

Effects of Time Pressure on Decision Making Process and Outcomes in Construction Projects

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Abstract

Decision making is one of the most important, difficult, and sensitive issues in management. Given the role and importance of managers in managerial decisions, many of these decisions are made under time pressure. Time pressure in decision making has been studied in various psychological studies, and research shows that this factor often influences decision-making processes and outcomes in detrimental ways. The study of this factor is one of the topics that has not been adequately investigated in the project management field. Thus, this study explores the effects of time pressure on the process and decision-making results in construction projects. In this study, four items, including time, cost, project scope, and employer acceptance have been introduced as effective components. The results show that decision making under time pressure of project managers significantly impacts their effective decision making and considerably increases their psychological stress. The results of this study can provide some general strategies to handle various in prompt situations and improve the decision-making process under time pressure for managers in the construction industry and provide.

Key Words: Decision Making; Time Pressure; Effective Factors; Project Management

1. Introduction

Decision making is one of the issues that managers frequently face in performing their duties. Time in decision making is also an important issue and is the subject of numerous studies in various fields [1]. Time is an important and minor factor that is present in all human activities and is increasingly becoming an important factor in making business decisions. The need to process large amounts of information over a short period of time has a definite effect on the decision-making process and decision quality [2]. According to studies conducted by researchers, time pressure affects human judgment and decision making in different situations, and they introduce it as an external stressor [3]. The effect of time pressure on key managerial responsibilities, such as decision-making, has received little attention and is a common constraint in many real-world decisions [4]. Decision making under time pressure or instantaneously leads to quick decision making. The project manager works with the project team and other stakeholders to

identify and use generally well-known solutions for each project. In fact, the project manager is a person appointed by the executive body to lead the team responsible for achieving the project goals [5]. One of the most common project management challenges is determining whether a project has been successful. Today, the definition of project success has changed, including the completion of the following [6]:

- Within the allotted time
- As much as the budget costs
- In proper operation or specified level
- With customer/user acceptance
- With minimal or mutually agreed domain changes

- Without disrupting the main workflow of the organization
- No change in organizational culture

Managers' decision making has an important role in the success of the project, and it can be called effective decision making of managers, so these cases are mentioned as effective factors in time pressure decision making in this research. The time pressure variable can influence managers' decisions at different stages of the project and therefore affect the effective factors.

The purpose of this study is to investigate the effect of time pressure on effective factors, effective status, and use of techniques, tools, selection of strategies, or their combination when making decisions in construction projects. Due to the nature of this industry, managers are expected to pay more attention to their immediate decisions in different stages of project implementation and success, which will lead to the survival and development of the organization and, ultimately, economic prosperity. The research question that this article intends to answer is whether the decisions of project managers under time pressure in construction projects affect their effective decision making and effective factors. The important findings of the literature of this research are as follows.

2. Literature review

There are three conditions for time pressure to occur:

1) Decision making time: The necessary condition of a period is defined in which a decision must be made. The person or persons making the decision should be aware that failure to meet the deadline will lead to serious problems. 2) Sensitivity: Decision-making sensitivity is a problem that causes time pressure. Because people have different biological natures and cognitive characteristics, their sensitivity level is different. 3) Problem severity: Problem severity refers to the subjective assessment of the importance of the problem from the decision-maker's point of view, not to the content of the problem subject to a decision [7].

Time pressure is a period of time for which decision time is limited [8]. A time limit is a period of time that is determined and limited by a specific period of time. "Deadlines, primarily in terms of long-term constraints over time use, based on effects that build up over many minutes or more" [9]. In this research, the terms time limits and time constraints are subsets of time pressure and are used with the concept of time pressure.

2.1 The effect of time pressure on decision making

Time pressure is both general and selective. Under time pressure, the whole decision-making process takes place within a time-limited framework. Selective time pressure occurs when the time constraint available to the decision-maker at a particular stage of the decision-making process is known [7]. Hwang introduces

time pressure as an important factor because he believes that most managers need to make quick decisions and adds that, decision making can be influenced by time pressure. He considers the role of information systems to neutralize the negative impact of time pressure on the choice of decision-making strategy and performance [1]. Under conditions of time pressure, a certain amount of information has too much effect. As the right amount may increase the quality of choice. on the other hand, too much information may lead to the effect of overloading information and reducing the quality of decision making [10]. An effective condition is a condition in which the pressure of time creates the condition for a change in the emotional nature of the decision-maker. The effect of time pressure on decision making has been done on three broad factors: effective conditions, information processing strategy, and how the work is done. Deadlines not only create a sense of time pressure but also bring about wider changes in the effective situation [8]. As Svenson and Edland indicate that severe time pressure may increase the level of arousal and psychological stress. Hockey argues time pressure as a factor in changing the emotional state of the decision-maker [9].

