

The Role of Project Health Check Reports in Identifying Indicative Factors of a Troubled Project

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ABSTRACT

Government-sponsored projects in Iraq significantly improve the economic situation and provide services but face high rates of troubling blocks. This work aims to identify indicative factors of the Troubled Project using periodic health check reports based on a literature review and interviews with Iraqi experts. As a result, a questionnaire was prepared that included four sections. The first is personal information; the second section is information about knowing the level of institutions' implementation of project management through prepared documents. The third section is about indicative factors for the project's trouble, including 25 workers; the fourth section is about the questions in the periodic reports to check the project's health. Findings show that the following factors affect the troubled projects: inaccurate initial budget and schedule estimates; poor project scope description; poor team communication; poor planning and definition of the project; lack of a risk management plan and disregarding risk indicators; high rate of rework, and ineffective documentation of project plans with a high relative importance index that ranges from 0.91 to 0.81. Thus, the institutions' activation of the project examination reports with the proposed questions with a relative importance index ranging from 0.88 to 0.77 helps identify the main factors for the troubled projects.

Keywords: Troubled Projects, Project Health Check Reports, Relative Importance Index, Iraqi Projects.

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دور تقارير فحص صحة المشروع في تحديد العوامل الإرشادية للمشروع المتعثر

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الخلاصة

تعمل المشاريع التي ترعاها الحكومة في العراق على تحسين الوضع الاقتصادي بشكل كبير وتقديم الخدمات ، لكنها تواجه معدلات عالية من العقبات المقلقة. يهدف هذا البحث إلى تحديد العوامل الإرشادية للمشروع المتعثر باستخدام تقارير الفحص الصحي الدوري، وبناءً على مراجعة الأدبيات والمقابلات مع خبراء عراقيين تم إعداد استبيان يشمل أربعة أقسام. ، تم إعداد استبيان يتضمن أربعة أقسام: القسم الأول هو المعلومات الشخصية ؛ القسم الثاني معلومات حول معرفة مستوى تنفيذ المؤسسات لإدارة المشروع من خلال الوثائق التي تم إعدادها. القسم الثالث يتعلق بعوامل إرشادية للمشروع المتعثر ويضم 25 عاملاً ؛ ويتناول القسم الرابع والأخير الأسئلة المقترحة تضمينها في التقارير الدورية للتحقق من صحة المشروع. وفقاً للنتائج ، تؤثر العوامل التالية على المشاريع المتعثرة: الميزانية الأولية غير الدقيقة وتقديرات الجدول الزمني ؛ وصف سيئ لنطاق المشروع ؛ تواصل الفريق الضعيف سوء التخطيط وتعريف المشروع ؛ عدم وجود خطة لإدارة المخاطر وتجاهل مؤشرات المخاطر ؛ ارتفاع معدل إعادة العمل والتوثيق غير الفعال لخطط المشروع مع مؤشر الأهمية النسبية المرتفع الذي يتراوح من 0.91 إلى 0.81. وبالتالي ، فإن تفعيل المؤسسات لتقارير فحص المشروع بالأسئلة المقترحة التي لها مؤشر أهمية نسبية يتراوح من 0.88 إلى 0.77 يساعد في تحديد العوامل الرئيسية للمشروعات المتعثرة.

الكلمات الرئيسية: المشاريع المتعثرة، تقارير فحص صحة المشروع ،مؤشر الأهمية النسبية ،المشاريع العراقية.

1. INTRODUCTION

Due to the complex and uncertain environment of the construction industry, which includes many activities, construction projects face difficulties finishing within the given work progress timetable and project cost. According to **(PMBOK@GUIDE, 2017)**, a successful project is defined as a temporary endeavor undertaken to produce a product or service, while project management is defined as the application of knowledge, skills, and the use of tools and techniques to complete project activities aimed at meeting project owners' expectations and aspirations by maintaining a balance of three basic project constraints, namely time, cost, and scope, within budget. Most academics agree that the most important aspects of a good project are closely related to effective management, which includes planning, control, a specific and clear goal, and project staff motivation **(Liu et al., 2015)**. The project is considered successful if it meets its basic objectives while staying within the acceptable quality constraints of time, cost, and scope **(Jiang and Klein, 2001)**. While there appears to be a reasonable understanding of the project's success, there is disagreement, particularly regarding the project's troubled conception. When the project's three constraints are out of balance, it causes confusion and contradiction between its current state and what is planned. **(Vargas, 2011)**, described the troubled project as being pushed down a road that will unavoidably fail because the gap between what was expected and what was completed exceeds acceptable tolerance limits. A troubled project has a timetable delay



