

A critical success factors for software project manager in GVTs within covid-19 pandemic

Ali Yahya Ghani¹, Hiba Adil Yousif², Yusmadi Yah Jusoh³

^{1,2}Department of Computer Science, University of Baghdad, Iraq

³Department of Software Engineering & Information System, Universiti Putra Malaysia (UPM), Malaysia

Article Info

Article history:

Received May 20, 2021

Revised Jun 30, 2021

Accepted Jul 5, 2021

Keywords:

Covid-19

Critical success factors

Global software projects

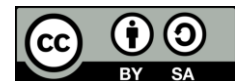
Global virtual teams

Software project manager

ABSTRACT

The covid-19 pandemic sweeping the world and has rendered a large proportion of the workforce as they are unable to commute to work. This has resulted in employees and employers seeking alternative work arrangements, including the software industry. Then comes the need for the global market and international presence of many companies to implement the global virtual teams (GVTs). GVTs members are gradually engaged in globalized business environments across space, time and organizational boundaries via information and communication technologies. Despite the advancement of technology, the project managers are still facing many challenges in communication. Hence, to become a successful project manager still a big challenge for them. This study is trying to identify the critical success factors (CSFs) for software project manager. A literature review was conducted to identify the CSFs. Next, an online survey was conducted to rank those factors according to their propriety. An online survey was distributed among the software developers, project managers, and academicians. The statistical package for social science (SPSS) version 22 was used to analyze the data collection. Twelfth CSFs were identified in this study. Also, the findings indicated that leadership skills factor is the highest factor level ranking in this study.

This is an open access article under the [CC BY-SA](#) license.



Corresponding Author:

Ali Yahya Ghani

Department of Computer Science

College of Education for Pure Science/Ibn Al-Haitham

University of Baghdad

Email: ali.y.g@ihcoedu.uobaghdad.edu.iq

1. INTRODUCTION

In the current global pandemic covid-19, the necessity for organizations to kickoff on working with new plans such as, virtual teams and remote working are seems to be part of the next step to consider [1]. Software project management is a type of project management that is solely concerned with developing or updating software [2]. Every project is transitory, with purpose of being completed within a particular time frame. Virtual projects are projects in which team members are spread across cities, states, nations, and/or time zones, making face-to-face contact difficult or impossible. Global virtual teams are the name given to such groups (GVTs). Project team members rely on technology for communication, i.e., teamwork tools, also known as information and communication technologies, because they operate from different places [3], [4]. covid-19 has rendered a big proportion of the workforce unable to commute to work, and start working from home. Gallup reported that 62% of employees start working from home and only 38% still working physically. Working virtually is a big challenge for many organizations [5], [6].

Current research on project managers are categorized in terms of their competency/competence,

selection, leadership, personality, and role in the literature review. In general, the Project Management Institute's Project Manager Competency Development Framework was used to aggregate 24 competency characteristics into four measures: communication, teamwork, attentiveness, and conflict management. In the UK, the construction industry presented a competency-based model for project manager performance to answer the question, "What makes a good project manager?" Twelve competencies are achievement orientation, initiative, information seeking, focus on client needs, impact and influence, directiveness, teamwork and cooperation, team leadership, analytical thinking, conceptual thinking, self-control, and teamwork and cooperation [7]. Competence-based measurements for the performance of construction project managers in developing nations, comprising four task competences in construction development (cognitive ability, job knowledge, task proficiency, and experience) [8].

Choosing the right project manager is a difficulty for any project-based business, according to reports [9]. When selecting project managers, competency/competence and performance were taken into account [10]-[11]. The top ten criteria for project managers selection are recognized communication, technical skills, stakeholder management, cost management, time management, education background, planning, leadership, team building, and professional certification. Hence, close communication is considered critical to the success fast track projects is considered important [12]. Primary the importance of communication, leadership could either smooth [13]. In the construction industry, selecting a project manager is always fraught with complexity and uncertainty [14]. As a result, establishing appropriate and methodical criteria for project manager selection, which must represent the project client's demands, is critical. Leadership has grown in popularity as a research topic for project managers. Project team leadership has been identified as an important component of project managers' competency/competence in several studies [14]. There are several distinct forms of project team leadership in general. Different leadership styles in construction projects were investigated by [15].

