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MANAGING IRAQI CONSTRUCTION PROJECT USING AGILE APPROACH

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Abstract

Continuous progress of construction projects using the agile approch refere to the project that can be managed at each stage. Agile approch is predicated on the idea that a project can be applied during project lifetime with minimal disruption. The present paper apply the effective project factors depend on a project time schedule as a key concept. In order to achieve this target, the RII method is used to specify the cause of the project schedule delay. then a survey with the experts evaluates the time effect of the higher score factor which causes the project delay. then specify the solution. the underestimation of project duration due to lack of experience and unforeseen conditions, slow in taking critical decisions, the financial ability of the contractor to continue working with owner's delay in payment, lack of resources and delays in delivering materials to the site was the effective factors on the project schedule. the results of RII specify the delays in delivering materials to the site as the main cause of scheduling delays in ıraqi projects. for that, the project schedule was modified with the time and quantities of needed material for each task as a solution to the scheduling delay problems.

Keywords: Agile Approach, RII, Scheduling Delay, Material Delivery

IRAK İNŞAAT PROJELERİNİN ÇEVİK YAKLAŞIM KULLANARAK YÖNETİMİ

Özet

Çevik yaklaşımı kullanarak inşaat projelerinin sürekli ilerlemesi, her aşamada yönetilebilen projeyi ifade eder. Çevik yaklaşım, bir projenin proje ömrü boyunca minimum kesinti ile uygulanabileceği fikrine dayanır. Bu makale, bir proje zaman çizelgesine bağlı olan etkin proje faktörlerini anahtar bir kavram olarak uygulamaktadır. Bu hedefe ulaşmak için, proje zaman çizelgesi gecikmesinin nedenini belirtmek için RII yöntemi kullanılır. daha sonra uzmanlarla yapılan bir anket, proje gecikmesine neden olan daha yüksek puan faktörünün zaman etkisini değerlendirir. sonra çözümü belirtin. Deneyim eksikliği ve öngörülemeyen koşullar nedeniyle proje süresinin eksik tahmin edilmesi, kritik kararların alınmasındaki yavaşlık, yüklenicinin mal sahibinin ödemede gecikmesi, kaynak eksikliği ve malzemelerin sahaya teslimde gecikmeler ile çalışmaya devam etme mali kabiliyeti etkili faktörler olmuştur. proje takviminde. RII'nin sonuçları, ırak projelerindeki programlama gecikmelerinin ana nedeni olarak malzemelerin sahaya teslimindeki gecikmeleri belirtiyor. bunun için proje programı, zamanlama gecikmesi problemlerine bir çözüm olarak her bir görev için ihtiyaç duyulan malzeme miktarı ve zamanı ile değiştirildi.

***Anahtar kelimeler*:** Çevik Yaklaşım, RII, Planlama Gecikmesi, Malzeme Teslimatı

1. INTRODUCTION

Scheduling, in the context of project management, refers to the documentation of tasks, products, and checkpoints. Schedules also typically include start and end times, activity durations, and resource allocations. Scheduling projects