that is more than what is permitted (**Havelka and Rajkumar, 2006**). By analyzing the characteristics of the projects, we can conclude that every project is marked by a challenge, whether due to its inherent complexity, tight timeline, or low cost. In this sense, every project necessitates a degree of control and management that deviates from customary commitments, frequently requiring an unpaid effort from the project manager and the team. Success in recovering the troubled project and returning it to its correct path, or failure in recovering it, depends on understanding the roots of the problem and identifying indicators of the project's trouble, which is the first step in taking corrective measures to recover it. According to research by (**Al-Ageeli and Alzobae, 2016**), the following factors are often blamed for faltering projects: political situation, security, deteriorating economy, financial efficiency good for business owners and contractors, low budget, bad design, and lack of effective Labor, where these factors have an impact direct upward on (cost increase, time delay, and project scope creep).

On the other hand, (**Larsen et al., 2022**) identified early indicators for troubled projects divided into four categories that indicate the failure of the project related to the planning and definition of the project, the project schedule and budget, an action plan for risk management, the relationship of stakeholders, the quality of the project and its impact on a large number of change orders, in addition to the project resources. The factors influencing the completion of irrigation development projects in Kenya were researched (**Kahiga, 2015**), and the results showed the influence of the contractor, cost, and administrative supervision of irrigation completion factors. The study concluded that the cost-related factors are the specific factors that influence the completion of irrigation projects and their ability to overcome disruption. Project supervision was the second-most important factor influencing irrigation project completion, and contractor-related factors were found to be the least significant. To prevent considerable resource losses and project completion, administrative supervision is crucial in promoting and detecting problem areas through prompt inspections of project implementation activities.

(**Havelka et al., 2004**) summarized the factors of possible early indicators for projects that face a problem or are destined for a problem or trouble, as the factors included multiple aspects classified as follows: factors related to the customer or stakeholders; factors related to the project and project tasks; factors related to project management; factors related to project cost and time; factors related to the project documentation; in addition to the factors associated to the project objective and communications. (**Erzaj et al., 2020**) investigated the factors disrupting projects in Iraq and the importance of identifying them as part of the project recovery procedures. The results revealed the following factors that cause Iraqi projects to falter: insufficient planning and inadequate documentation. Unsatisfactory leadership tracking, errors in cost estimation, inadequate communication between levels of management, ignoring project warning signals and no risk assessment, business objectives being considered less important than technical objectives, insufficient resources, lack of adherence to deadlines, and insufficient client funding. Several design changes have been implemented inadequate contractor site management.

(**Shrivastava and Singla, 2022**) discussed the key elements that contribute to the delays in Indian construction projects, drawing on their research to build a model based on how these elements interact with one another. The root cause (i.e., driving factor) of delay is a lack of proper construction methodology and sequencing, followed by a lack of a defined project management plan, ineffective contracting strategy, interdependence, inadequate contractor evaluation, and poor project management. These twelve factors have been identified as the most significant influences on delay. Other factors include, in descending order: missed



design review deadlines; material shortages; bad contract management; disagreement between owners and outside parties; rework because of poor quality or craftsmanship; and poor site conditions.