Many studies recognized a connection between project team leadership and project success [16], [17], and also the fit leadership style to project types and project teams [18]-[21]. The literature study reveals a number of research interests in project manager personality. Rather than being gloomy, project managers should be optimistic since optimism helps them overcome challenges in the workplace, whether it is innate or learned [22]. Talkative project managers are more likely to improve project performance and reach project success [23]. Project managers' personalities have an impact on their leadership abilities [24]. Project managers' personalities, on the other hand, have an impact on their competency/competence. They argued that project managers with varied personality qualities may differ in terms of psychological adjustment to job stress, according to construction studies on the personality of project managers [25]. Risk may be viewed and dealt with differently by project managers with different personality qualities [26]. Project managers' personalities have a big impact on team communication, dispute resolution, and team leadership [27]. As mentioned, some general studies have identified the role of project managers in customer satisfaction, team building, knowledge management, innovation management, and change management.

In the early 1980s, signifying that personal skills are face to face behaviors that people use when they demand to achieve something useful with help and through others [28]. It was seen as a set of behaviors and skills that distinguishes a good management. They argue that a good people manager must be able to communicate effectively [29]. Successful project managers understand the importance of efficiently managing people in projects by possessing and implementing a variety of people management skills. They argue that project managers should learn and practice good interpersonal skills such as empathy for others' feelings [30]. Considers that true project leaders inspire their teams and make everyone glad to be a part of the project's mission and organization [31]. Considers that project managers are more likely to complete their tasks if they earn the respect of their team members by acting politely and reasonably [32]. They believe that solid and effective people skills are more important than technical skills for project managers. People project managers that are effective motivate their team members to think "beyond the box." And come up with innovative ideas based on the strength of the data gathered [33].

More importantly, in construction project management, decision makers, safety coordinators, organizers, team workers, motivators, planners, process controllers, inspectors, diplomats, quality coordinators, communication facilitators, and implementers all have roles to play, and which role a construction project manager will play depends on personal maturity and the nature of the project [34]. Some initiatives fall short of expectations due to a lack of enthusiasm, poor human relations, low productivity, and a lack of staff engagement [35]. According to a review of the management literature, early motivational theorists and authors believe that a good manager must demonstrate concern for people, create trust, demonstrate sympathy, and involve people's emotions, for example, in problem resolution [36], [37]. Trust and teamwork are two more subjects that have been identified as important to project managers, such as creating intra-organizational trust and project success [38], [39]. Project managers work to build inter-organizational trust, which allows project partners to collaborate effectively [40]. Working relationships are

often recognized as requiring a high level of trust. According to several studies, creating trust is a crucial people skill for project managers to possess. They must develop levels of loyalty with team members in such a way that both sides appreciate each other and their shared values [41], [42].

In terms of the project manager's personality, relationship performance and quality are also taken into account. Relationship-oriented objective metrics and relationship-oriented subjective measures are split into the relationship performance index [43]. The index can be used by project managers to measure, monitor, and enhance relationship management performance. When establishing the relationship quality framework, on the other hand, teamwork, commitment, and trust were identified as three qualities of relationship quality, all of which could not be achieved without the assistance of a project manager [44]. The communication of team members from a different cultural background should be considered. Culture may be divided into organizational, national and functional [45]-[49]. Email communication, for example, is not preferred by managers in eastern nations such as Korea and Japan because it might cause animosity among team members. The cultural theme is linked to conflict in global virtual teams, and this has an impact on their performance. Understanding diverse cultures is a crucial people skill, and managers must be aware of the different cultures' values and beliefs [50]. Creating an environment of trust and support in problem resolution, motivating team members, fostering open and effective communication, and offering suitable communication tools, strategies, and systems are all criteria for effective project team management [51]. In conclusion, according to the studies above, we identified the critical success factors (CSFs) in general and for software project manager. They include leadership skills, communication skills, decision making skills, analytical thinking skills, technical skills, optimistic, education background, building trust, teamwork skills, personality, focuses on Clint's needs and finally, understanding different cultures.

The paper is organized as; section 1 is the introduction, the related works is presented including the definitions of software projects and CSFs for software project manager according to the literature. Section 2 presents the research methods and process, then the results and discussion are discussed in section 3. Finally, section 4 presents the conclusion and future work.

2. RESEARCH METHOD

A systematic literature review is the first step in this research systematic literature review (SLR). As shown in Figure 1, the SLR starts with planning the review, then identifying the study, selecting the publications, and finally data extraction. To answer the first research question (RQ), a systematic literature study was conducted:

What are the CSFs for a software project manager?

RQ1: What are the CSFs for a software project manager? In addition, the researchers conducted a survey to address the following second RQ.

RQ2: How are these CSFs ranked?