efficiently is essential to efficient time management, especially for organizations that provide professional services(Williams 2020). Scheduling a project involves more than just putting together a calendar of events; it's also meant to balance the time commitment of various tasks with the availability of various resources. A well-planned schedule can free up production bottlenecks, ensure that all resources are acquired on time, and hasten the project's conclusion(Poku and Arditi 2006). Poor scheduling, on the other hand, can lead to significant losses while workers and machines idle while waiting for the completion of prior activities or the arrival of necessary materials. Owners who want to use the new amenities as soon as possible may also be negatively affected by delays in the project's completion owing to bad scheduling(Xie, Chen, and Chang 2021). The formal scheduling of projects is typically met with strong opposition. It is common practice for building owners to request that contractors present comprehensive construction schedules so they can keep tabs on the development of the project(Khalilzadeh et al. 2017). Construction progress is typically evaluated by comparing actual work done to the timetable. Similar comparisons between the anticipated timeline and the actual accomplishments may be made after construction is finished to assign responsibility for delays in the project caused by owner-requested alterations, labor strikes, or other unforeseeable occurrences. In spite of these uses of formal timetables, many field supervisors find them tedious and unnecessary(Sharma and Bansal 2018). Even though the critical path scheduling method has been taught in universities for over two decades and is often required by owners, many professionals in the sector still view it as unnecessary bureaucracy that wastes their time. The end result is "fly by the seat of one's trousers" scheduling, which can be effective or lead to extremely ineffective schedules and low output. When the complexity of jobs is significant and the coordination of different workers is essential, modern construction companies resort to formal scheduling systems(Zhou et al. 2013). The widespread availability of computers on building sites and the accessibility of scheduling software have greatly increased the usage of formal scheduling techniques. One such factor encouraging the usage of formal scheduling approaches is the ease with which schedule information may be shared online. The most technologically advanced construction managers frequently use wearable or mobile computers to keep track of project schedules and finances(Chau, Anson, and Zhang 2003). Therefore, the practical issues associated with formal scheduling processes have been eliminated as a result of the ongoing development of user-friendly computer programs and improved means of presenting schedules. However, until managers learn how and when to apply scheduling tools effectively, difficulties will persist. There is a clear divide between scheduling approaches that prioritize resources and those that prioritize time. With resource-oriented scheduling, time and effort are allocated such that specific resources are utilized most efficiently(Bansal and Pal 2011). On a high-rise building site, for instance, the project manager's top priority may be to ensure efficient use of cranes for moving goods; without efficient scheduling, supply vehicles may wait in a line on the ground while workers on upper floors stand around. As the name implies, time-oriented scheduling is focused on calculating when a project will be finished based on the essential dependencies between tasks. In the presence of precedence relationships, hybrid strategies exist for either resource leveling or resource limited scheduling. The majority of scheduling algorithms focus on time, but almost all also allow for the introduction of resource limitations(Klanšek and Pšunder 2010)

2.THE AGILE APPROACH

The Agile approach is a style of project management that divides a project into phases. It necessitates ongoing engagement with stakeholders as well as continual development at each stage. Teams cycle through a process of

planning, executing, and assessing once the job begins. Collaboration is essential among team members as well as project stakeholders. Agile project management is an iterative project management strategy that focuses on breaking down huge projects into smaller, more manageable tasks that are accomplished in short iterations over the course of the project life cycle (Bukłaha 2017). Agile teams are better equipped to accomplish work faster, adapt to changing project needs, and streamline their processes. The Agile technique allows teams to re-evaluate the work they're doing and alter in small increments so that the team's focus shifts as the work and customer landscape shifts(Padickakudy 2019). The Agile project management approach, which was originally developed for software development, is increasingly being adopted by more than just IT teams. Marketers, universities, the military, and even the car industry are using Agile methodologies and frameworks to develop creative products in difficult circumstances(Ribeirinho et al. 2020). Agile project management may help a wide range of enterprises, and it's simple to set up and use. Individuals and relationships over processes and tools are the basic values of Agile, which include the human aspect, which is always vital in project management. When you rely too heavily on processes and equipment, you won't be able to adjust to shifting conditions. Working software takes precedence over detailed documentation as the second basic value. The third value is adapting to change in a planned manner. One of the most significant departures from standard project management is this value(de la Cruz López et al. 2021). Change has traditionally been viewed as a cost to be avoided. Agile project management allows for continual change throughout the life of a project. Each sprint provides an opportunity to reflect on the previous sprint and make route corrections (Sanaz Tayefeh Hashemi, Omid Mahdi Ebadati 2019).

3. SCHEDULING EFFECTIVE FACTORS

It is estimated that between 40 and 50 percent of India's total capital spending goes into the construction industry for use in projects across many sectors (highways, railways, buildings, etc.). The construction sector is India's primary driver of economic growth and the country's second largest industry(Olawale A. Yakubu and Sun Ming 2010). Overrunning deadlines is a common problem in the construction sector. Most projects in India were completed after substantial additional effort in terms of both time and money(Asal 2014). In the construction sector, it is unusual for a project to be finished in the allotted timeframe. Most construction projects experience delays of some kind, and this is true everywhere in the world. Preconstruction, or the time between the start of a project and the signature of a contract between the owner and contractor, is prone to cost overruns(Kishan, Patel & Bhatt, Dr. Rajiv & Bhavsar 2014). There is a chance that some of these issues will arise during the building process itself(Management 2020). One of the most important factors in determining whether or not a building project was successful was the time it took to complete. Based on a meta-analysis of relevant studies, we know that the following variables have an impact on scheduling:

1) Knowledge and expertise of the project manager: a thorough familiarity with the project's parameters, meticulous planning, and organized on-site execution make for simple monitoring and control, as well as the ability to foresee and prevent unforeseen issues.
2) When everyone involved in a project is on the same page, it's much easier to stay on track and finish on schedule.
3) The site engineer and project manager should be in close contact and communicate regularly to ensure the project is moving forward smoothly.

4) Conflicts can be avoided in the future if roles and responsibilities are clearly defined for all parties participating in the building process.
5) A well-defined set of plans and specifications can cut down on the need for change orders during construction and ensure that the established timeline is adhered to without a hitch.
6) Accurate weather forecasts allow for more efficient planning of site operations and better use of available resources.
7) Any hiccups in the owner's financial resources (with road projects, the Egyptian government is the owner of the project) cause the contractor to suspend work, which in turn causes significant delays in the project's completion date.
8) On schedule, with the delivery of all tools and supplies needed to get started right away.
9) Powerful contractor oversight and site management.
10) The degree to which everyone involved in the building process is working together.
11) The owner issued a change order.
12) Constraints on payment and permission processing imposed by the government.
13) The high standard of the project's hardware and supplies.
14) Consultants' inability to handle exceptional circumstances due to a lack of experience.
15) Accurate project planning and timing is possible through in-depth knowledge of the project's parameters.
16) Contract, design paperwork, and drawings must be meticulously prepared in advance of any work being done on-site.
17) Owner guarantees prompt payment to contractor.
18) Responsibility allocation should be made crystal clear.
19) Ability to acquire the required manpower and tools.
20) Prompt shipment of necessary components.
21) Employing reliable service providers.
22) Finding reliable third-party suppliers.
23) Finding an experienced manager and competent engineer for the job location.
24) Project owner-driven scope changes.
25) Natural disasters, including floods and earthquakes.
26) Issues that arose during building that were not anticipated.
27) Due to a lack of available competent workers, more and more products are being sent back for corrections.
28) Fluctuating costs of components and machinery.
29) Weak site administration and oversight.
30) Long periods of downtime due to repairs and upkeep.
31) Contractor payments have been held up.
32) Faulty timing estimates and inappropriate tool choices

4. RELATIVE IMPORTANT INDEX (RII)

The decision-makers' level of tolerance has a substantial impact on management decisions made at all levels of the process. This means that once the s have been assessed, a decision must be made on their acceptability. When a decision-maker is willing to assume a specific degree of , they are making a decision based on the level of they are willing to take. Any budget, timeframe, technology solution, or building method must first be examined against an acceptable degree of before proceeding further. The acceptable degree of must be determined early in the project so that the best decisions may be made in the early phases. Acceptable s should be defined in the project's management plan. A decision-willingness maker's to accept a particular determines acceptance. One's or an Organizational perception, decision criteria, and past knowledge and experience with similar option scenarios all effect acceptance. Individuals and organizations can be categorised into one of three groups when it comes to acceptance: averse, neutral, or taking. When it comes to expressing a dangerous scenario, one may apply certainty equivalents, which are expected values or resources that are as valuable as a y circumstance(Özdemir 2010)(Bari et al. 2012). Acceptance of decisions may be influenced by a number of things. Therefore, the appropriate level of changes from person to person, group to group, and nation to nation based on a wide range of circumstances, including the tech-savvy, wealth, and social-consciousness of the individual in question. Many factors, including past experience with, public awareness, and familiarity with company policies and procedures, affect an individual's openness to taking s. When it comes to tolerance, however, project managers take a more neutral, perhaps even tolerant, stance. According to the average viewpoint, which is more pessimistic and less accepting of s, we have a negative disposition. When the cost or loss is negligible, neutrality is assumed. Tolerance levels of individuals and institutions can be difficult to ascertain in most contexts. This means that we need to resort to more elementary approaches when determining permissible bounds. Determine the appropriate level by weighing the costs and benefits. The major goal of the project is to maximize the overall benefit while lowering the total expense. The overall cost takes into account the likelihood and severity of failure(Ahbab 2019). The RII test on survey responses is primarily used to identify the influence of variables by giving a value to each variable. To determine the relative importance of the many criteria indicated as being critical to the successful completion of projects, this research set out to analyze them. The total of each respondent's scores is used to compute the factor's score. The equation below was used to compute RII.(Ankit Vishwakarma et al. 2016):