In addition to the aforementioned (**Nelson, 2011**) agreed that the following factors are the main candidates for projects trouble: inadequate planning and project definition; requirements that are ambiguous, inconsistent, and constantly changing in scope; a lack of resources and an insufficient amount; an unrealistic time frame; and excessive optimism and intensity; risks that are not controlled are unknown or are assumed due to a lack of knowledge or documentation. The findings of the study carried out by (**Larsen et al., 2016**) on the factors that have the most significant influence on the project's goals, time, cost, and quality, as well as the degree to which the effects differ. According to the findings, instability or a lack of project finance is an element that most impact the timing. The cost was significantly affected by inaccuracies or omissions and errors in the design documents, which was one of the most significant reasons. One of the most important elements affecting quality is the frequency of modification orders and errors or omissions in building work. A study by (**Ibbs et al., 2007**) presented a conceptual framework for the quality relationship and its impact on project disturbances resulting from many change orders by the owner and the contractor's role in reducing or escalating these disturbances.

The objective of the study (**Yigrem, 2018**) was to assess the causes of problems in irrigation projects using the construction of Mijek Dam as a case study. The findings showed that project performance is significantly impacted by planning flaws. Lack of a risk management strategy, ineffective scope management, insufficient money, foreign exchange, and political unrest. A study conducted by (**Okpala et al., 2019**) in Serdang, Malaysia, aimed to identify the causes and factors contributing to the delay and disruption of construction projects. Financial difficulties were recognized as the most important factor, while cost, time, and conflict were the most important effects that caused delay and disruption in construction projects. The main objectives of this work are:

1. Determining the main Indicative Factors that led to troubled construction projects in Iraq/government buildings as a case study.
2. Inference by periodic health check reports of the project on the indicative factors for the project's trouble.
3. Evaluate the relative importance of these factors from the point of view of experts.
4. Evaluate the relative importance of the project health check reports from the point of view of experts.

2. IDENTIFYING INDICATIVE FACTORS OF A TROUBLED PROJECT

Every troubled project has some guiding Indicators that can help identify the problem. We can quickly and accurately assess a project's level of trouble by considering several factors related to stakeholders, project resources, documentation, risk, quality, definition and planning, and the triple constraint (scope, cost, and time). The researcher summarized previous studies on the most important indicative factors that cause projects to be disturbed in a mental map to facilitate the identification and evaluation of the troubled project, as shown in **Fig. 1**.