Laboratory-based research shows that time pressure often affects decision-making processes and outcomes in detrimental ways [11].

When time is short, there is a tendency to make early decisions without producing all the available options. Among the options that are immediately available, a superficial search of information among all the options is predicted during the time pressure [3]. Under time pressure, individuals prefer to have a relatively small amount of knowledge about all options rather than detailed information about some of them [8].

2.2 Decision-making strategies and rules

Strategies are the tools by which a company can achieve its long-term goals [12]. Choosing a limited time strategy is one way to deal with difficult deadlines. A cognitive strategy describes how people choose to select and process available information when they judge, make decisions, or solve problems [3]. Time constraints change cognitive strategy in decision-making and judgment situations [9]. Maule and Hockey proposed three broad approaches to macro-level descriptive strategy change, describing micro-level changes, and combining the two approaches [9].

Decision-making laws are divided into compensatory laws and non-compensatory laws [13]. Compensatory rules have integrated advantages and disadvantages so that the defects in an option can be compensated with the advantage of the same option. An example of non-compensatory rules such as "Choose the alternative that is better on the most important attribute" and "Choose the first alternative available that is acceptable on a certain attribute". Most decision-making strategies include both non-compensatory

decision rules in the beginning and compensatory decisions at the end. Thus, "time pressure leads to increased use of non-compensatory decision rules" [3]. Only four of Miller's seven micro-strategies, including filtering, omission, acceleration, and relying on intuition, have been examined in time pressure research [9]. The effects of time pressure on information processing strategy showed that people use both filtering and acceleration strategies to adapt to time pressure so that they have a significant negative correlation [8]. "Working faster moderates the relationship between time pressure and irritation. The positive effect of time pressure on irritation is significant only on days when the strategy working faster is increasingly used. Working longer only moderates the relationship between time pressure and work engagement" [14].

Decision-making under time pressure reinforces routine maintenance, as these routines are based on habits that have been reinforced in the past. Strategies based on intuition involve these automated processes, as opposed to controlled processes such as conscious decisions [15].

2.3 Decision making and normative theories

A complete normative or logical model of decision making consists of seven steps: 1) Problem identification 2) Problem definition 3) Identification of causes 4) Development of options 5) Evaluation of options 6) Execution of selected option 7) Evaluation of results and process used [16]. Time pressure is a major factor that causes real decision-making processes to deviate from the normative model [7].

2.4 Risky decision makings under time pressure

"Time-pressure affects risk-taking and that the nature of this effect varies with task structure. From this, we may conclude that regardless of how individuals adapt to time-pressure, risk-taking is not affected so long as the strategy is successful in terms of making a decision within the time allowed. If this is not the case, then there is a change in risk-taking in the direction of increased risk aversion" [8]. "Time pressure led to increased risk attractiveness in a gain domain and decreased probability discriminability in a loss domain. These findings point to multiple cognitive processes involved in decision making that may be differentially influenced by time pressure" [17]. Excitement and time pressure are two important factors in risk decision making. In general, positive emotion puts people at greater risk than negative emotion, and people in high time pressure are more likely to take risks than not in time pressure. Thus, time pressure polarizes the effects of different emotions on decision-making risk [18].

2.5 Decision making and weight of features under time pressure

People under time pressure place more weight or more importance on the more important feature [13].

