

IMPROVING CONSTRUCTION PROJECT SCHEDULE BY USING AGILE RULES

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Construction projects utilizing the agile technique may go seamlessly as long as each stage of the project is effectively supervised. An essential principle of an agile approach is that project alterations may be made as work is being performed, with minimum impact on other project components. This study employs the influential project factors, with specific emphasis on the project timeline. To determine the cause of the project schedule delay, the RII approach is employed. Subsequently, a poll of experts in the area assesses the impact of the component with a higher score on the timeliness of the project. Now, proceed to give the answer. The project timeline was affected by several factors, including an imprecise estimation of the required time for completion due to inexperience or unexpected events, insufficient resources, a delay in the delivery of essential materials to the site, and the contractor's financial capacity being hindered by the owner's delayed payment. According to RII's investigations, the primary factor contributing to timetable delays in Iraqi projects is the logistical delay in procuring and

delivering materials to the project site. One approach to resolving the scheduling delays was to incorporate the time and material needs for each activity into the project plan.

Keywords: RII, construction project scedual, agile method

1. Introduction

Within the realm of project management, a project's timetable include activities, deliverables, and milestones. Additional common components of a timetable are the durations of the activities, the specified start and finish times, and the allocation of resources. Efficient project scheduling is a crucial aspect of time management, particularly for service-oriented firms [1]. Project scheduling seeks to achieve a harmonious allocation of time and resources, while also generating a detailed schedule of events. An effectively organized schedule helps mitigate production constraints, guarantee prompt acquisition of resources, and expedite project finalization [2]. Nevertheless, ineffective scheduling can result in substantial financial losses due to the idleness of people and equipment while waiting for supplies or the completion of previous tasks. If the project exceeds the expected completion time due to poor scheduling, owners who are eager to utilize the additional facilities as soon as possible may also experience the negative consequences. In general, projects strongly oppose having a specific timetable. Building owners sometimes request thorough construction timelines from contractors to closely monitor the progress of the project [4]. A common approach to evaluate construction progress is comparing the actual work accomplished with the predetermined schedule. In the event that the project has delays due to worker strikes, adjustments requested by the owner, or any other unforeseen

circumstances, the project's owner can be held responsible by comparing the actual timeline of the project with the originally estimated timeframe once construction is completed. Despite the benefits [5], regular timelines are often perceived as tedious and ineffective by many field supervisors. Within the realm of project management, a project's timetable include activities, deliverables, and milestones. Additional common components of a timetable are the durations of the activities, the specified start and finish times, and the allocation of resources. Efficient project scheduling is a crucial aspect of time management, particularly for firms that provide services [1]. Project scheduling seeks to optimize the allocation of time and resources while also creating a detailed schedule of activities. An effectively organized schedule helps minimize production constraints, guarantee prompt acquisition of resources, and expedite project finalization [2]. Despite being a subject taught in colleges for more than two decades and occasionally mandated by owners, many experts in the field still perceive vital route scheduling as a burdensome bureaucratic process. In essence, scheduling is a question of relying on intuition and improvisation, which can result in either very ineffective plans with low production or success. Contemporary construction firms employ formal scheduling systems in situations when the assignment is very complicated and workforce coordination is crucial [6]. The utilization of formal scheduling methods has experienced a substantial rise due to the accessibility of scheduling software and the extensive adoption of computers on construction sites. One element that promotes the use of formal scheduling systems is the convenience of sharing online scheduling information. Project managers that are highly skilled in technology sometimes utilize wearable or portable computers to monitor deadlines and budgets [7]. Advancements in user-friendly computer systems and improved schedule presentation techniques have reduced the practical limitations associated with formal scheduling methodologies. However, unless

managers possess knowledge of the appropriate timing and methods for utilizing scheduling tools, problems will continue to exist. The distinction between scheduling techniques that prioritize resources and those that emphasize time is evident. Resource-oriented scheduling seeks to optimize the allocation of time and effort in order to maximize the usage of available resources [8]. For example, the primary objective of the project manager on a high-rise construction site may be the efficient and expeditious utilization of cranes for the purpose of moving things. Inefficient scheduling can cause a queue of supply cars on the ground, resulting in staff at higher levels having to wait idly. Time-oriented scheduling is a method that takes into account the important relationship between activities in order to complete a project within the specified time frame. Priority connections enable the implementation of hybrid approaches that address both resource leveling and resource limited scheduling. While most scheduling algorithms prioritize time, nearly all of them also consider resource limits [9].