In this study, a SLR was carried out. The SLR begins with planning the review, identifying the study, selecting the papers, extracting the data as revealed in Figure 1. To answer the first research question, a systematic literature review was carried out:

RQ1: What are the CSFs for software project manager?

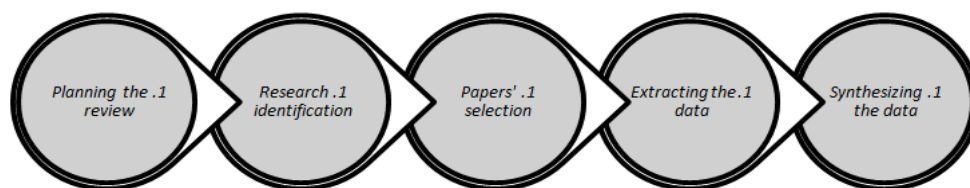


Figure 1. Research methodology and process

2.1. Systematic literature review

2.1.1. Planning the review

We begin by laying out a strategy for conducting a systematic literature review. We start by scanning particular databases, journals, electronic publications, and conferences for precise terms and resources.

2.1.2. Research identification

The initial step in this study is to identify precise terms and keywords related to the research topic. General keywords were used to find noteworthy publications about software projects and CSFs for software

project managers. This is done in order to obtain relevant published articles from conferences, archival journals, and electronic books from Emerald, IEEE, Elsevier's, IGI, and Scopus, five electronic databases.

2.1.3. Papers' selection

To choose the papers, we employed two methods: archival journals and conferences, as well as a combination of the two. The first list was created by reading the abstract and conclusion of the articles, and the second list was created by reading the whole manuscript with all of the details. In the end, only 52 papers were examined. Our findings are based on publications from nine electronic databases, including IEEE Explore, Science Direct, Research Gate, Springer Link, ACM, IOP, Wiley Online, IET Library, and Google Scholar, that were published in archival journals, conferences, and electronic books. Between 2000 and 2021, the research papers considered in this study were published. The shortlisted research was published throughout the year, with dissemination to public places and presentations. For this study, a total of 52 articles were used.

2.1.4. Extracting the data

The researchers extract information about CSFs for software project managers from the selected studies.

2.1.5. Synthesizing the data

The researchers chose major papers in order to cover the literature on CSFs for software project managers in depth. The researchers began to understand software projects and software project managers by studying basic definitions of software projects and software project managers. The study discussed the most important CSFs for software project managers. The study was divided into two halves, the first of which was concerned with gathering information on the definition, concepts, and management of software projects, and the second of which was concerned with CSFs for software project managers. Table 1 contains all of the definitions for these variables.

Table 1. Definition of CSFs

| No. | CSFs | Definitions |
|-----|----------------------------------|--|
| 1 | Leadership Skills | Takes control, gives direction, takes responsibility [18] |
| 2 | Communication Skills | Display behaviors of coordination [1] |
| 3 | Decision Skills | Make decisions to do things better and effectively [12] |
| 4 | Analytical Thinking | Gets to the heart of complex problems [50] |
| 5 | Technical Skills | The ability to use project management tools [9] |
| 6 | Optimistic | Be positive [22] |
| 7 | Education Background | Be educated such as having a certificate [18] |
| 8 | Building Trust | Having trust between software project manager and team members [1] |
| 9 | Teamwork Skills | Able to manage a group of people as a team [9] |
| 10 | Personality | The way to behave [51] |
| 11 | Focuses on clients' needs | Do what the customers want [51] |
| 12 | Understanding different cultures | Have knowledge in peoples' cultures and backgrounds [50] |

2.2. Data collection/survey

A survey is an effective tool for emphasizing the value of research [52]. To answer the second research question, an online survey was sent to 60 academics, developers, and software project managers. The data was analyzed using the statistical package for social science (SPSS) version 22. The questionnaire had four closed-ended parts and a total of 15 questions. The SPSS version 22 was utilized to analyze the data in this study. The second RQ is addressed by this survey:
RQ2: what is the ranking of these factors?

3. RESULTS AND DISCUSSION

3.1. Results of systematic literature review

From 55 papers, the first research question was answered as the CSFs for software project manager is shown in Figure 2. These factors also listed with sources in Table 2.