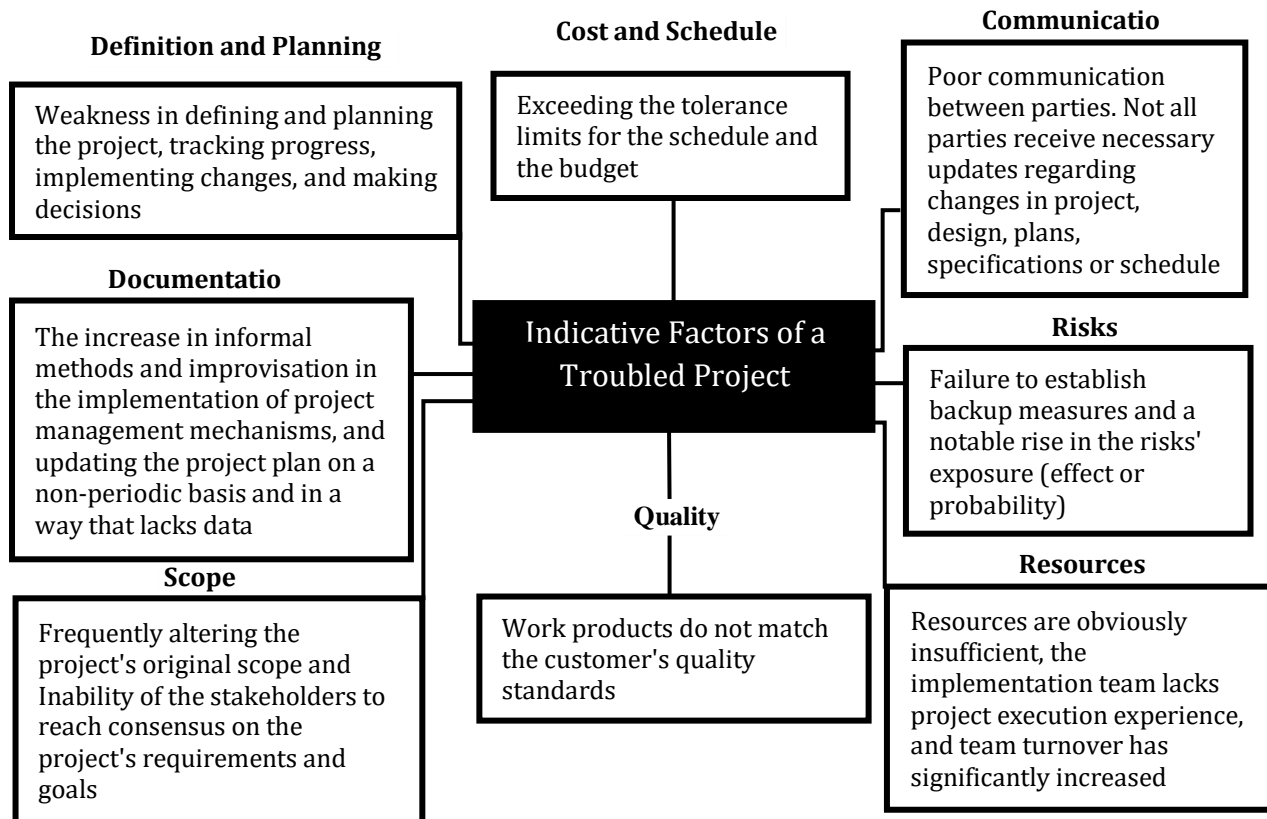


Figure 1. Mind Map of the Indicative Factors for the Troubled Project Based on Previous Studies

2.1 Project Health Checks (PHC)

Troubles are typically discovered late in the project life cycle, limiting the scope of the rescue. Organizations judge trouble by cumulative variations, which are difficult to identify due to weak project management procedures and human nature, which is the cause of this tardy recognition of the troubles.

Project health checks are referred to as periodic checks and are carried out monthly or semi-annually. Assists the project manager in locating the root causes, analyzing its weaknesses, and monitoring the corrective actions to ensure they are carried out correctly.

The purpose of the Periodic project health check reports (PHC) tool is to systematically specify how project variables are handled to ascertain whether a project is managed systemically (as in a healthy project) or randomly (in the case of a troubled project). The health check tool offers an illustrative view of the situation faced by the project manager in the troubling case and highlights how corrective steps were taken in focused areas to support the recovery of the projects (Jaafari, 2007; Philbin and Kennedy, 2014). Project health reports help project managers to identify the root causes of any issues early in the project delivery process and to enable managers to maintain overall project performance better (Almahmoud et al., 2012).

The suggestions of the questions in the project health reports (Merla, 2005) match with the nine knowledge areas in the Project Management Body of Knowledge (PMBOK® Guide, 2017) and quickly analyze the root causes of the project's trouble and communicate the results visually by asking several questions from a neutral resident outside the project as a



consultant, for example. The results will indicate the aspects of the project that need improvement, development, and follow-up. Below is a sample of the suggested checklist questions):

- 1- **Communications:** Check whether continuous communication between the parties allows the parties to receive any updates on the aspects of the project.
- 2- **Definition and Planning:** Check whether the work plan is appropriately understood and approved by the project sponsor and key stakeholders. To ensure a shared vision of what the project will deliver, when it will be completed, what it will cost, who will do the work, how it will be done, and what the benefits are.
- 3- **Scope:** Check whether the descriptions of the project's logical boundaries (which include output types such as business requirements, assessment of the current state of the project, and significant life cycle processes such as analysis and design, as well as existing data such as finance, sales, and personnel) are identified and to obtain agreement about them, and to make sure of the scope data about what is within the project boundaries and what is outside those boundaries.
- 4- **Time:** Check whether the project activities align with the planned schedule and whether the program is organized enough to ensure success.
- 5- **Cost:** Check whether the cost of the project activities is in line with the planned budget and whether all project requirements have been implemented with the required quality and without reworking or deleting activities from the project plan within the planned budget.
- 6- **Risk:** Check the planning for the expected risks by developing a plan for the risks and managing them effectively.
- 7- **Quality:** Check whether a proactive plan has been developed to understand the customer's expectations regarding quality and whether these expectations have been met or exceeded.
- 8- **Resources:** Check whether the appropriate people, equipment, and materials required to deliver the project have been appropriately allocated, planned, and made available.
- 9- **Documentation:** Check whether the organization follows a formal, documented project management mechanism and verify its documentation of project contracts with schedules of quantities, schedules, follow-up reports, meeting minutes for project teams, and other documents essential for projects.