2.6 The effect of time pressure on judgment

According to a study by Edland and Svenson, the first study of the effects of time pressure was published by Wright in 1974. He showed that people under high time pressure changed their strategy to give more weight to the negative aspects. They found that the accuracy of human judgments decreases under time pressure [13]. Time pressure has significant effects on human judgment [19]. The quality of decision-making depends not only on human judgment, but also on the pressure created by time constraints [20]

2.7 Time pressure and stress

Stress is a perceived psychological, physiological, and behavioral response to threats that can thus not be controlled by the human will [21]. Stress can be experienced when there is a sharp time difference between what one wants to do and what one can do before it is over [3]. Stress is a process by which specific job demands are summoned, an assessment in which perceived demands outweigh resources. The ability to cope with stress depends on personal perception or interpretation of an event [22]. Time pressure can be used as a stressor, while the level of perceived mental stress is significantly associated with an increase in heart rate during the work solution [21]. Time pressure is related to stimulation and sometimes to other types of stress that can enhance the feeling of time pressure and time stress in one situation [3]. Time stressors are often the biggest source of stress for managers. Excessive workload and lack of control are the biggest sources of time stress for managers [23].

2.8 Decision making and stress

Stress affects every stage of the decision-making process and understanding the decision-making process in stressful situations can provide more insight into decision-making and may increase awareness of the sources of potential harm to managers when making decisions [24].

3. Research method

The present research is based on the purpose of applied research and is descriptive in nature. The type of quantitative method used in this research is a survey method that aims to describe the situation or attitude [25] so that by using the research of various researchers in the field of time pressure in decision making to study this impact on the process and decision results of construction projects. It is a questionnaire that takes into account the effective factors and individual differences of project managers. After analyzing them, the results are obtained according to the effect of the decision-making under time pressure of project managers on each of these factors.

The statistical population of the present study consists of construction projects in Iran in which project managers are active

and are focused on construction projects, transportation, water and sewerage, tourism and urban services. Because their number is limited and they can be transferred or participate, they have more ability to be transferred to the non-governmental sector. Following the research carried out by the government on the transfer of projects to the private sector and the survey of personnel working in these companies, an estimated 510 projects.

To calculate the sample size, Cochran's formula has been used, in which the allowable error d is 0.1, the reliability coefficient is 0.95 equal to 1.96 and the values of p and q are considered 0.5. Thus, the statistical sample of this research is 81 samples, which due to the limited access to project managers and also to ensure the results of the research, 121 questionnaires have been completed by qualified individuals. Statistical sampling of this research is a type of judgmental sampling and according to the category of decision making that takes place in different conditions and stages of the project, project managers and people who have the position of deputy project manager, project executive manager and generally people who the decisions of the organization or project are effective and are considered as decision makers in the project. They are considered as part of the statistical population of this research.

Data collection of the present study consists of two parts that can be done and used in both virtual and real space, which are:

- Library Studies

According to the research topic with the fields of management and psychology to compile the basics, definitions, theoretical concepts and literature review of the research topic and research records mainly are extracted from articles, books, and dissertations that are searched in the Internet, libraries, digital libraries, resources, and databases.

- Field research

In order to collect information and measure research variables, a questionnaire with closed questions was used. In order to implement the questionnaire and collect information and identify project managers, by referring and communicating with project management organizations, engineering system, and also companies active in the field of construction projects and buildings in order to complete the questionnaire, the following methods have been used:

By the questioner: By referring directly and in-person to the respondent to talk and ask questions, the answers have been received.

By the respondent: The answers were received by distributing the questionnaire sheets to the respondents.

E-mail: Questionnaire in cyberspace via email, membership in

specialized groups in social networks, the questionnaire link has been provided to managers.

The questionnaire consists of four main parts. The first part deals with personal characteristics. The second part is divided into effective factors in decision making in three general parts: information and decision making - time pressure and stress - time pressure and prioritization. The third part deals with individual differences in decision making and the fourth part includes questions to test research hypotheses. The impact of decision making under time pressure of project managers on each of the factors: time, cost, project efficiency, project employer acceptance, project scope, main work of the organization and corporate culture have been examined and to answer them, the attitude scale has been used in the form of a Likert scale with five options, which are very low, low, medium, high and very high, respectively, with a value of 1 to 5.

The sources of the second part of the information and decision-making question include the topics that various researchers have addressed in their articles [1], [13], [10]. Questions about time pressure and stress are also among the articles presented by various researchers: [8], [24], [13] and the sources of the questions in the third section based on the opinion of psychologists has been raised in this regard.

