are as shown in the figure 4.19 below:

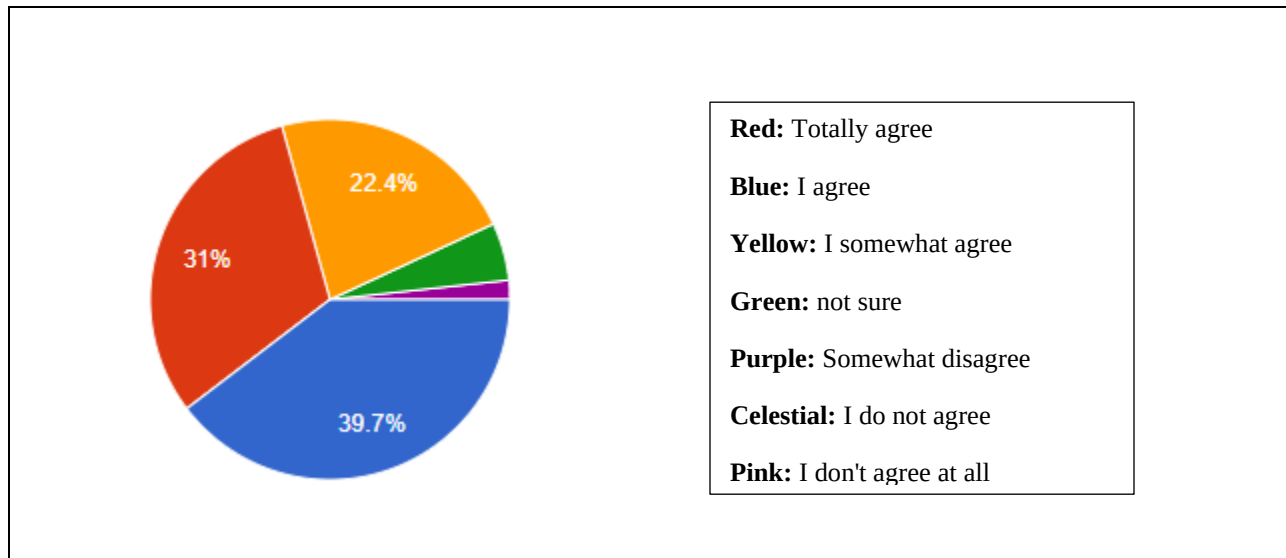


Figure 4.19: The Proportions of the Answer to the Ninth Question in the Part3

4.1.2 The Second Part (Project Completion Stages)

A: Project start

- a) The project management obtains information from multiple parties for the purposes of the feasibility study.

The proportions of the answer are as shown in the figure 4.20 below:

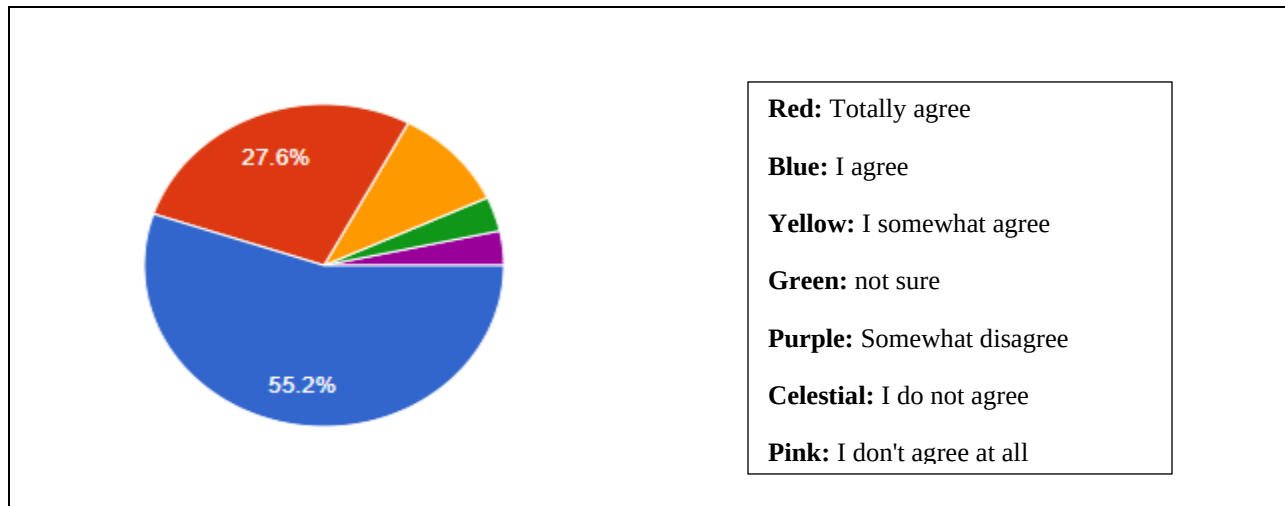


Figure 4.20: The Proportions of the Answer to the First Question in the Part1

- b) The project management is keen on defining the activities and scheduling the financial resources for the project.

The proportions of the answer are as shown in the figure 4.21 below:

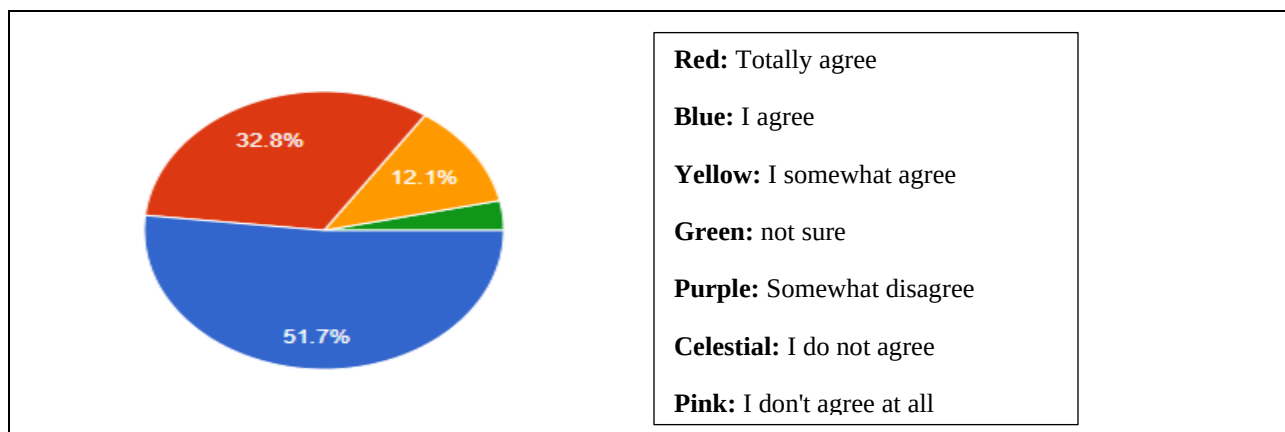


Figure 4.21: The Proportions of the Answer to the Second Question in the Part1

c) The project team includes experienced and qualified individuals

The proportions of the answer are as shown in the figure 4.22below:

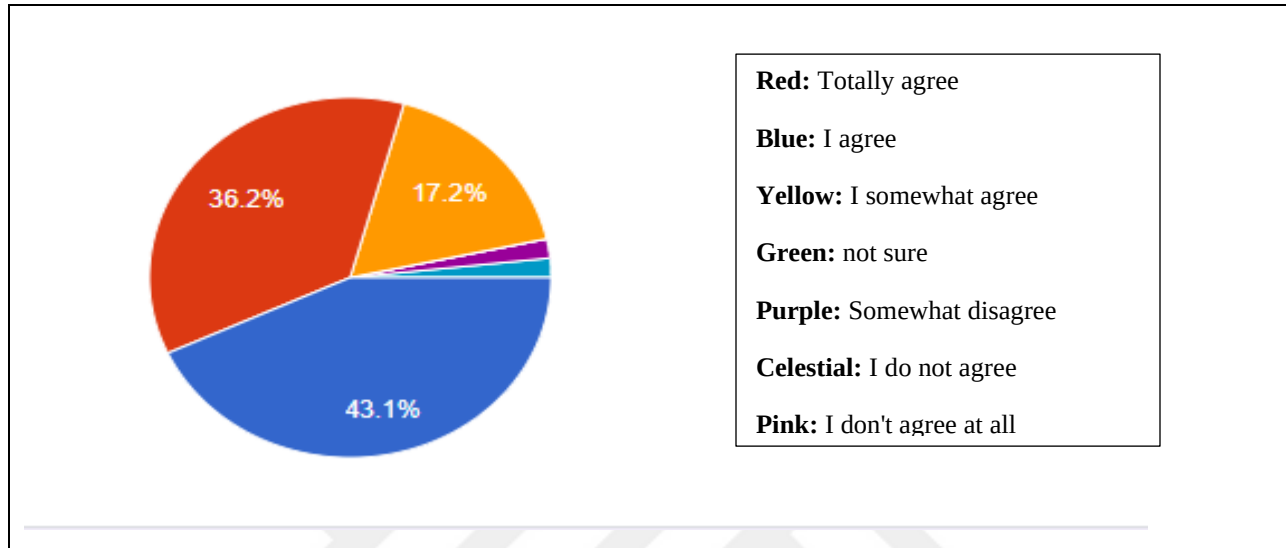


Figure 4.22: The Proportions of the Answer to the Third Question in the Part1

d) Establishing a project office for the purpose of listening to the opinions of project workers

The proportions of the answer are as shown in the figure 4.23 below:

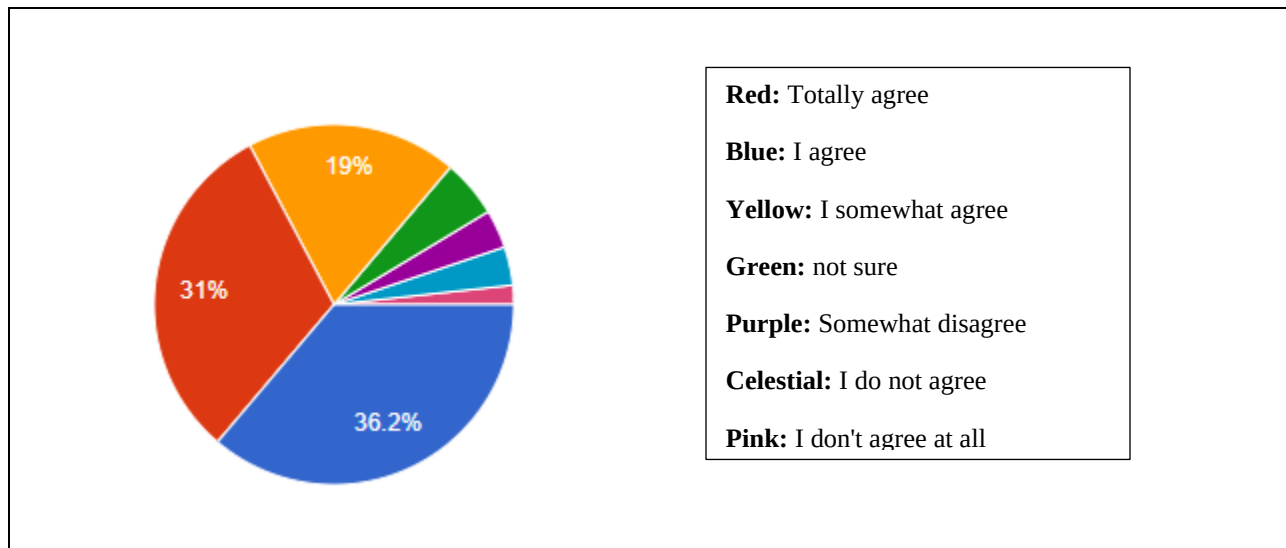


Figure 4.23: The Proportions of the Answer to the Fourth Question in the Part1

e) Follow-up by the project management for changes in the project

The proportions of the answer are as shown in the figure 4.24 below:

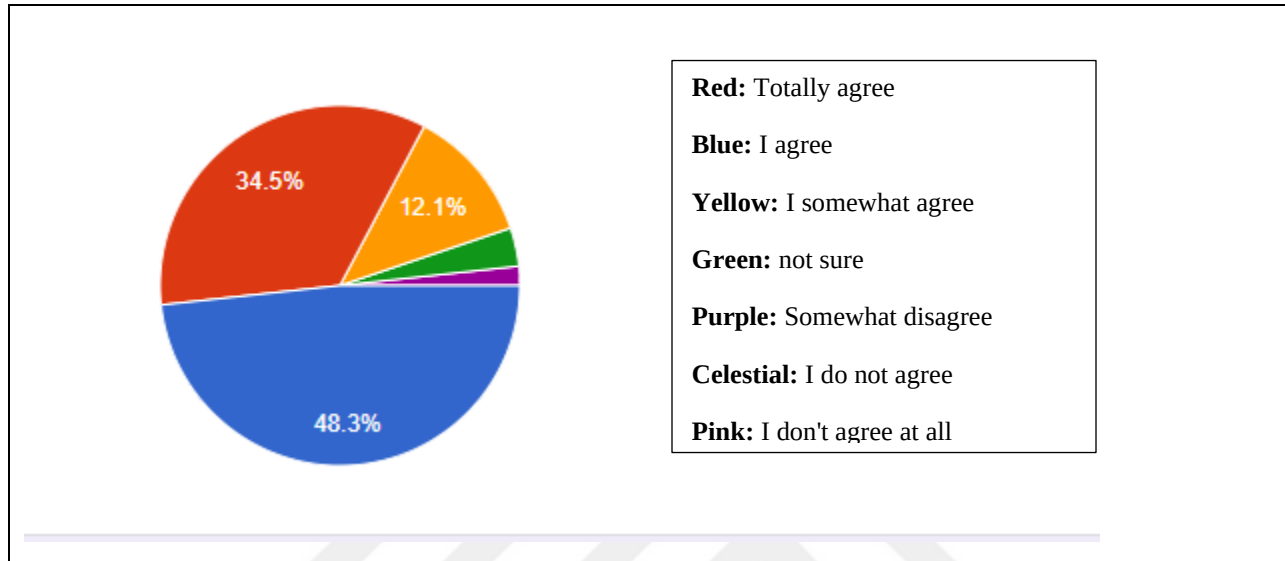


Figure 4.24: The Proportions of the Answer to the Fifth Question in the Part1

B: Project planning

a) The project management prepares the project phases within a specified time schedule

The proportions of the answer are as shown in the figure 4.25below:

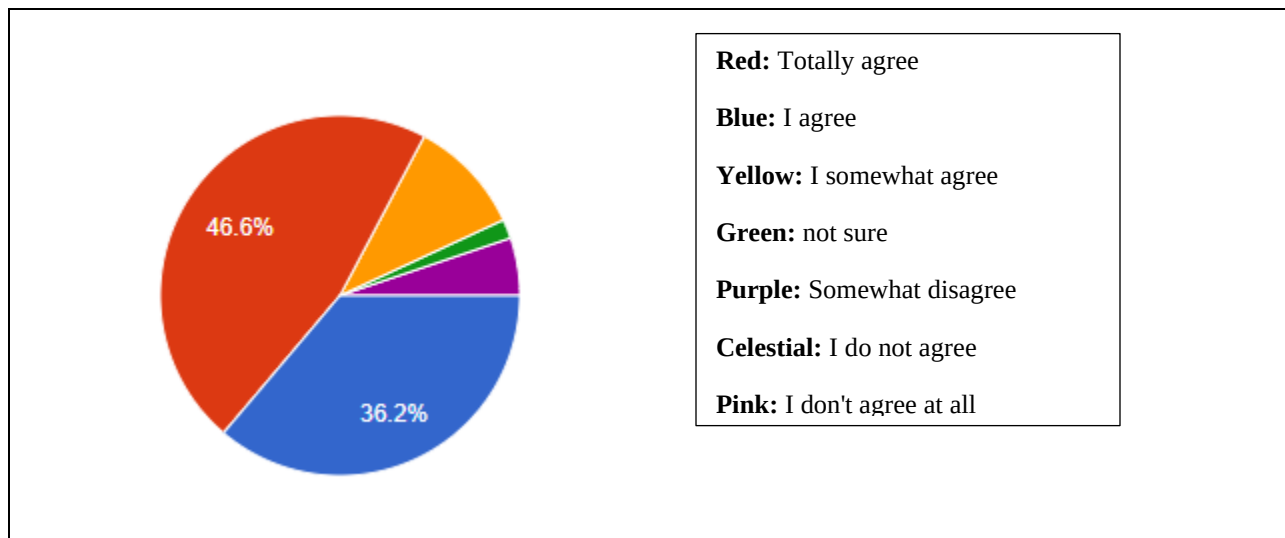


Figure 4.25: The Proportions of the Answer to the First Question in the Part2

b) The project management determines the start and end date of each project activity