3. METHODOLOGY OF RESEARCH

The research methodology includes the following:

1. A review of the literature to collect and identify the indicative factors disrupting projects.
2. A field visit to troubled buildings in the Baghdad governorate to collect data as a case study to achieve the research objective.
3. Discuss the reasons with experts through organized interviews aimed at developing the closed questionnaire process for the next stage.
4. Analyze the data statistically using the SPSS statistical analysis program to extract the relative importance factor (RII) and the arithmetic mean (M) to evaluate and arrange the factors from most to least important.
5. Using Cronbach's alpha to show the validity and reliability of the questionnaire.



4. QUESTIONNAIRE DESIGN

The questionnaire questions were divided into four main sections to collect the required data. The first section contains the participant's personal information (gender, specialization, and work sector) and the classification of educational credentials, job titles, and job abilities, as given in **Table 1**.

Table1. Participant data

Personal information	Frequency	Percentage %
Gender		
Female	13	21
Male	49	79
Academic Credentials		
Ph.D.	8	13
Master	28	45
Bachelor	25	40
Diploma	1	2
Specialization		
Civil Eng.	46	74
Mechanical Eng.	2	3
Architectural Eng.	2	3
Electrical Eng.	8	13
Another	4	7
Experiential Years		
Less Than 5 Years	11	18
From 5 to 10	15	24
From 10 to 15	13	21
From 15 to 20	10	16
More than 20 Years	13	21
Work Sector		
Public	44	71
Private	18	29

The second section of the questionnaire includes simple questions about the extent to which companies implementing construction projects in Iraq apply project management concepts through the documents prepared for the project. It consists of eight questions compiled and designed using the Triangular Likert scale. The scale is (yes, no, sometimes), and respondents answered based on their experiences, as shown in **Table 2**.

Table 2. Qualitative variables on the 3-point Likert scale (**Wade, 2010**)

Level	Likert scale	Intervals	Difference	Descriptions
Yes	1	1-1.66	0.66	High
Some times	2	1.67-2.33	0.66	Medium
No	3	2.34-3	0.66	Low



The third section deals with the indicative Factors of the troubled project, as this section contains 25 questions using the five-point Likert scale (1: unimportant; 2: little important; 3: medium; 4: important; 5: significant).

The fourth and final section of the questionnaire included the questions suggested for inclusion in periodic project health check reports.

Using the five-point Likert scale (1: unimportant; 2: a little important; 3: medium; 4: important; 5: significant).

5. DATA GATHERING

The researcher gathered information, evaluated the actuality of troubled projects, discovered flaws, and carried out a field questionnaire after reviewing existing literature and researching a case study. It was finished in two steps:

5.1 Open Questionnaire

Statistical analysis is adopted to determine the accuracy and clarity of the questions asked and the possibility of modification. And to conduct research and improve the understanding of respondents and the research sample. To reach the final version of the questionnaire for the next stage, fourteen experts were interviewed about the questionnaire's questions and their coverage of the research topic, its importance, and its impact, and their characteristics are summarized in **Table 3**.

Table 3. The Expert’s characteristic

No.	Specializations	Scientific qualification	Experience
4	Construction manager(civil)	Ph.D.	> 20 years
4	Consultant (Civil)	MSc& Ph.D.	15 ≥ 20years
2	Mechanical)(Consultant	MSc	15 ≥ 20years
2	Planning Engineer(Civil)	MSc	10 ≥ 15years
2	Site engineer(civil)	MSc	10 ≥ 15 years

5.2 Closed Questionnaire

Following the first stage of modifying the questionnaire, 70 questionnaires were distributed to engineers with experience in various fields related to faltering projects in the public sector and multiple ministries and contracting companies in the private sector. The study sample was chosen to be the most knowledgeable and talented in the Iraqi construction industry, and 62 valid questionnaires were received that met the conditions for answering the questionnaire.