Sources The questions in the fourth section are based on the sources in the PMBOK Guide. Project time is based on project scheduling management processes: scheduling, the sequence of activities, duration of activities, and control of project schedule. Project cost management includes cost planning, budgeting, and project cost estimation. Project efficiency includes guiding, managing, supervising, and controlling project work. Employer acceptance is based on project stakeholder management processes that include: stakeholder identification, stakeholder planning, and interaction management. Project scope based on area management processes includes: scope management plan, validate and control scope. The culture of the organization has considered the environmental factors within the organization, which include: governance, structure, and organizational culture, and the main work of the organization has considered the environmental factors of the organization according to the organization's resources, staff capabilities, and market conditions.

In this research, in order to check the relevance and applicability of the survey expert judgment from a group of project management and psychology professionals was used. In determining the validity of the questionnaire from the content validity method, after designing it with 71 questions, the questionnaire was distributed among 14 experts, and according to necessity, it was classified into necessary, useful, and unnecessary or not necessary, so that the items were related. Using the content validity ratio formula of CVI and CVR, the validity was assessed for each of the questions

and thus their validity was ensured. Finally, the questionnaire was approved with 57 questions related to the research hypotheses.

In this study, to calculate the reliability of the questionnaire, Cronbach's alpha coefficient with $\alpha=0.92$ shows that the questions of the questionnaire have good reliability [26].

4. Results

In order to analyze the data of this research, first, the descriptive data are examined so that time pressure as an independent variable and effective factors in decision making (1. Project implementation time 2. Cost allocated to project 3. Project efficiency 4. Employer acceptance 5. Scope of project changes 6. Main work of the organization 7. Culture of the organization) are considered as dependent variables and with the help of frequency distribution, fashion and average obtained from the data to describe and examine each of the factors affecting the components, the results are obtained according to the degree of effectiveness of each of them.

4.1 Descriptive study of individual characteristics

Due to the presence of male professionals in the country's projects, about 90% of the respondents were men. In terms of frequency distribution, the majority of respondents aged between 31 to 40 years were equal to 56.3%. The highest percentage of work experience group was 11 to 15 years, with 30%. As the largest number of personnel working in their projects between 1 to 25 people and as a project manager with 35% have the highest position compared to other responsibilities. 63.6% of all people are members of the Iranian Construction Engineering Organization, of which 68.8% are in the field of civil engineering, 18% in architecture, 10% in mechanics, traffic and electricity, and 1% each are members of this organization. The level of familiarity of the respondents with the Project Management Institute (PMI) with 81.8% indicates the greater expertise of people in the field of project management and related to the subject of this research.

4.2 Descriptive study of individual differences in decision making

Based on the results of the data, the majority of respondents with 39% considered the available statistics and information to be more effective in their decision making. The available evidence and information, including the most practical method in decision-making with 36% and in important decisions with 54% in the opinion of project managers. In this study, managers with a majority of 40% based on their understanding of the situation, make their decisions in stressful situations, and in decision making under time pressure, a majority of people with 38% believe that they are calm and focused even when there is a lot of pressure.

4.3 Descriptive study of influential factors in decision making

- Information and decision making

In this study, the very high impact of information at 47% in managers' decisions shows its importance, impact and also its application. The role of information systems with 51% (Figure 1), more accurate use of information with 46% (Figure 2) and also excessive information load with 33% show their importance to have information, even too much or too much many have been evaluated as effective in decision making under time pressure of managers.

- Time pressure and stress

Setting deadlines with a high impact of 55% stimulates the feeling of time pressure more for project managers (Figure 3), so that this feeling with a high impact of 45% increases their level of arousal and psychological stress (Figure 4). But making decisions in stressful situations also greatly increases their 40% awareness of the resources or circumstances that may cause potential damage to the project.

- Time pressure and prioritization

Half of project managers believe that their decisions under time pressure by as much as 50% lead to a change in their prioritization. Based on these results, immediate decisions can lead to the priority and delay of activities, change the timing of activities and even create stress in project planning.

4.4 Descriptive study of decision-making under time pressure of project managers on effective factors

- Descriptive study of the effective factor of time in decision-making under time pressure of project managers

The majority of managers (47%) believe that their decisions under time pressure have a significant impact on the project schedule, and 45% report that this amount of impact impairs the sequence or order of project activities. The effect of their decisions under time pressure greatly leads to a 44% increase in activity time, a 51% neglect of activity time estimates, and a 45% delay in requesting project changes.