2. the concept of agile

Agile project management is easily implementable and user-friendly, making it highly adaptable for diverse organizations. Agile, as a project management approach, prioritizes the human aspect and values people and relationships more than procedures and technologies. By only relying on the process and equipment, you become incapable of adjusting to changing circumstances. The second crucial principle is that operational software takes precedence over comprehensive documentation. The third virtue is the capacity to systematically adapt to evolving circumstances. Compared to conventional project management methods, this value is very innovative [10]. Individuals often perceive change as a cost that should be reduced to a

minimum. Modifications can be implemented at any given point during the agile project management process. It is advisable to evaluate your actions and make necessary adjustments for each sprint based on the analysis of your past performance [11]. Agile is a project management methodology that follows an iterative approach. Consistent enhancement is necessary at every level, just as continuous involvement with stakeholders is essential. At the beginning of a project, teams often engage in the customary phases of planning, executing, and evaluating. It is important for team members and other project stakeholders to engage in collaboration. Throughout the project life cycle, agile project managers employ brief iterations to complete smaller, more easily handled tasks, resulting in larger, more easily handled projects as a whole [12]. Agile teams are characterized by their proficiency in swiftly accomplishing tasks, adjusting to evolving project requirements, and streamlining procedures. The Agile methodology allows teams to regularly evaluate their work and make gradual modifications, enabling them to adapt their priorities to evolving work and customer requirements [13]. The Agile project management methodology, initially developed for software development, is also being adopted by non-IT enterprises. Various industries, such as marketing, academia, the military, and the car sector, are employing Agile frameworks and processes to produce innovative products despite limitations [14].

3. the independent factors

Iragian's economic development is significantly influenced by the construction industry, which is the second largest employer in the country[15]. In the construction sector, it is not uncommon for deadlines to be missed. The majority of initiatives in India necessitated a substantial amount of additional time and money to be completed [16]. In the construction industry, it is exceedingly

uncommon to complete a project within the designated timeframe. The construction industry is characterized by a global phenomenon of delays of some kind. Preconstruction, which commences with the formal commencement of a project and concludes with the signing of a contract between the proprietor and contractor, is characterized by frequent overspending [17]. Some of these issues may be caused by the construction procedure itself [18]. The duration of a construction endeavor was a significant factor in determining its success or failure. The following factors have been demonstrated to influence scheduling, according to a meta-analysis of related research:

- 1- Unforeseen circumstances or lack of expertise resulted in an underestimation of the project duration.
- 2-Exercising significant discernment requires exertion.
- 3- The contractor's ability to continue working on the project despite delays in receiving money from the owner.
- 4-cash flow.
5. Supply delivery delays at the site.

3. RELATIVE IMPORTANT INDEX (RII)

Tolerance thresholds exert a substantial influence on management decisions at all stages of the process. A determination about their acceptance must be made after the evaluation process. A choice is made based on the level of risk that the decision-maker is prepared to tolerate when they take on a given level of responsibility. Prior to implementing any strategy, schedule,

technological solution, or building process, it is imperative to subject it to thorough testing in order to meet an acceptable standard. In order to make sound judgments at the beginning of the project, it is crucial to first establish the criteria for an acceptable level of quality. The project management method should provide clear guidelines on what is deemed appropriate. In order to accept anything, the one responsible for making the decision must possess a willingness to do so. Acceptance, whether at the individual or organizational level, is influenced by perception, decision criteria, and prior knowledge/experience with similar alternative circumstances. Individuals and organizations can be categorized as either averse, neutral, or receptive in their attitudes. In order to demonstrate a dangerous condition, one might employ certainty equivalents, which are anticipated values or assets that have a comparable worth as in a certain circumstance[19][20]. Several factors might impact an individual's inclination to embrace a decision. The suitable amount varies significantly based on factors such as the person's income, level of social awareness, and technical proficiency, among other variables. An individual's propensity to engage in action is contingent upon several elements, such as their acquaintance with the matter, public consciousness of it, and comprehension of the organization's norms and protocols.

Conversely, project managers often exhibit tolerance, or at the very least, impartiality, in this matter. An average view with a more gloomy and less tolerant perspective posits that humans have an inherent inclination towards negativity. The assumption of neutrality occurs when the loss or expenditure is negligible. The level of tolerance exhibited by people and organizations is sometimes ambiguous.