6. DATA ANALYSIS APPROACH

After reviewing previous studies in different countries, identifying the most important indicators of the factors that cause projects to falter and summarizing them with a mind map. **Fig. 1** is the first step for the data analysis approach.

The second stage was represented using the SPSS V24 statistical package for social sciences to conduct the data analysis. The primary goal of these programs is to generate descriptive statistics from collected data. The following were included in the statistical analysis:



6.1 Reliability Test

Before data processing, reliability testing was done to ensure the data from the questionnaire survey was internally consistent. The correlation between the average rating and the internal consistency of each survey component is estimated to yield the Cronbach coefficient of alpha (C) Eq. (1), which has a (0–1) range (Morgan et al., 2019). The internal consistency was computed based on the values in Table 4 and the derived parameters.

$$C\alpha = \frac{K}{K-1} \left(1 - \frac{\sum_{i=1}^k \sigma^2 y_i}{\sigma^2 x} \right) \tag{1}$$

where K is the number of factors, $\sigma^2 x$ is the variance of total scores for the respondents, and $\sigma^2 y_i$ is the variance of component i for the respondents

Table 4. Cronbach's alpha value Criteria (Bonett and Wright, 2014)

Alpha-Cronbach value	Degree of Reliability
$\alpha \geq 0.9$	Excellent
$0.9 > \alpha \geq 0.8$	Good
$0.8 > \alpha \geq 0.7$	Acceptable
$0.7 > \alpha \geq 0.6$	Questionable
$0.6 > \alpha \geq 0.5$	Poor
$0.5 > \alpha$	Unacceptable

6.2 Arithmetic Mean

The obtained data were analyzed using the arithmetic mean (AM), as in Eq. (2) (Aldhamad and Rezouki, 2020).

$$AM = \frac{\sum (\text{Weight Value for particular} \times \text{number of frequencies})}{\text{Total number of the answers}} \tag{2}$$

6.3 Relative Importance Index (RII)

The analysis aims to ascertain the relative significance of the numerous elements that contributed to construction troubled projects, as shown in Eq. (3) (Aldhamad and Rezouki, 2020). The replies are added to determine the score for each element, which is then used to calculate the relative significance index (RII):

$$RII = \frac{\sum_{k=0}^N (X1 * S1 + X2 * S2 + X3 * S3 + \dots Xn * Sn)}{(A * N)} \tag{3}$$

where:

RII is the Relative Importance Index.

S is the weight given to any factors by responders, and its range is (1 to 5), where '1' is less important, and '5' is highly important.

X is the frequency of each rating for each factor or option

N is the total number of responses for that factor or option

A is the highest weight (i.e., in this case, 5 or 3)

(Genc, 2021) defined the relative importance index in relation to the Five Likert scales, from most important to least important, as shown in Table 5 below:



Table 5. The RII for 5-point Likert scale (Genc, 2021)

RII values	Importance level	(RII-Level)
$0.8 < RII \leq 1$	High	H
$0.6 < RII \leq 0.8$	High - Medium	H-M
$0.4 < RII \leq 0.6$	Medium	M
$0.2 < RII \leq 0.4$	Medium-Low	M-L
$0.0 \leq RII \leq 0.2$	Low	L

7. RESULTS OF THE STATISTICAL ANALYSIS

After the data were analyzed with IBM SPSS-V24 software, the means for each factor were calculated. Additionally, the relative importance index (RII) was used to calculate the weights of the variables using the equation indicated below. The indicator's materiality level was also computed. When starting to analyze the results of the answers to the questions of the questionnaire and according to the sections in order, the questions in the second section aimed to know the level of application of institutions to project management through the documents that are prepared for the projects of those institutions or companies. It should be noted that the document in question is either organized by the company or not. That is, the answer "sometimes" means that the company often does not prepare this document, which means there is some deception involved in the response. The averages of the variables were measured from 1 to 9 and on a Likert scale from three points, so we will consider that each mean deviation from the value (1) indicates that the company has not prepared this document.