- Descriptive study of the cost-effective factor in decision-making under time pressure of project managers

The results of the effect of managers' immediate decision-making are 53% on cost planning, 36% on the allocation of sufficient resources and 43% on the deviation from the budget allocated to the project. Due to the impact of cost planning and the use of more resources, which ultimately leads to deviations from the set budget, the cost of project implementation will also increase.

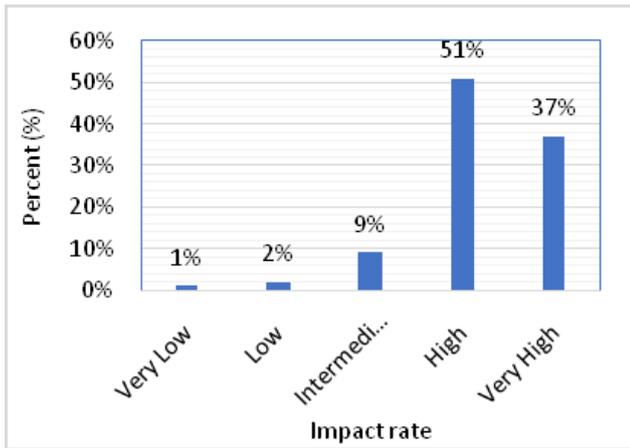


Figure 1: Impact of information systems on decision making under time pressure

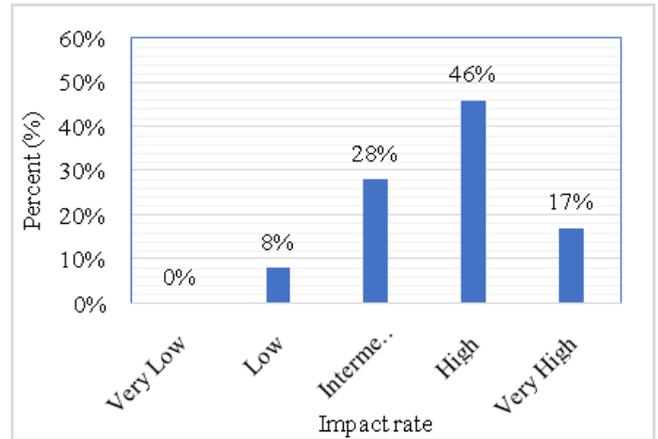


Figure 2: The rate of more accurate information search in decision making under time pressure

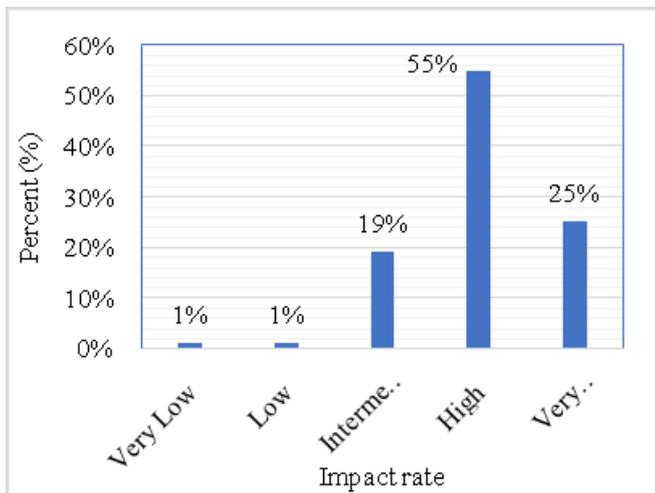


Figure 3: Impact of time limits and feeling of time pressure

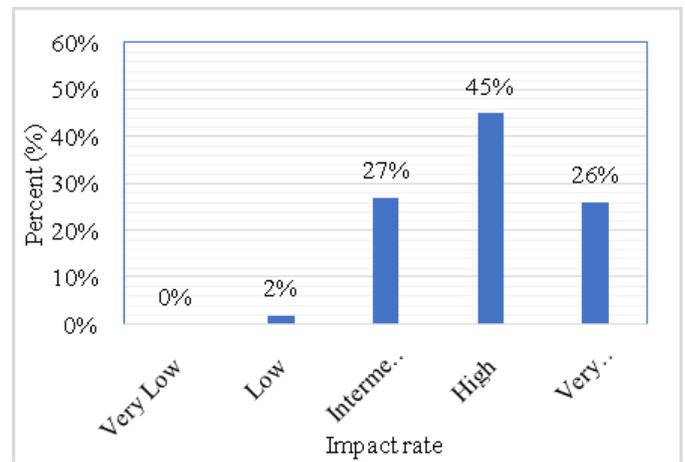


Figure 4: The effect of time pressure on psychological stress and arousal level

- Descriptive study of the effective factor of appropriate efficiency in decision-making under time pressure of project managers

In this study, most project managers control their stress by 51% for better project performance when making under time pressure decisions. Their immediate decisions have an average to 35% impact on changing project specifications and a 51% reduction in project efficiency, but they believe that their immediate decisions provide a high 43% completion rate of the project so it does not damage the project.