	$RII = \sum (PiUi)/Nn$	(1)

RII = relative importance index

Pi = respondent’s rating of

Ui = number of respondents placing identical weighting/rating on the

N = sample size people responded to the survey

n = the highest attainable score for each

5. RESULTS AND DISCUSSION

The percentage scoring approach mentioned earlier in this study was used to determine the importance of the hazards. To identify all factors associated with project operations, a thorough methodology is required. Table 1 shows the results for the top five most important factors that cause the scheduling delay.

Table 1. The Selected Scheduling Delay Factors

1	Underestimation of project duration due to lack of experience and unforeseen conditions.
2	Slow in taking critical decisions.
3	The financial ability of the contractor to continue working with owner's delay in payment.
4	Lack of resources.
5	Delays in materials delivered to the site.

Based on the expert's opinions, the working factors have been specified and the evaluation the next sections.

5.1. RII Results

Relative importance index analysis is a technique for prioritizing indicators assessed on Likert-type scales that allows for the identification of the majority of important criteria based on participant replies. To establish their relative significance, the criteria were sorted using a relative index analysis. The relative index analysis ranking findings for each region are provided in the tables in the following sections. As a consequence of these ranking results, five factors were recognized as having high priority levels in the assessment of projects based on scheduling impacts. The relative importance index, or RII, was created for each problem to detect variables in schedule projects. The obtained RII values were used to rank these factors.

Table 2. RII of Factors respond scoring in scheduling the construction project

factor	samples summation	RII
Underestimation of project duration due to lack of experience and unforeseen conditions.	25	0.68
Slow in taking critical decisions.	25	0.728
The financial ability of the contractor to continue working with owner's delay in payment.	25	0.696
Lack of resources.	25	0.688
Delays in materials delivered to the site.	25	0.848