Therefore, to set suitable limits, we must employ more fundamental methods. Evaluate the expenses and advantages in order to determine the optimal level. The primary objective of the project is to determine the most favorable equilibrium between overall advantage and overall cost. The total cost encompasses both the probability and impact of failure [21].

The main objective of utilizing the RII test on survey results is to evaluate the effects of variables by assigning a numerical value to each variable.

The objective of this study was to evaluate the several aspects that have been acknowledged as crucial to the success of a project. In order to calculate the score of the factor, we sum up all the evaluations provided by the respondents. The below equation was employed to compute the Relative Importance Index (RII) [22].

4. RESULTS AND DISCUSSION

The researchers used the percentage scoring system that was previously stated in the study to rate the hazards. To uncover every facet of project operations, a thorough approach is required. Which criteria are most important can be ascertained by using a technique called relative significance index analysis, which examines participant replies on Likert-type scales. The criteria were ranked according to relative significance using a relative index analysis.

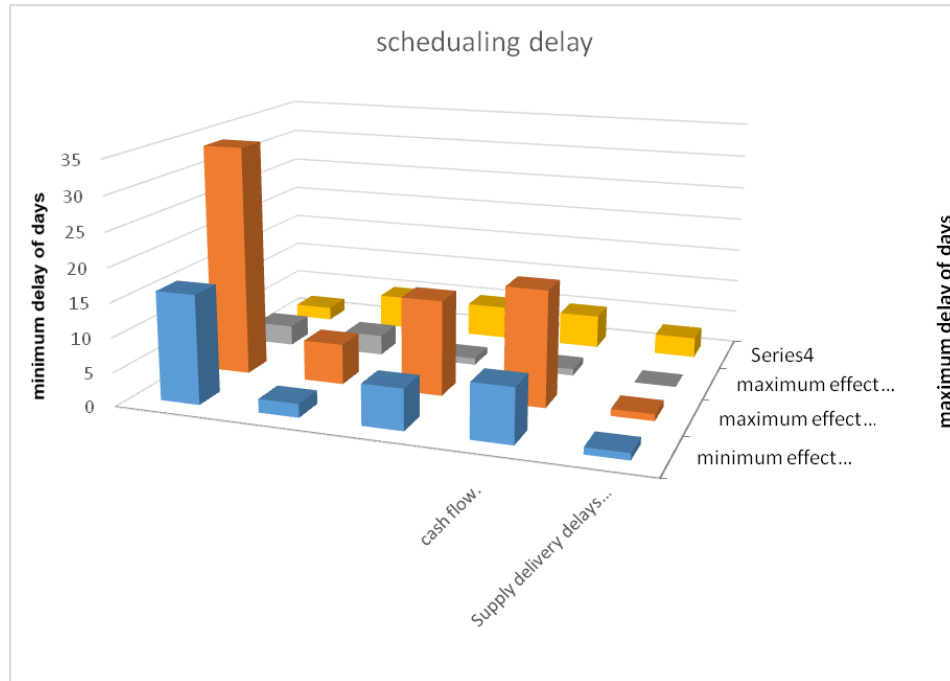


Figure 1: The Likert method results

The following tables provide the findings of the relative index analysis rating for each location. These ranking results led to the identification of five criteria with high priority levels for project evaluation based on schedule implications. For each challenge, the relative importance index (RII) was created in order to detect factors in project scheduling. We used the obtained RII values to rank these factors.