- Descriptive study of the effective factor of the employer in decision-making under time pressure of project managers

Project managers largely take into account 36% of the employer’s interests and expectations in immediate decision making, but these decisions provide a high 40% impact on the employer’s lower benefits and productivity, and an increasingly high 39% impact on undermining the employer interaction.

- Descriptive study of the effective factor of scope changes in decision-making under time pressure of project managers

In this study, project managers evaluated their usual decision-making with a high impact of 46% change in project scope. Their immediate decision is 52% change in project scope, 50% in employing inexperienced contractors - selecting inappropriate materials and equipment to carry out the project, 53% in reworking some activities, 44% delay in project deliverables and 53% of correctional or preventive measures were obtained in the project.

- Descriptive study of the effective factor of the main work of the organization in decision-making under time pressure of project managers

In this study, the immediate decisions of project managers 45% have a great impact on the misallocation of organizational resources and with an increasing average of 39% leads to the loss of expertise, so that both are the resources and capabilities of the organization.

Values of 41% show the high impact of not meeting the financial goals of the organization and the increasing average, creating problems in the competitive environment of the organization.

- Descriptive study of the effective factor of organizational culture in decision-making under time pressure of project managers

In this study, the high impact of organizational culture on the usual decision-making of project managers with 54% shows that most of them make decisions within the framework of organizational culture, but in immediate decisions based on the results 42% change in organizational culture, non-compliance or Ignoring the hierarchy of the organization, which is one of the pillars of the culture of any organization, has been approved by 40%, leaving the limits and powers of the organization with a high impact of 41% and interfering with different parts of the organization with an increasing average of 36%. The effect of these factors on each other can also damage the relationships between project managers inside the building, as this effect is also reported to be a high 35%.

4.5 Calculating the correlation between research variables

Due to the normality of the variables in this study, Pearson correlation test was used. Pearson correlation coefficient is used to determine the relationship, type and direction of the relationship between two distance and relative variables or a distance variable and a relative variable.

- Investigating the relationship between work experience variables with each of the components of influential factors in decision making

In this study, no significant correlation was found between the work experiences of individuals with any of the component questions: information and decision making, time pressure and stress, time pressure and prioritization.

- Investigating the relationship between work experience variables with each of the components of effective factors

According to the obtained data, a significant relationship between the work experience of individuals with each of the components of cost, time, project efficiency, employer acceptance, project scope, main job and culture of the organization has not been obtained.

- Investigating the relationship between personnel number variables with each of the components of influential factors in decision making

The results of the data did not show a positive and significant correlation between the number of staff and each of the component

questions: information and decision making, time pressure and stress, time pressure and prioritization.

- Investigating the relationship between personnel number variables with each of the components of effective factors

In the correlation test, no positive and significant relationship was found between the variables of number of staff with each of the components of cost, time, project efficiency, employer acceptance, project scope, main job and culture of the organization.

- Investigating the relationship between personnel number variables and work experience

In this study, a positive and significant correlation between these two variables shows an average of 0.309 that with increasing work experience, the number of their staff has also increased, but this correlation is not strong.

5. Discussion

The results of a descriptive study on each of the factors influencing instant decision making according to the opinion of project managers show that all these factors were greatly affected, which shows the high impact of instant decision makers in development projects on the effective factors of this study. Therefore, the hypothesis of this research is confirmed. Considering the effect of factors affecting the project time in a descriptive review of the obtained data showed that decision-making under time pressure of project managers have a great impact on the time allotted to the project, its implementation cost and the scope of changes or project scope. A descriptive study of the factors affecting the employer's acceptance in the immediate decisions of project managers showed that more than 60% of the employer's acceptance factors were greatly affected. Therefore, decisions under the pressure of time of project managers in construction projects do not seek the acceptance of the employer.