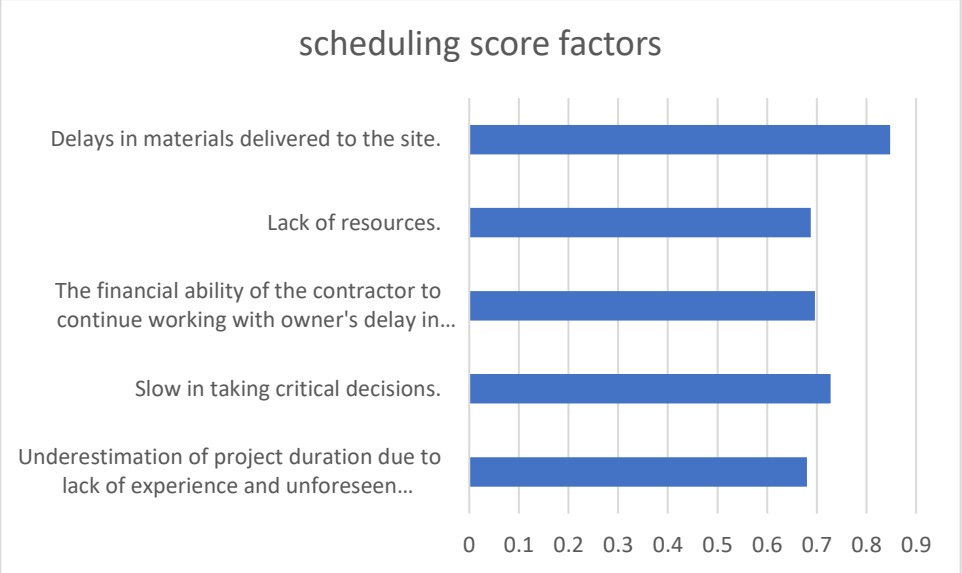

Figure 1. The RII Score factor results

The delays in materials delivered to the site rank came up on top, as can be shown (84.8 percent). To avoid any potential delays in material delivery, the Main Contractor must take early control of the material suppliers. This is because, in general, failure to manage Contractor's Risk events will force to drive projects badly, resulting in large damage and losses to the Main Contractor. Unreasonably Despite the Contractors having clear visibility on the expected material delivery via maintaining a schedule in excel, they often tend to fail in order to do a proper follow-up on scheduled deliveries, and only become aware when the work is ready to be performed but the material is not on-site. This is a risk event for the Employer. The second delay reason is the Slow in taking critical decisions with score of (72.8%). The questionnaire of these two factors evaluated the delay time in small projects s shown in figure 2.

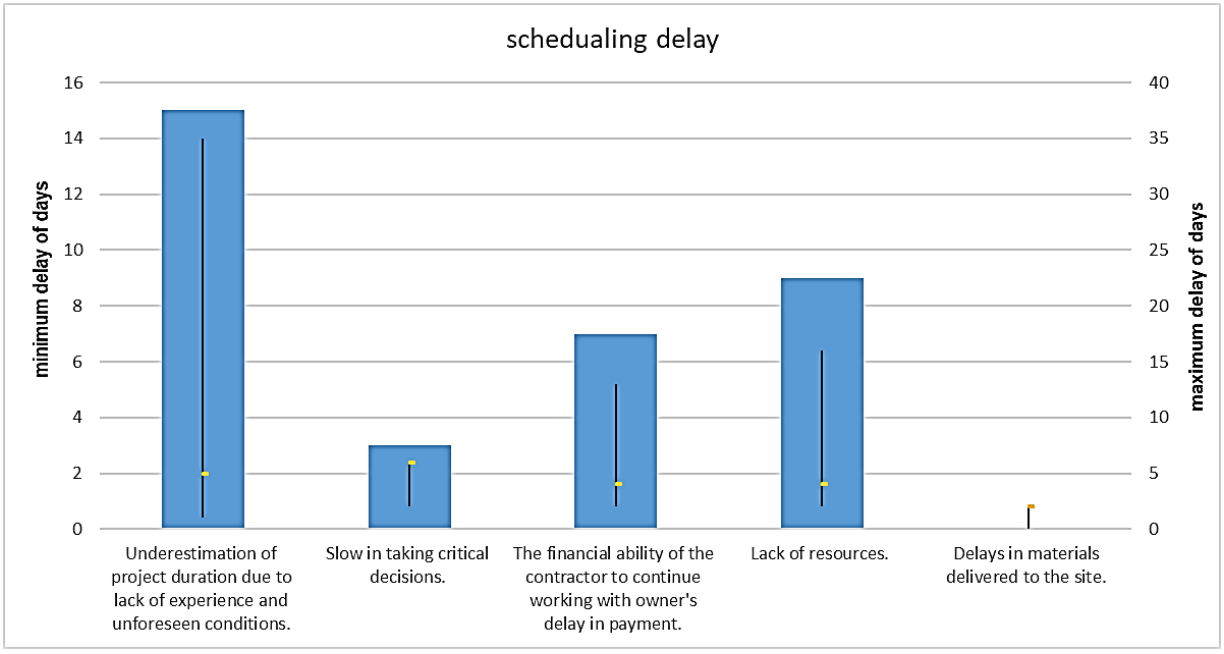

Figure 2. The Delay time (days) of the small projects due to the effective factors

Based on the time delay of each factor, the project schedule developed to contain a list of required material and the required time to order the materials as shown in figure 3..