Table 6 shows that the only variables that do not deviate from (1) significantly are those related to the schedule and the estimated budget. Most institutions rely only on the primary documents related to time and cost and do not give importance to the rest of the basic planning documents in project management. This brings us to the third part of the questionnaire regarding Indicators of the relative importance of the Key Factors Affecting Troubled Projects. By analyzing the answers to Section III questions to determine the rank of one element among the remaining elements, the RII value of each component was calculated. Twenty-five factors related to project trouble are highlighted in Table 7.

Table 6. The arithmetic mean of project documentation variables

No.	Variables	Mean	Descriptions
1	Time Schedule	1.3115	High
2	Cost Estimation	1.3279	High
3	Project Charter	1.7869	Medium
4	Table of Tasks	2.1475	Medium
5	Risk Management Plan	2.2131	Medium
6	Follow-up health check project Reports	1.6721	Medium
7	Quality Management Plan	1.9508	Medium
8	Resource Management Plan	1.9344	Medium
9	Communication management plan	1.8361	Medium

Respondents agreed that the project's initial budget estimates were inaccurate and that projects had been affected and faltered by the economic crisis. Initial project schedule



estimates are incorrect or exaggerated; poor scope of work description and clarity, as well as a lack of actual follow-up of the project's critical path activities; a high rate of rework during project implementation; poor monitoring and continuous updating of project plans; poor operational experience of project implementers; and the absence of modern technologies for managing time, cost, and quality.

The poor perception among stakeholders about the project scope (due to the communication gap between the project team). In addition to the above, project risk indicators and warning signs are ignored. These factors are ranked in the top twelve, with the RII level ranging from 91 to 81, and this gives these factors a high level of importance in distressed projects.

The answers to the fourth section of the questionnaire, about the questions proposed to be included in the periodic reports to check the project's health, indicate good results with high relative indicators. Each of the questions related to the schedule and the cost obtained a high relative importance index (RII = 0.88), and in the first place, followed by the questions about the presence of a scope management plan to document scope statement and identify scope changes (RII = 0.87).

Concerning documenting the project plan as a basis for tracking progress, implementing change, and making decisions, I got an RII value of 0.83. The team's perception of the project, the extent to which the project activities adhere to the set plan, and how well it was implemented and understood got the same significance index (RII) is 0.82.

Table 7. The RII and the Rank of Indicative Factors Troubled Projects

No.	Indicative Factors	Rank	Mean	RII	RII Level
1	The project's initial budget estimates are inaccurate	1	4.5574	0.91	H
2	Economic crises have harmed and disrupted projects	1	4.5574	0.91	H
3	the project execution agencies' lack of implementation expertise	2	4.4918	0.90	H
4	Initial project timetable projections are false or inflated	3	4.4426	0.89	H
5	There is no real follow-up on the project's critical path activities.	4	4.3770	0.88	H
6	Between project team members, there is a communication gap	4	4.3770	0.88	H
7	Weak oversight and continuous updating of project plans	4	4.3770	0.88	H
8	utilizing insufficient project management expertise or knowledge	5	4.3115	0.86	H
9	Defining the scope and clarity of the work is weak.	6	4.2295	0.85	H
10	Absence of modern technologies to manage time, cost, and quality	6	4.2295	0.85	H
11	Poor perception of the project's scope among stakeholders	7	4.0656	0.81	H
12	disregarding the project's risk indications and warning signs	7	4.0656	0.81	H
13	Defining the connections between activities incorrectly	8	3.7049	0.74	H-M
14	There has been a lot of rate re-work during the project's implementation	9	3.5410	0.71	H-M
15	Employer involvement in the execution strategy	10	3.5082	0.70	H-M