Factors influencing decision making under time pressure in this study showed that managers need a lot of information in decision making so that the use of information systems, the use of more accurate and even additional information has an important role in their immediate decisions, so the use of user-friendly and accessible information systems easy can guide managers in immediate and optimal decisions more effectively. By setting deadlines, managers perceive more time pressure, and managers' levels of psychological stress increase. Since time commitment is one of the most important commitments of any project, as a result, the effect of time pressure on stress and stressors increases. While increasing the level of stress, managers' awareness of the damaging aspects of decision making also increases. Immediate decisions have a great impact on changing the priorities of managers, so it can affect the schedule of project implementation (such as: changing the time of activities,

latency and priority of activities and even the tightness of project planning).

In this research, project managers consider statistics and information as the most effective decision-making cases, which shows the application of lessons learned and available information. Evidence and information are considered to be the most practical and even important method in decision making, which directly refers to project documentation and the importance of information. As in stressful situations, they make decisions based on their understanding of the situation. In instantaneous decisions, they maintain their focus and calmness despite the high pressure, which is a sign of the background and experience of the managers, which has been obtained in this study.

6. Conclusion

Given that in this study, regardless of corrective or preventive measures and fulfillment of change requests has been achieved to a large extent in decision-making under time pressure of managers, the project requires integrated change control that will be created by change requests. Change requests are actually a formal proposal to modify any document, deliverable or project baseline. Demand requests can be made when issues are found at the same time as the project work, which may lead to modifications to the project's procedures or policies, project or product scope, project budget or cost, project schedule or project quality, or project results. Change requests are processed through integrated change control, and any project stakeholder can request a change. The ultimate responsibility is to control the integrated change of the project manager. The change request is processed by the project manager and the Change Control Board (CCB). This authorized group is responsible for reviewing, evaluating, approving, suspending or rejecting project change requests and registering and notifying change decisions.

Change requests are scheduled and implemented by the project team and can affect any area of the project or project management plan. It also modifies project documents or project management plan components. Therefore, changes are controlled from the beginning of the project to the end of the project.

According to the results of decision-making under time pressure of project managers on each of the different factors and stages of the project and the use of information and information systems that in this research have been greatly supported in supporting project managers in this type of effective decision-making, use of information management tools and techniques for example, lessons learned, user-friendly Decision Support Systems (DSS) and Project Management Information Systems (PMIS) with easy access, as well as continuous monitoring and control of the project manager throughout the project are effective solutions. Continuous monitoring by the project manager ensures the health of the project

and identifies any areas that require special attention. Therefore, adapting the project management plan to the project can affect the project from the occurrence of many changes, risk or application of time, cost or reduce the performance of the project and the project will move in line with the needs of the business.

Current research necessitates the use of people who are responsible for decision-making in construction projects. However, due to the role of project managers as responsible people in decision making, easy access to these people as the only respondents in this study was not possible, so the use of people who are involved as decision makers regardless of their positions in project decision making has been used.

Limitations of project management knowledge, information, access to resources and consideration of factors that can be better used in research due to managerial experiences, are among the limitations of this research.

- In this study, the effect of time-pressure on decision making process and outcomes in construction projects was discussed. It is suggested that the effect of time-pressure on decision making process and outcomes on other projects such as urban projects be studied and researched.
- Considering the impact of time-pressure on decision making process and outcomes in different projects in order to compare between projects such as: high-level projects and industrial projects, their effectiveness can be evaluated.
- Considering the possibility of implementing projects with the private and public employer sector, a comparison can be made between the effect of time-pressure on decision making process and the results of project decision making with the private employer and the public employer.
- Despite the impact of performance indicators in each project, which are the criteria for the success of each project, these performance indicators can be compared between instantaneous decisions and routine project decisions.