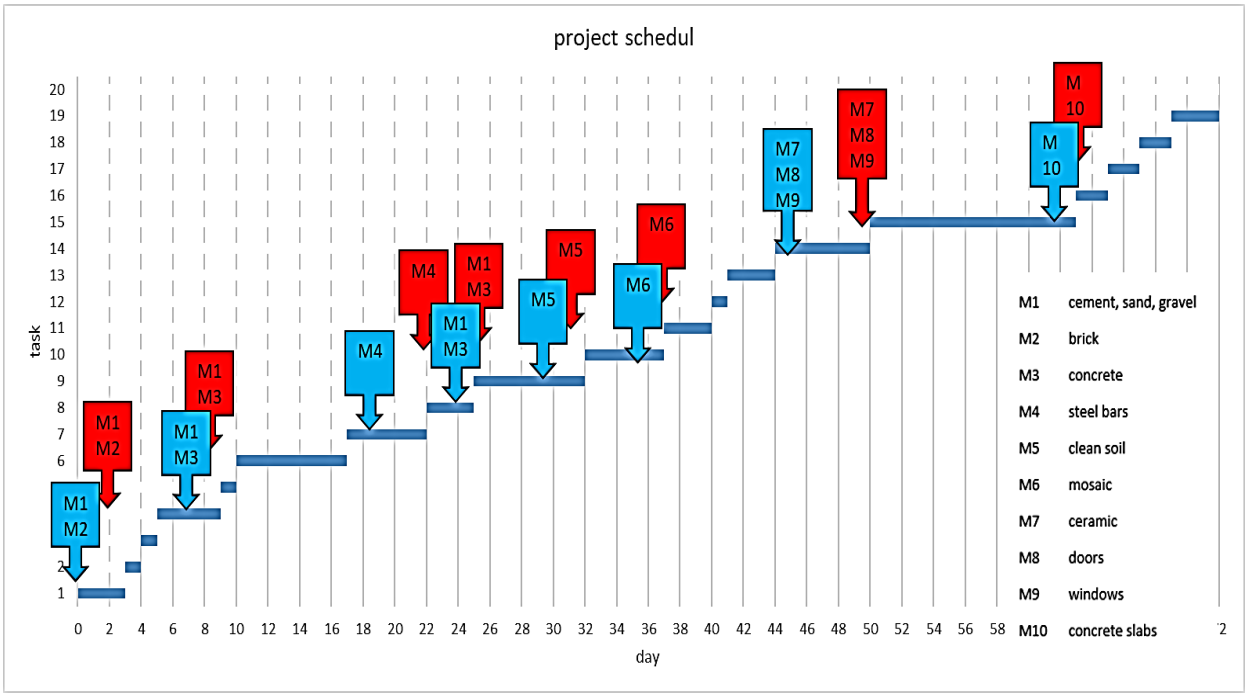

Figure 3. The Developed agile approach project schedule

It can be seen that the blue sign represents the suitable time to order the materials, and the red sign is the dead time. Each sign position contains the material symbol and the list of materials fixed in the corner.

6. CONCLUSION

The goal of this study is to develop a method for scheduling the project for construction field in Iraq by developing a model that may assist projects managers to avoid the delays in projects. The following methods and processes were used to attain this goal:

1) a surveys and the opinions of experts in projects were used to assess effective aspects and the degree of their influence, as well as interviews with experts and exploratory research from prior studies. A total of 5 different categories of influencing projects were chosen.
2) There were many steps required in creating an RII model, the first of which was selecting the program that would be used to generate the model. The Microsoft Excel tool for basic assessment and the Microsoft Excel software were chosen to determine the degree of effect of each category due to of their ease of use and ability to make conclusions.
3) The results observe a significant schedule chart contains the time of each task in project and the time of required material order.

7. REFERENCES

Ahbab, Changiz. 2019. "An Investigation on Time and Cost Overrun in Construction Projects An Investigation on Time and Cost Overrun in Construction Projects." *East Mediterranean University* (April):1–170.

Ankit Vishwakarma, Ashish Thakur, Sushant Singh, and Ashwini Salunkhe. 2016. "Risk Assessment in Construction of Highway Project." *International Journal of Engineering Research And* V5(02):637–41. doi: 10.17577/ijertv5is020515.

Asal, Emad Mohamed. 2014. "Factors Affecting Building Construction Projects Cost Estimating." *Arab Academy for Science, Technology and Maritime Transport (AASTMT)* 95.

Bansal, V. K., and Mahesh Pal. 2011. "Construction Projects Scheduling Using GIS Tools." *International Journal of Construction Management* 11(1):1–18.