16	There is insufficient data in the completion reports.	11	3.4262	0.69	H-M
17	Making frequent modifications to the work's scope	12	3.4098	0.68	H-M
18	Adopting a regular routine and not sending reports to other parties	13	3.1148	0.62	H-M
19	Employer requirements not being made explicit	13	3.0820	0.62	H-M
20	Relationships between stakeholders and the project team are weak and tense	13	3.0984	0.62	H-M
21	Employer dissatisfaction over the work	14	3.0656	0.61	H-M
22	Poor planning by the organization resulted in poor implementation	15	2.9836	0.60	M
23	The project was challenged with uncontrollable force majeure situations that weren't taken into consideration	15	2.9836	0.60	M
24	The project has no real feasibility study	16	2.8689	0.57	M
25	Once the project is over, the project manager updates the project management plan (action plan)	17	2.6557	0.53	M

In addition to the above, the critical indicators for the questions related to quality, the risk management plan, and resource management in the project were RII = 0.81, 0.8, and 0.77, respectively, as shown in **Table 8**.

Table 8. RII and the Rank of Project Health Check Report Questions

No.	Questions	Rank	Mean	RII	RII Level
1	Time: To what extent are the activities implemented according to the specified schedule, and to what extent does the table include the project parameters?	1	4.4098	0.88	H
2	Cost: How documented is the budget, and how well do you track actual expenses versus budgeted expenses?	1	4.4098	0.88	H
3	Scope: The extent to which a scope management plan is in place that documents the scope statement and identifies scope changes.	2	4.3984	0.87	H
4	Documentation: How reliable is the documented project plan for tracking progress, implementing change, and making decisions?	3	4.1475	0.83	H
5	Communication: The extent of communication between the administration and the project team, and a clear perception of the group about the project?	4	4.0820	0.82	H
6	Definition and Planning: How closely do the project's activities adhere to the established plan, and how well is it implemented and understood?	4	4.0984	0.82	H
7	Quality: How often are quality management and improvement methodology used?	5	4.0492	0.81	H
8	Risks: How well defined and documented is a plan to manage the main risks in the project?	6	3.9836	0.80	H
9	Resources: To what extent are roles and responsibilities defined according to a resource management plan?	7	3.8525	0.77	H-M



8. MEASURING THE RELIABILITY OF THE STUDY

Cronbach's alpha coefficient ($C\alpha$) was calculated for each part of the questionnaire separately to check the accuracy and reliability of the questionnaire questions. The results concluded that the reliability coefficient for each of the second and fourth sections of the questionnaire is good. As the third section's reliability coefficient is acceptable, as given in **Table 9**.

Table 9. Reliability of the questionnaire by Alpha Cronbach's method

The Sections of the Questionnaire	Value of $C\alpha$	Degree of reliability
The Second Section (Project Documentation)	0.815	Good
The Third Section (Indicative Factors for the Troubled Project)	0.756	Acceptable
The fourth section (Project Health Check Report Questions)	0.865	Good

9. CONCLUSIONS

The study sheds light on the indicative factors for the troubled projects in Iraq and how to infer and follow up on them by activating the role of periodic health check reports on the project. The following conclusions can be extracted from this study:

1. The adopted statistical analysis shows weakness, a clear imbalance in project management and scientific knowledge in this area, and a lack of practicality through the study of projects and direct meetings with several heads of departments and data engineers.
2. The search findings also showed that some aspects significantly affect project performance and call for preparation, attention, and control to prevent project tripping.
3. Some factors commonly affect project stumble in general and a clear defect in specific areas.
4. The findings indicate that most of the factors were managerial. Thus they could be controlled and minimized by improving organizational skills in construction organizations. add to, the importance of questions about project health check reports is high, and thus the institutions' reliance on such types of questions aids in project tracking and obtaining a list of the project's root problems, analyzing them, and filling the gaps by applying corrective measures and developing a plan for reform in the event of project disruption.

NOMENCLATURE

AM: The Arithmetic Mean

SPSS: Statistical Package for Social Science

$C\alpha$: Cronbach's Alpha factor

PHC: Project health checks

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