References

1. Hwang Mark I. Decision making under time pressure: A model for information system research. *Information & Management*. 1994;27(4):197-203.
2. Smith CAP, SC Hayne. Decision making under time pressure an investigation of decision speed and decision quality of computer-supported groups. *Management Communication Quarterly*. 1997;11(1):97-126.
3. Svenson O, A Edland. On judgment and decision making

- under time pressure and the control of process industries. Nuclear Power Safety, Risk Analysis and Decision Research Unit Department of Psychology Stockholm University. 1993;367-375.
4. Madan CR, Spetch ML, Ludvig EA. Rapid makes risky: Time pressure increases in decisions from experience. *Journal of Cognitive Psychology*. 2015;27 (8):921-928.
 5. Project Management Institute. Translator: Zakai Ashtiani, Mohsen. Project Management Body of Knowledge Knowledge (PMBOK), Adineh, Tehran. 2017:1396.
 6. Kerzner Harold. A System Approach to Planning, Scheduling and Controlling. John Wiley & Sons, Inc., Hoboken, New Jersey, Published simultaneously in Canada. 2003.
 7. Kenny GK, DJ McQuade. Effects of time pressure on decision-making. *Journal of Management in Engineering*. 1987;3(4):303-307.
 8. AJ Maule, GR Hockey, L Bdzola. Effects of time-pressure on decision-making under uncertainty: Changes in affective state and information processing strategy. *Acta Psychol (Amst)*. 2000;104(3):283-301. doi: 10.1016/s0001-6918(00)00033-0
 9. Maule AJ, G Robert J Hockey. State, Stress, and Time Pressure. Time pressure and stress in human judgment and decision making. Svenson O, Maule J (Eds). New York: Plenum Publishing, 1993;83-101.
 10. Hahn M, Robert Lawson, Young G Lee. The effects of time pressure and information load on decision quality. *John Wiley & Sons, Inc*. 1992;9(5):365-378.
 11. Svenson O, AJ Maule. Time pressure and stress in human judgement and decision making. New York: Plenum Publishing. 1993.
 12. David Fred R. Strategic Management. Translator: Parsaian, Ali; Arabi, Seyed Mohammad, Cultural Research Office, Tehran. 1999:1396.
 13. Edland A, O Svenson. Judgment and decision making under time pressure. Time pressure and stress in human judgment and decision making, Svenson O, Maule J (Eds.). New York: Plenum Publishing, 1993:27-40.
 14. Beathge A, N Deci, J Dettmers, T Rigotti. Some days won't end ever: working and longer as a boundary condition for challenge versus hindrance effects of pressure. *Journal of Occupational Health Psychology*. 2018:1-11.
 15. Betsch T, S Haberstroh, B Molter, A Glockner. Oops, I did it again-relapse errors in routinized decision making. *Organizational Behavior and Human Decision processes*. 2004;93(1):62-74.
 16. Mintzberg Henry, Duru Raisinghani, Andre Theoret. The structure of unstructured decision processes. *Administrative Science Quarterly*. 1976;21(2):246-275.
 17. Young DL, AS Goodie, DB Hall, E Wu. Decision making under time pressure, modeled in a prospect theory framework. *Organizational Behavior and Human Decision Processes*. 2012;118(2):179-188.
 18. Hu Yixin, Dawei Wang, K Pang, G Xu, J Guo. The effect of emotion and time pressure on risk decision-making. *Journal of Risk Research*. 2014;18(5):1-14.
 19. Rothstein Howard G. The effects of time pressure on judgment in multiple cue probability learning. *Organizational Behavior and Human Decision processes*. 1986;37(1):83-92.
 20. Saleem R, Anwar UH Shah, Muhammad Waqas. Effect of time pressure and human judgment on decision making in three public sector organizations of Pakistan. *International Journal of Human Sciences*. 2011;8(1):701-712.
 21. Cingl L. Essays on decision making under stress. PhD diss, Charles University in Prague. 2016.
 22. Kowalski KM, C Vaught. Judgment and decision-making under stress: An overview for emergency managers. National Institute for Occupational Safety and Health. Pittsburgh Research Laboratory. 2003.
 23. Wheten David A, Cameron Kim S. Stress Management, Translator: Jafari Moghadam, Saeed, Management Research and Training Institute, Tehran. 1946:1384.
 24. N Atsan. Decision-making under stress and its implications for managerial decision-making: A review of literature. *International Journal of Business and Social Research*. 2016;6(3):38-47.
 25. Khaki Gholamreza. Research Method in Management. Islamic Azad University Publishing Center, Tehran. 2015.
 26. Sekaran Oma. Management Research Methods. Translator: Saebi, Mohammad; Shirazi, Mahmoud, Public Management Training Center, Tehran. 1992:1392.