Bari, Nor Azmi Ahmad, Rosnah Yusuff, Napsiah Ismail, Aini Jaapar, and Rizan Ahmad. 2012. "Factors Influencing the Construction Cost of Industrialised Building System (IBS) Projects." *Procedia - Social and Behavioral Sciences* 35(December 2011):689–96. doi: 10.1016/j.sbspro.2012.02.138.

Bukłaha, Emil. 2017. "Project Controlling in the Adaptive Perspective of Project Management." 1(1):8–17.

Chau, Kwok Wing, M. Anson, and J. P. Zhang. 2003. "Implementation of Visualization as Planning and Scheduling Tool in Construction." *Building and Environment* 38(5):713–19.

Khalilzadeh, Mohammad, Hedieh Shakeri, Hadis Gholami, and Leila Amini. 2017. "A Heuristic Algorithm for Project Scheduling with Fuzzy Parameters." *Procedia Computer Science* 121:63–71. doi: 10.1016/j.procs.2017.11.010.

Kishan, Patel & Bhatt, Dr. Rajiv & Bhavsar, Prof. J. J. 2014. "A Study of Risk Factors Affecting Building Construction Projects." *International Journal of Engineering Research & Technology* 3(12):831–35.

Klanšek, Uroš, and Mirko Pšunder. 2010. "Troškovna Optimizacija Terminskih Planova Za Vodenje Projekata." *Ekonomska Istrazivanja* 23(4):22–36. doi: 10.1080/1331677X.2010.11517431.

de la Cruz López, María Pilar, Juan José Cartelle Barros, Alfredo Del Caño Gochi, and Manuel Lara Coira. 2021. "New Approach for Managing Sustainability in Projects." *Sustainability (Switzerland)* 13(13):1–27. doi: 10.3390/su13137037.

Management, Project. 2020. "Assessment of Risk Factors to Cost And." *CTBUH Journal* (Iii):28–36.

Olawale A. Yakubu and Sun Ming. 2010. "COST AND TIME CONTROL OF CONSTRUCTION PROJECTS: INHIBITING FACTORS AND MITIGATING MEASURES IN PRACTICE Yakubu Adisa Olawale, Ph.D., MCIOB and Ming Sun, Ph.D. (Professor)." *Construction Management and Economics* 28(5):509–26.

Özdemir, M. 2010. "A Probabilistic Schedule Delay Analysis in Construction Projects By Using Fuzzy Logic Incorporated With Relative Importance Index (Rii) Method." (July).

Padickakudy, Martin. 2019. "Evaluating the Importance of Sustainability in the Project Management."

Poku, Stephen E., and David Arditi. 2006. "Construction Scheduling and Progress Control Using Geographical Information Systems." *Journal of Computing in Civil Engineering* 20(5):351–60.

Ribeirinho, Maria João, Jose Luis Blanco, Jan Mischke, David Rockhill, Erik Sjödin, Gernot Strube, Rob Palter, and Timmy Andersson. 2020. "The next Normal in Construction." *Mckinsey & Company* (June):84.

Sanaz Tayefeh Hashemi, Omid Mahdi Ebadati, Harleen Kaur. 2019. "Cost Estimation and Prediction in Construction Projects: A Systematic Review on Machine Learning Techniques." 1–27.

Sharma, Sunil, and V. K. Bansal. 2018. "Location-Based Planning and Scheduling of Highway Construction Projects in Hilly Terrain Using GIS." *Canadian Journal of Civil Engineering* 45(7):570–82.

Williams, Teakon J. 2020. "Relationships Between Cost Estimates, Scheduling and Project Success in the Construction Sector." *ProQuest Dissertations and Theses* 174.

Xie, Linlin, Yajiao Chen, and Ruidong Chang. 2021. "Scheduling Optimization of Prefabricated Construction Projects by Genetic Algorithm." *Applied Sciences (Switzerland)* 11(12). doi: 10.3390/app11125531.

Zhou, J., P. E. D. Love, X. Wang, K. L. Teo, and Z. Irani. 2013. "A Review of Methods and Algorithms for Optimizing Construction Scheduling." *Journal of the Operational Research Society* 64(8):1091–1105. doi: 10.1057/jors.2012.174.