The proportions of the answer are as shown in the figure 4.26below:

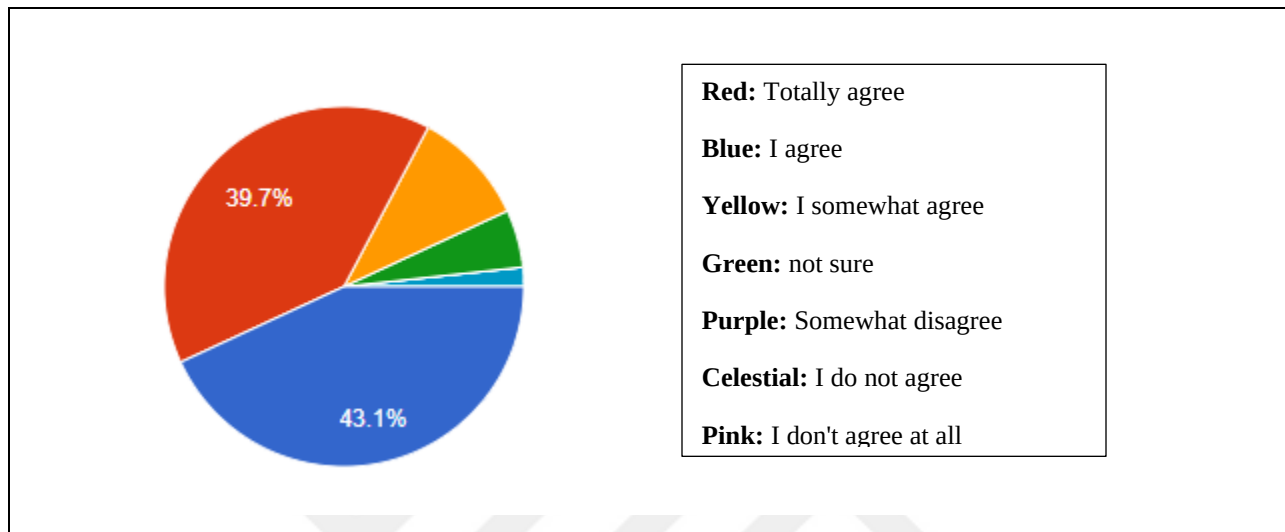


Figure 4.26: The Proportions of the Answer to the Second Question in the Part2

c) Project management has the ability to provide resources in the required time and quantity

The proportions of the answer are as shown in the figure 4.27 below:

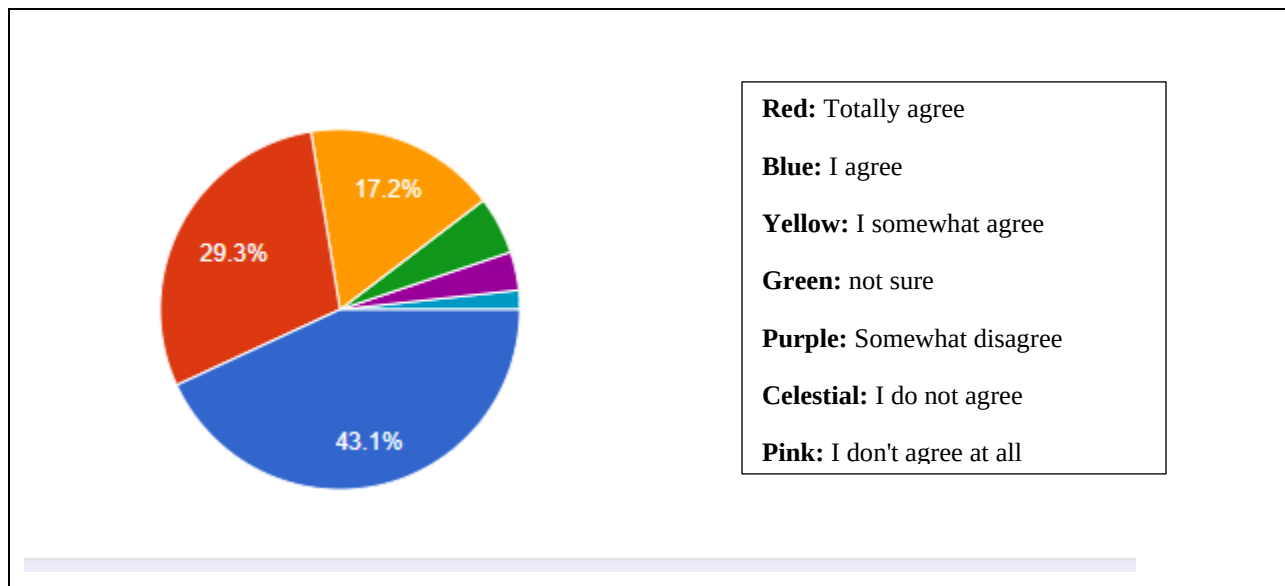


Figure 4.27 The Proportions of the Answer to the Third Question in the Part2

- d) When setting the project schedule, the project management takes into account the environmental changes that have occurred

The proportions of the answer are as shown in the figure 4.28below:

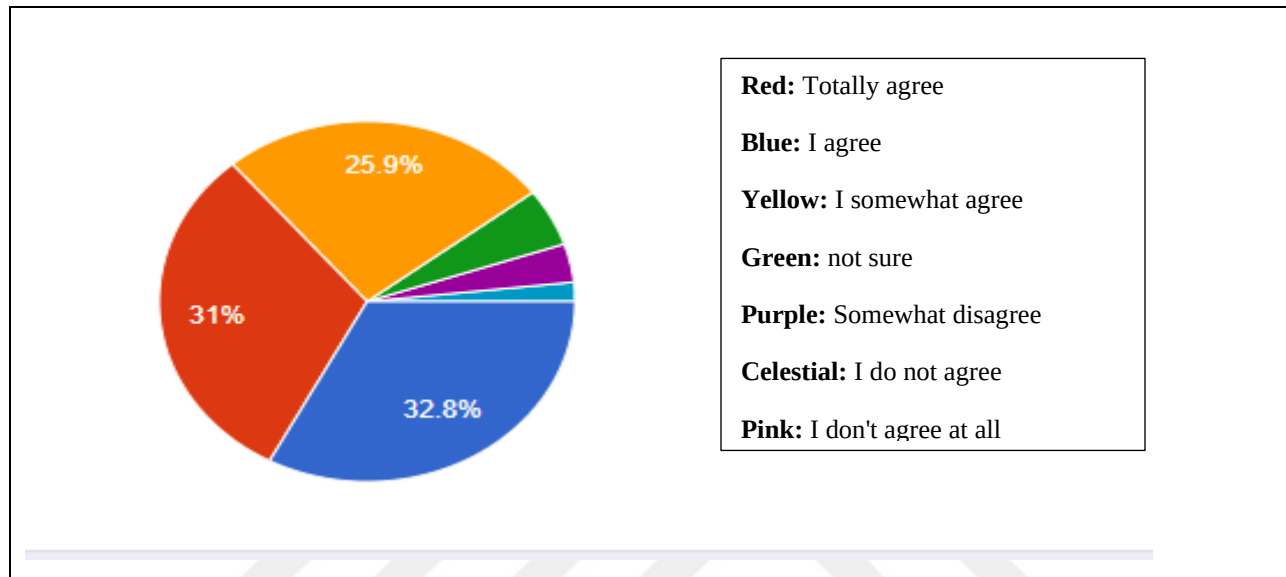


Figure 4.28 The Proportions of the Answer to the Fourth Question in the Part2

- e) The project management is keen to develop an effective risk management plan

The proportions of the answer are as shown in the figure 4.29 below:

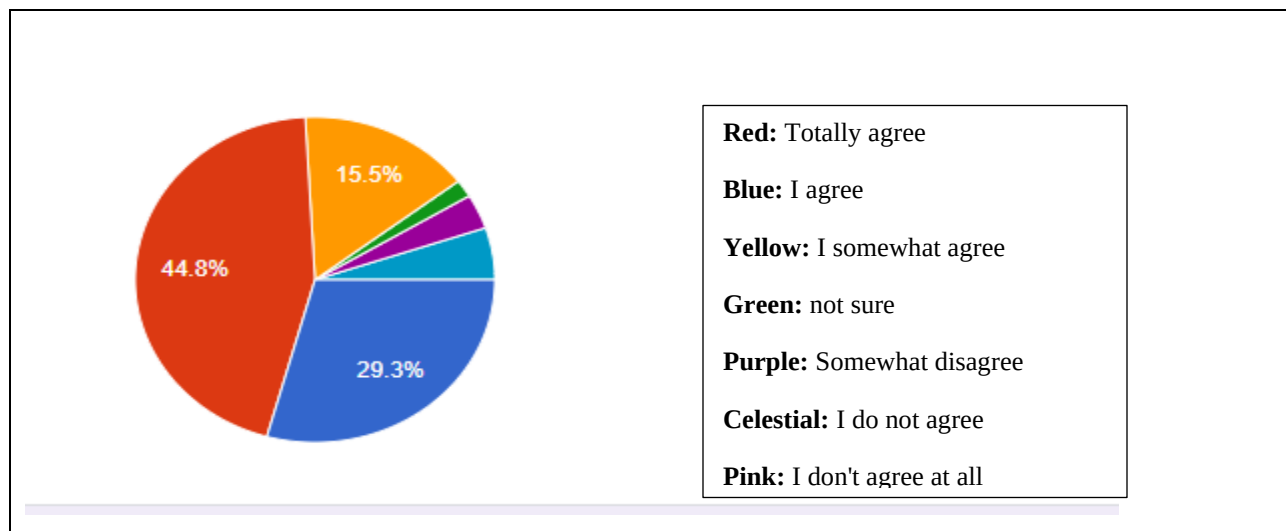


Figure 4.29: The Proportions of the Answer to the Fifth Question in the Part2

C: Project execution

- a) The project management is keen to apply international standards and use modern methods to improve the quality of the project

The proportions of the answer are as shown in the figure 4.30 below:

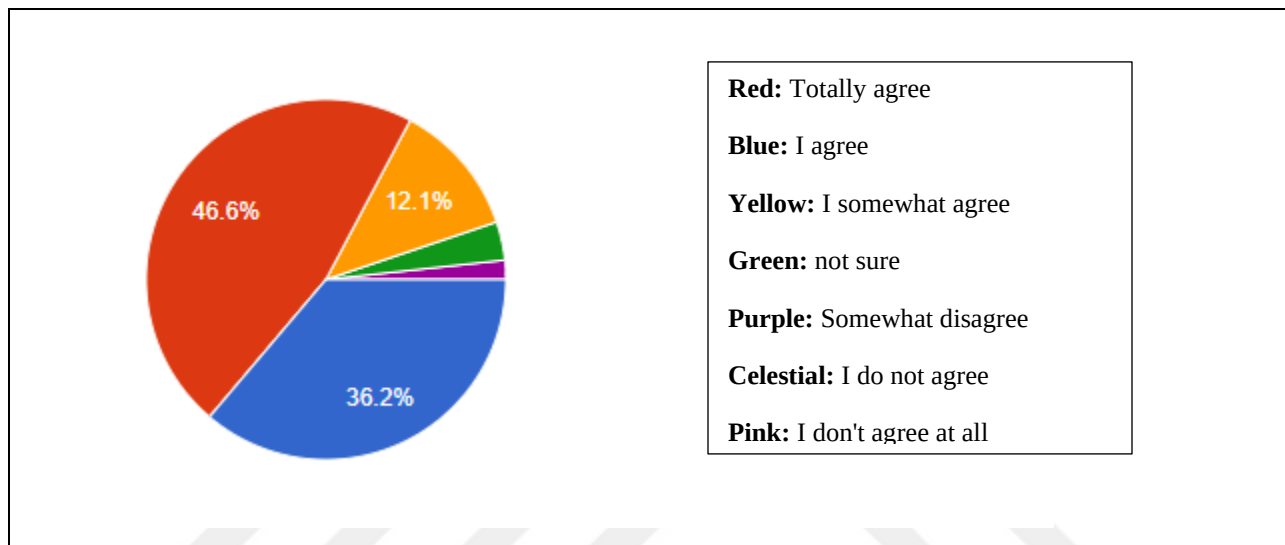


Figure 4.30: The Proportions of the Answer to the First Question in the Part3

- b) The project activities are carried out according to the schedule prepared in advance for the project

The proportions of the answer are as shown in the figure 4.31 below:

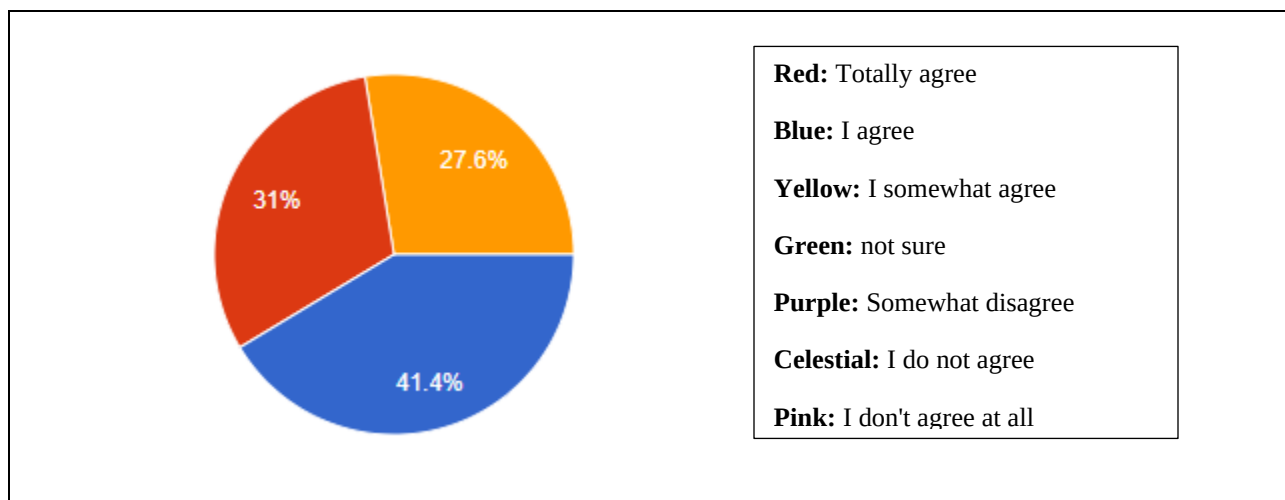


Figure 4.31: The Proportions of the Answer to the Second Question in the Part3

c) Project management has the ability to deal with unexpected crises

The proportions of the answer are as shown in the figure 4.32 below:

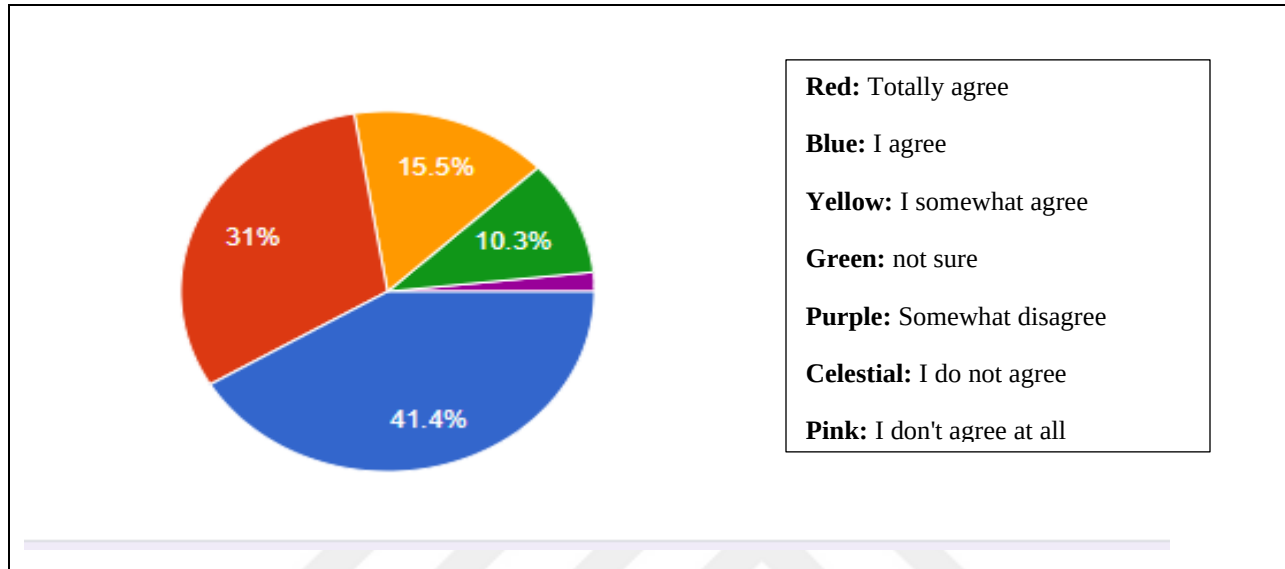


Figure 4.32: The Proportions of the Answer to the Third Question in the Part3

d) Project management follows the method of external control in the project implementation process

The proportions of the answer are as shown in the figure 4.33 below:

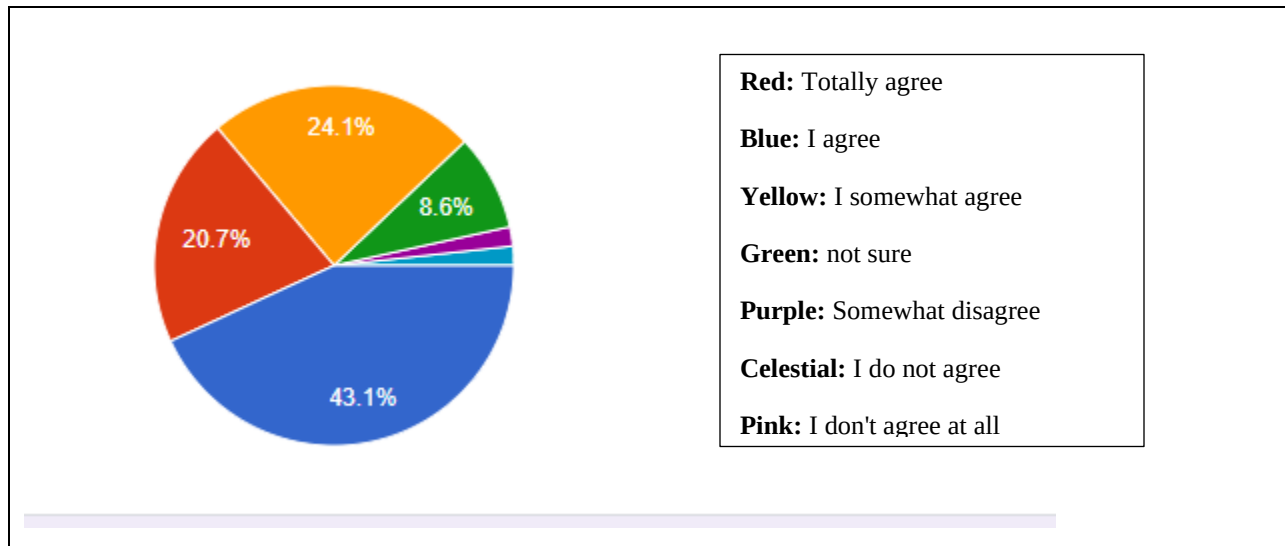


Figure 4.33: The Proportions of the Answer to the Fourth Question in the Part3

e) The project management conducts sudden checks to ensure the quality of work on the project

The proportions of the answer are as shown in the figure 4.34 below:

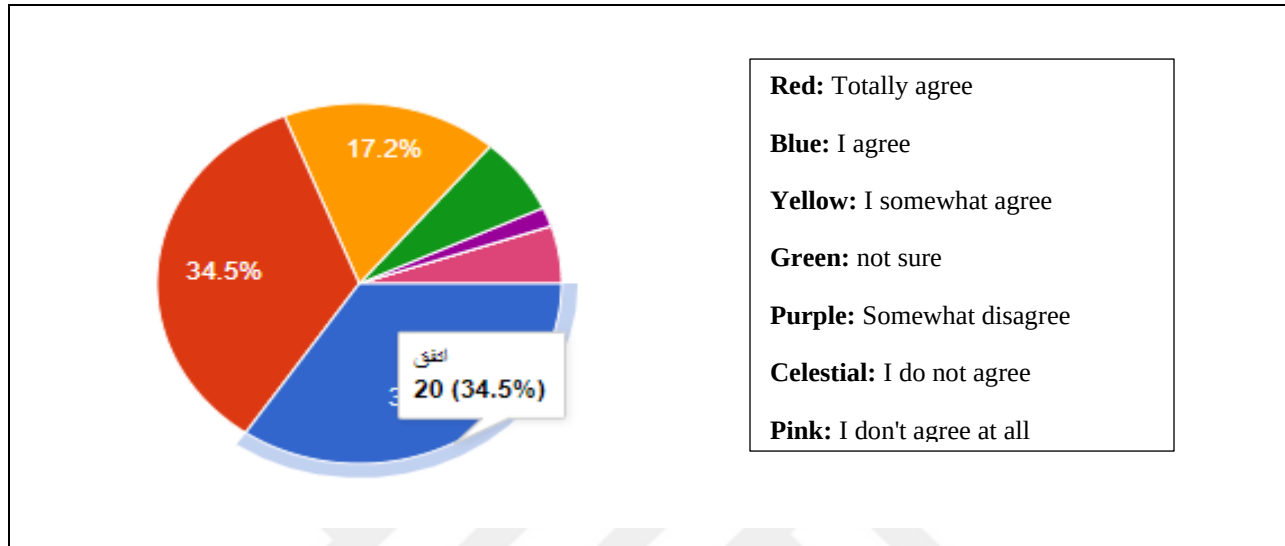


Figure 4.34: The Proportions of the Answer to the Fifth Question in the Part3

D: Close and terminate the project

a) The project plan is matched with what has been accomplished, and the results are determined and matched

The proportions of the answer are as shown in the figure 4.35 below:

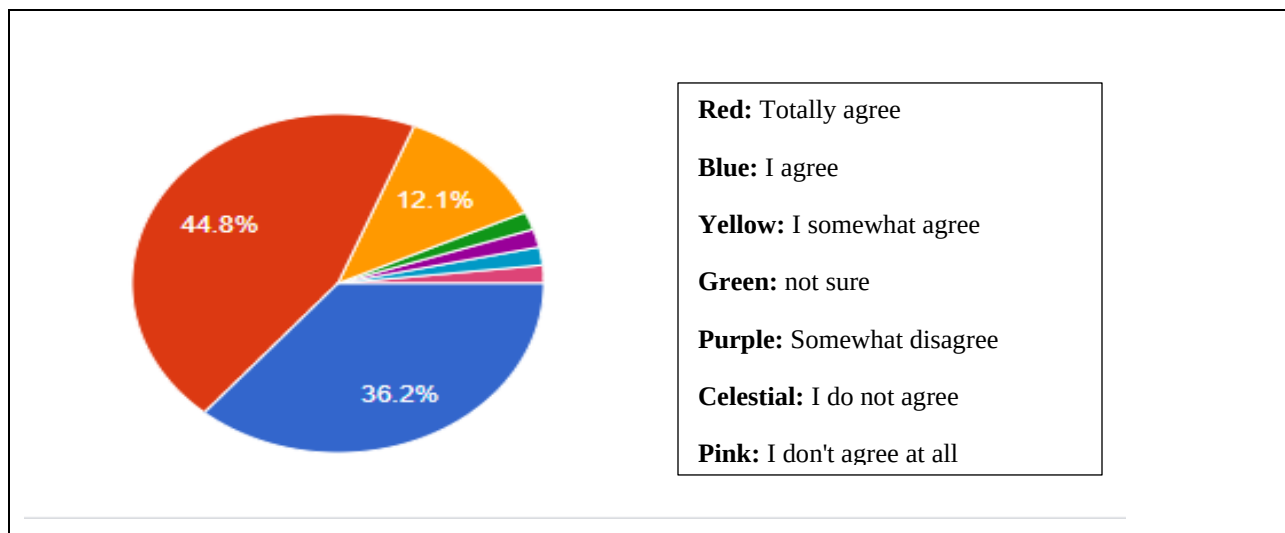


Figure 4.35: The Proportions of the Answer to the First Question in the Part4

b) The project management has high confidence in the performance of its workers

The proportions of the answer are as shown in the figure 4.36 below:

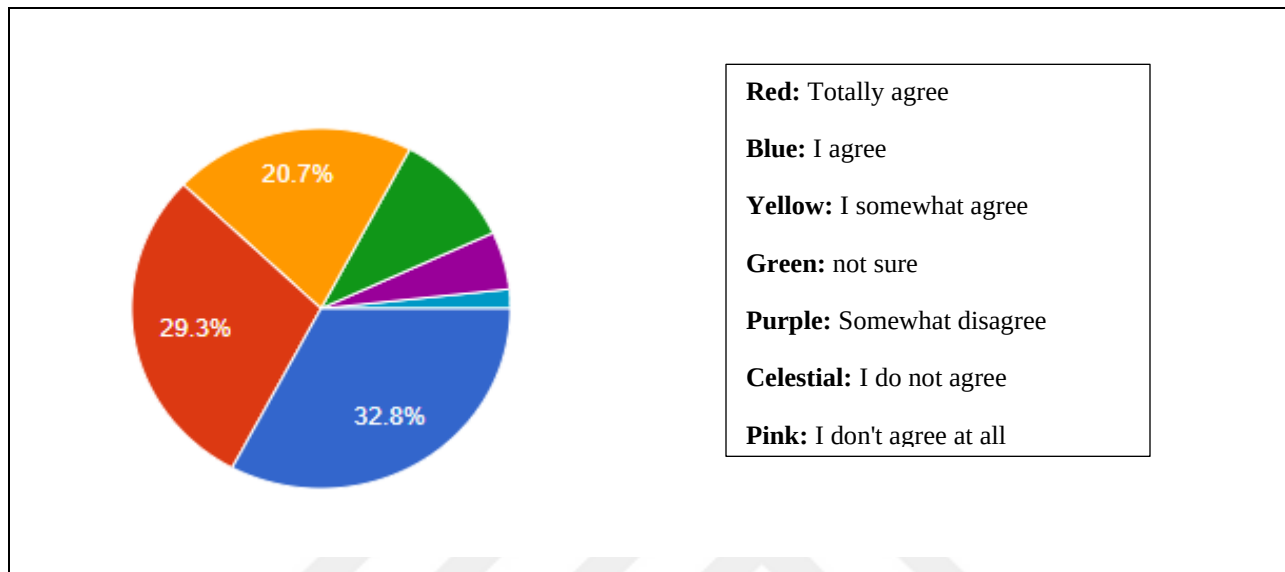


Figure 4.36: The Proportions of the Answer to the Second Question in the Part4

c) The project management seeks to enhance trust with the project beneficiary

The proportions of the answer are as shown in the figure 4.37 below:

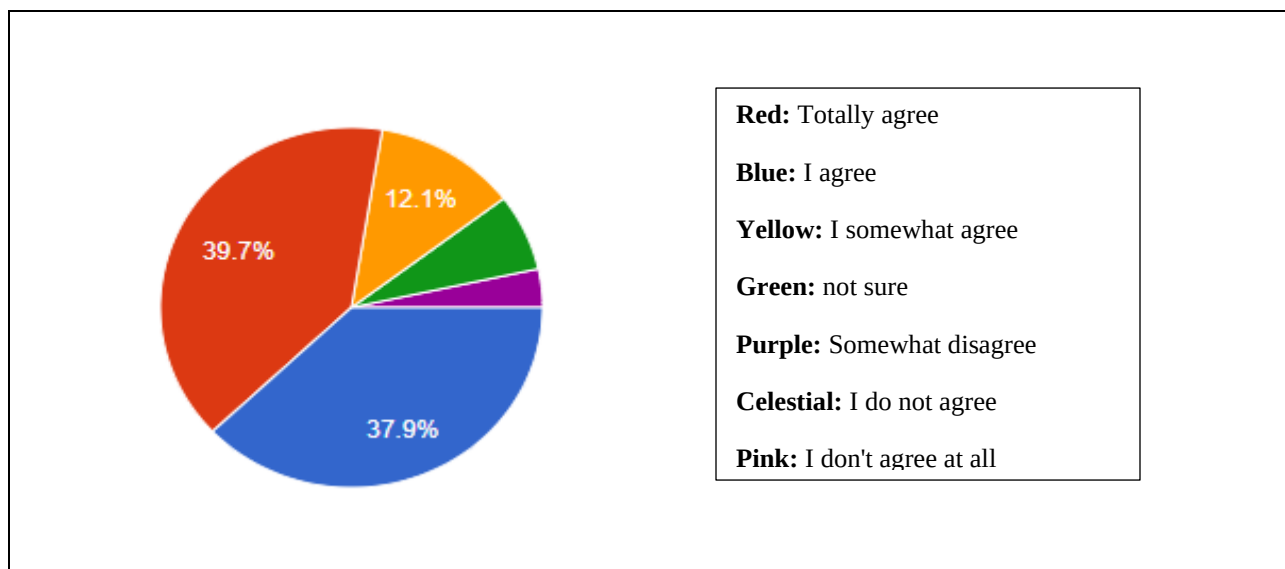


Figure 4.37: The Proportions of the Answer to the Third Question in the Part4

- d) The project management seeks to create a good reputation among its competitors through its achievements

The proportions of the answer are as shown in the figure 4.38 below:

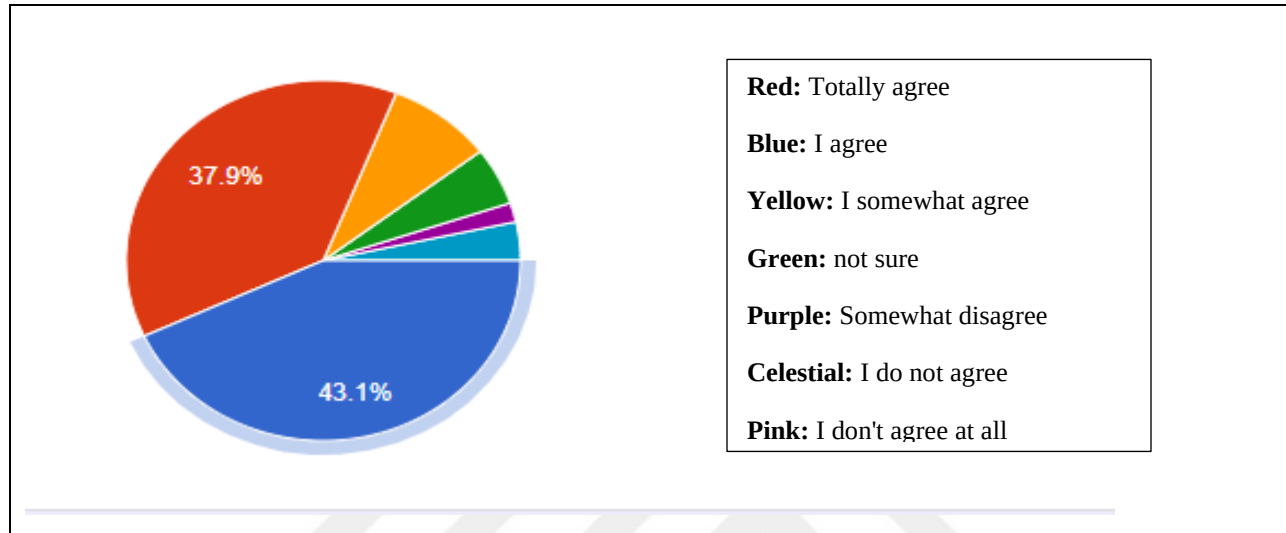


Figure 4.38: The Proportions of the Answer to the Fourth Question in the Part4

4.2 DESCRIPTIVE ANALYSIS

In this part, respondents were asked to rate their agreement with each item using a 7-point scale (Likert scale), ranging from completely agree to not at all. The responses of the questionnaire were satisfactorily completed, numerical codes were assigned (1 = agree completely, 2 = agree, 3 = agree to some extent, 4 = not sure, 5 = do not agree to some extent, 6 = do not agree, 7 = do not agree at all), done Analyze the answers using descriptive statistics. The average of each category will be represented by a Likert scale and therefore the average score will be obtained. Details of these statistical analyzes are provided in the next section.

Table 4.2: 7-Point Likert Scale[68]

Mean	Result
1 – 1.8	Strongly disagree
1.81 – 2.6	Disagree
2.61 – 3.4	Neutral
3.41 – 4.2	Agree
More than 4.2	Strongly agree

4.2.1 The First Part (Dimensions of Time Management)

The research questionnaire consists of two main axes. The first axis on the dimensions of time management consists of 4 sub-parts to determine the dimensions of time management on the implementation of projects, and each part contains a set of questions, the frequency of responses and their means shown in Table (4.3). Figure (4.39) shows the responses and their proportions.

Table 4.3: Descriptive Statistics of Dimension of Time Management

Descriptive Statistics	N	Minimum	Maximum	Mean	Std. Deviation
Daily performance falls within a list of tasks that I want to accomplish daily, according to paragraphs arranged according to priorities	58	0	3	1.6724	0.78109
Defining project activities according to a schedule Defining and documenting the planned work	58	0	4	1.7931	0.78937
Implementation of the project according to a realistic time schedule	58	0	6	1.8103	1.01665
Adjusting the project's daily schedule as part of the integrated control process by the project's senior management	58	0	4	1.569	0.72818

Continue to Table 4.3

Descriptive Statistics	N	Minimum	Maximum	Mean	Std. Deviation
The schedule of daily activities plays a major role in the speed of completion of planned projects	58	0	3	1.6034	0.64725
The company sets priorities for the completion of projects to be consistent with its strategic goals	58	0	4	1.6207	0.7684
The institution sets a timetable for achieving the project goals, which helps in the speed of their achievement	58	0	6	1.7241	0.96959
Giving authority is one of the priorities of the institution's work in implementing its projects	58	0	6	1.8966	1.07098
Executing projects on time is one of the priorities of the Foundation's work	58	0	5	1.8621	0.94495
The institution's keenness to adhere to the deadlines for the completion of projects and considers them among the main priorities	58	0	5	1.8103	0.90722
Clarity of responsibilities within the institution despite the overlap in powers	58	0	5	2.0517	0.98091
The company works in a team spirit	58	0	4	2.2069	0.87376
Highly qualified staff work in the institution	58	0	5	2.0517	1.05002
The company is able to provide financial resources in a timely manner	58	0	7	3.0517	1.60506
The presence of multiple supervisors within the same project	58	0	6	2.8448	1.44855
People in the organization depend on the method of self-monitoring	58	0	5	2.1897	1.19144

Continue to Table 4.3

Descriptive Statistics	N	Minimum	Maximum	Mean	Std. Deviation
There is a serious interest in preparing project implementation follow-up reports	58	0	5	2.0862	0.9419
The organization's communication system with the relevant authorities is effective	58	0	7	2.0862	1.35445
The decisions taken in the institution are carefully considered	58	0	6	2.0345	1.02539
Valid N (listwise)	58				

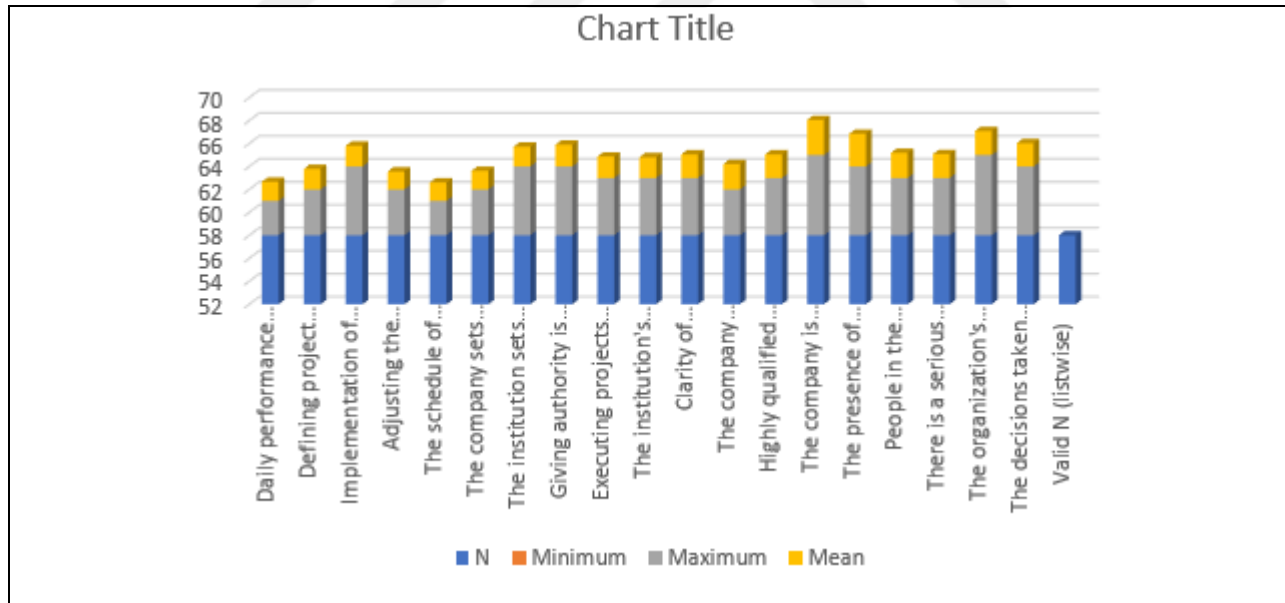


Figure 4.39: Chart of Dimension of Time Management

From Figure (4.39) and Table (4.3) the average result of the responses to the first part of the questionnaire appears. The average answers varied between the paragraphs of this part, and the highest percentage of responses to the question about the availability of financial funding (The company is able to provide financial resources in a timely manner).