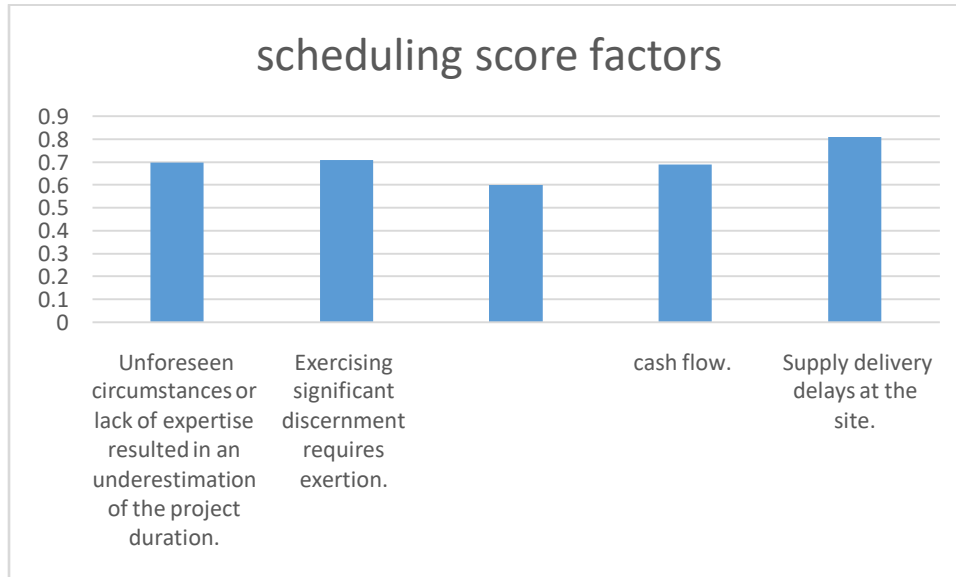


Figure 2: the RII score factor results

It is evident that 82% of the time, this was the main reason for material delivery delays at the location. To avoid any potential delays in material delivery, the Main Contractor must take early control of the material suppliers. This is because, in most situations, poorly managed Contractor's Risk events would result in badly managed projects that would lead the Main Contractor to suffer significant losses. Irrationally The contractors can see when the items are expected to arrive based on their Excel plan, but they don't always appropriately follow up on these deliveries and sometimes don't find out until it's too late that the materials aren't on site. This poses a possible danger to the Employer. With a score of 72%, making critical decisions slowly comes in second among the reasons of delay. As can be seen in the picture, a

questionnaire comprising these two components was used to examine the delay time in small projects.

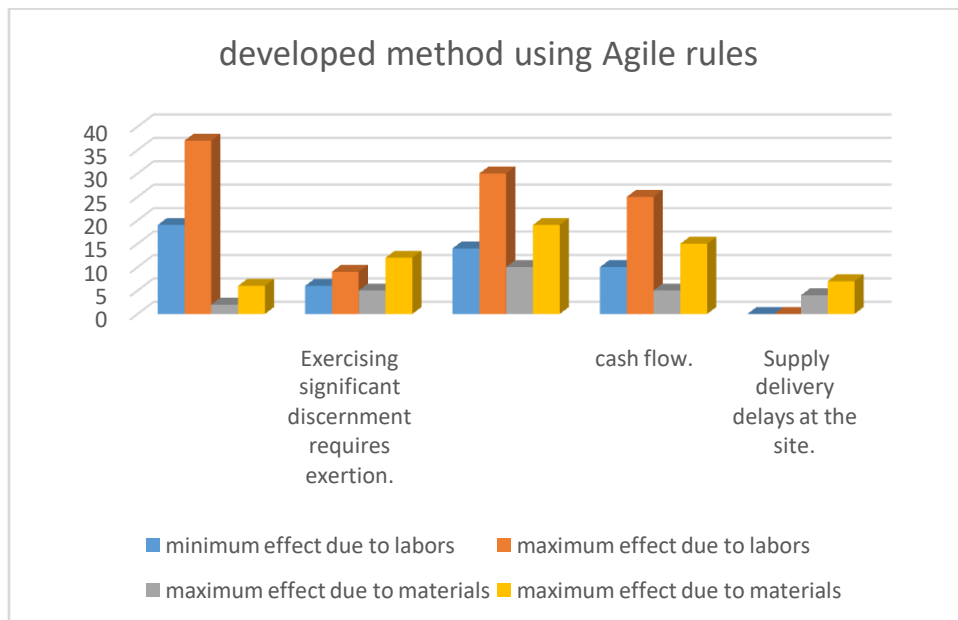


Figure 3: the results of developed agile approach project schedule

5. conclusion

The goal of this study is to develop a model for project scheduling in the construction industry, which will assist project managers in Iraq in preventing project delays. To accomplish this goal, the subsequent protocols were adhered to:

1. Along with expert interviews and exploratory research from earlier studies, survey data and expert comments were used to evaluate which project components were most useful and how big of an influence they made. Five different categories of influence attempts were determined.
2. Selecting the application to begin the model creation procedure was the first of several stages in creating a RII model. The Microsoft Excel application was chosen as the tool for fundamental assessment and as the software to determine the influence of each category due to its ease of use and robustness.
3. The results demonstrate the existence of a sizable schedule chart that contains the timestamps for each project task and the material orders.

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