4.2.2 The Second Part (Project Completion Stages)

The second axis of the project questionnaire is the project implementation stages and includes many paragraphs. Each paragraph includes several questions. The responses to the questions by the respondents to the questionnaire are as shown in Table No. (4.4) and Figure (4. 40) below.

Table 4.4: Descriptive Statistics of Dimension of Project Completion Stages

Descriptive Statistics	N	Minimum	Maximum	Mean	Std. Deviation
The project management obtains information from multiple parties for the purposes of the feasibility study	57	1	5	1.9123	0.87179
The project management is keen on defining the activities and scheduling the financial resources for the project	57	1	7	2.3333	1.39301
The project team includes experienced and qualified individuals	57	1	6	1.9474	0.98961
Establishing a project office for the purpose of listening to the opinions of project workers	57	1	4	1.8772	0.75758
Follow-up by the project management for changes in the project	57	1	5	1.9825	0.83434
The project management prepares the project phases within a specified time schedule	57	1	6	2.0526	1.36828
The project management determines the start and end date of each project activity	57	1	6	2.2456	1.15389
Project management has the ability to provide resources in the required time and quantity	57	1	6	2.1754	1.11999
When setting the project schedule, the project management takes into account the environmental changes that have occurred	57	1	6	1.8947	0.99434

Continue to Table 4.4

Descriptive Statistics	N	Minimum	Maximum	Mean	Std. Deviation
The project management is keen to develop an effective risk management plan	57	1	5	1.8421	1.04863
The project management is keen to apply international standards and use modern methods to improve the quality of the project	57	1	7	2.2982	1.48763
Project activities are implemented according to the pre-prepared schedule for the project	57	1	6	2.3509	1.06051
Project management has the ability to deal with unexpected crises	57	1	5	2.1228	1.01893
Project management follows the method of external control in the project implementation process	57	1	3	1.9825	0.76745
The project management conducts sudden checks to ensure the quality of work on the project	57	1	5	1.7895	0.92073
The project plan is matched with what has been accomplished, and the results are determined and matched	57	1	6	2.0175	1.1876
The project management has high confidence in the performance of its employees	57	1	5	1.9825	1.06051
The project management seeks to enhance trust with the project beneficiary	57	1	6	2.3684	1.24831
The project management seeks to create a good reputation among its competitors through its achievements	57	1	7	1.9298	1.23722
Valid N (listwise)	57				

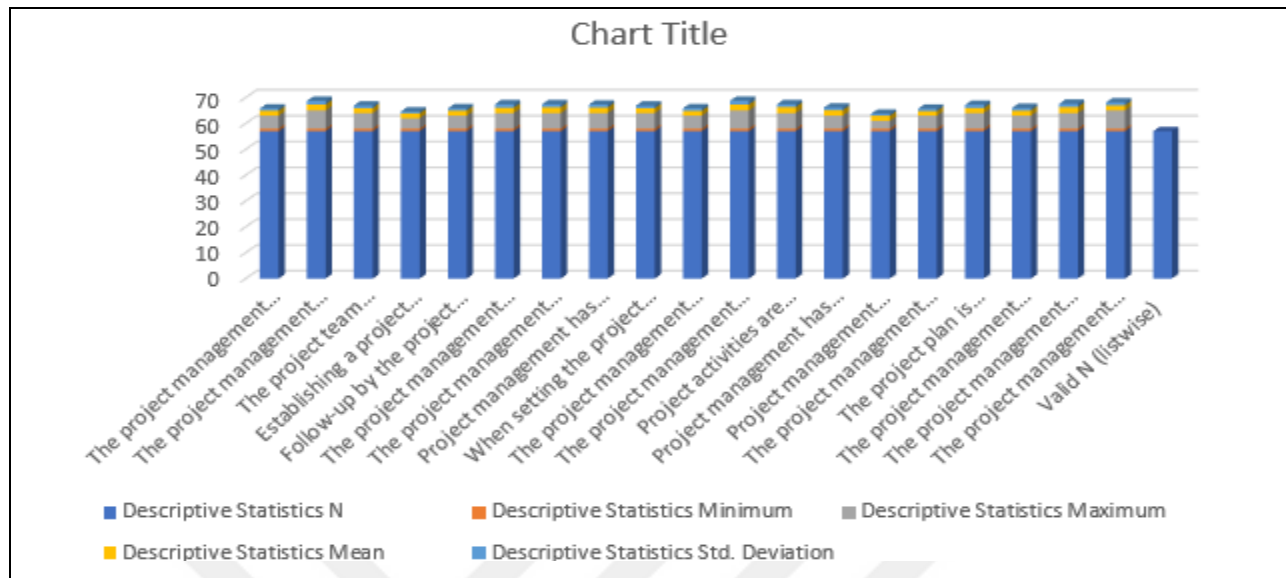


Figure 4.40: Chart of Project Completion Stages

Figure (4.40) and Table (4.4) show the average result of the answers to the second part of the questionnaire. The average variation of the answers between the paragraphs of this part, and the highest percentage of responses to a question (Project activities are implemented according to the pre-prepared schedule for the project).

5. CONCLUSION AND RECOMMENDATION

Most projects in the Middle East and in Iraq, especially, face problems in delaying project delivery within the specified project schedule and within the required quality. During this research, the factors affecting the delay in project delivery within the specified period were studied, as a questionnaire was prepared consisting of two main axes, the first concerned with the dimensions of time management It is divided into three main sections, including:

- a) Time planning
- b) Setting goals and priorities
- c) Avoid wasting time

As for the second axis, it is concerned with the phases of project implementation and includes four main parts:

- a) start the project
- b) Project planning
- c) Implementation of the project
- d) Close and end the project

The electronic questionnaire form was distributed to a large segment of engineers working in the public and private sectors and in various disciplines. 58 answers were obtained from various disciplines. The results were analyzed using the statistical analysis program SPSS version 23. The results of the analysis were obtained where descriptive analysis was used and the credibility of the results was tested It turned out to be 87%, and the results were as follows.

The first axis was the highest answers referring to the paragraph within avoiding wasting time, specifically the question about the institution's ability to provide financial resources in a timely manner, as this is one of the main reasons for stopping the project is the inability of the institution to provide financial resources when needed, which is reflected on the schedule For the delivery of the project within the specified time, where the arithmetic mean value for this paragraph was

3.0517, and this is the highest value among the rest of the variables compared to the Likert scale, which was relied on in analyzing the results and according to the following table.

Table 5.1: 7-Point Likert Scale[68]

Mean	Result
1 – 1.8	Strongly disagree
1.81 – 2.6	Disagree
2.61 – 3.4	Neutral
3.41 – 4.2	Agree
More than 4.2	Strongly agree

As for the second axis related to the project implementation stages, the largest percentage was the paragraph on project implementation stages, which includes that project activities are implemented according to the project's pre-prepared schedule.

We conclude through our research that a pre-schedule must be prepared for each project and a commitment to implement each of the project's paragraphs according to the pre-prepared schedule for each project, in addition to the importance of providing financial resources on time, because any failure to provide financial resources for the project is negatively reflected in the project implementation time and thus delay Delivery of the project within the stipulated time

5.1 RECOMMENDATIONS FOR FUTURE RESEARCH

- a) Immediately after the completion of the research, the researcher recommended that the research deals with the impact of the economic financing crisis in Iraq, which is related to approving the investment budget, and its impact on the implementation of construction projects in Iraq.
- b) That the results of this research be implemented in construction projects in countries close to Iraq, such as the countries of the Middle East region.
- c) It is also possible to refer to some other influences that affect the delay in the process of completing projects and delivering them on time applicable in the geographical area, such as

the regulations, laws and legislation of the country through which the project is being implemented.

- d) The researcher also recommended that other studies address the time challenges facing these projects, such as green buildings, especially that these projects are not common in implementation.



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