3.2. Results of data collection/survey

3.2.1. Reliability and validity test

Validity demonstrates an instrument's ability to measure what it purports to assess, whereas reliability demonstrates how consistent and trustworthy a survey is. The questionnaire was evaluated and

reviewed by two specialists in English language and questionnaire design to confirm its validity. Their recommendations and feedback were taken into account, and the questionnaire was updated. After then, a pilot study was carried out. As a result, a total of 20 questionnaires were distributed through online survey (Google survey), with 18 respondents completing the survey. SPSS 22 was used to analyze the data. The reliability test was also performed on data from the pilot study for other components of the questionnaire that are not the focus of this study.



Figure 2. CSFs for software project manager

Table 2. CSFs for software project manager from SLR

| No. | CSFs | Sources |
|-----|----------------------------------|-----------------------------------|
| 1 | Leadership Skills | [7], [9], [13], [15]-[19] |
| 2 | Communication Skills | [9], [28], [29], [30], [34], [51] |
| 3 | Decision Skills | [34] |
| 4 | Analytical Thinking | [34] [51] |
| 5 | Technical Skills | [9], [33], [51] |
| 6 | Optimistic | [22], [23] |
| 7 | Education Background | [8], [9], [34] |
| 8 | Building Trust | [36], [38] [39], [43], [44], [50] |
| 9 | Teamwork Skills | [9], [34] |
| 10 | Personality | [21], [24]-[27], [31]-[35] |
| 11 | Focuses on clients' needs | [14] |
| 12 | Understanding different cultures | [45]-[50] |

3.2.2. Respondents' characteristics

After removing the damaged case and examining the outliers, the final sample revealed that 70% of responders were men and 30% were women. Thirty percent of those who responded were between the ages of 26 and 35. Middle Eastern respondents made up 53.3 percent of the total. Because the study's focus was on IT companies, 71.7 percent of respondents worked in the field. 88.3 percent of those polled had a bachelor's degree. 71.7 percent of those polled work in IT, such as software project managers. Around 23.3 percent of the samples have 11-15 years of work experience. Finally, 66.6 percent of the population is employed in the private sector. Table 3 provides more detailed information on the demographic characteristics of respondents.

3.2.3. Reliability and validity test

According to the online survey, Table 4 shows the ranking of CSFs for software project managers according to their propriety level. The highest level of CSFs for software project manager are leadership skills. On the other hand, the lowest level of CSFs for software project manager is personality.

The following review of the literature on software project managers, some variables that contribute to their performance were identified. Leadership capabilities, communication skills, decision-making skills, analytical thinking skills, technical skills, optimism, education background, creating trust, teamwork skills, personality, focusing on Clint's needs, and ultimately comprehending diverse cultures were all investigated. Furthermore, the research revealed that leadership qualities are the greatest level of factor for these aspects. A personality, on the other hand, is the lowest level of factors. More information on the ranking of these factors may be seen in Figure 3.

Table 3. Demographic data of respondents

| No | | Percent | No | | Percent |
|----|------------------------|---------|----|--------------------------|---------|
| 1 | Gender | | 5 | Education level | |
| | Female | 30% | | Undergraduate | 88.3% |
| | Male | 70% | | Postgraduate | 11.7% |
| 2 | Age | | 6 | Qualification | |
| | Less than 26 | | | Academic | 18.3% |
| | 26-35 | 30% | | Software Project Manager | 76.7% |
| | 36-45 | 43.3% | | Software developer | |
| | 46-55 | 20% | 7 | Work experience | |
| | More than 55 | | | Less than one year | |
| 3 | Nationality | | | 1-5 years | 23.3% |
| | Asian | 45% | | 6-10 years | 20% |
| | Middle East | 53.3% | | 11-15 years | 23.3% |
| | European | | | 16-20 | 15% |
| | North America | | | More than 20 years | |
| | South America | | 8 | Organization type | |
| 4 | Industry | | | Government | 21.2% |
| | Academic | 28% | | Semi government | 11.7% |
| | Information Technology | 71.7% | | Private | 66.6% |

Table 4. Frequency and ranking of CSFs for software project manager

| | Percent | Rank |
|----------------------------------|---------|------|
| Leadership Skills | 61.7% | 1 |
| Communication Skills | 53.3% | 2 |
| Teamwork Skills | 51.7% | 3 |
| Analytical Thinking | 50% | 4 |
| Decision Skills | 48.3% | 6 |
| Education Background | 45% | 5 |
| Focuses on clients' needs | 45% | 5 |
| Technical Skills | 31.7% | 7 |
| Building Trust | 30% | 8 |
| Optimistic | 23.3% | 9 |
| Understanding different cultures | 21.7% | 10 |
| Personality | 1.7% | 11 |

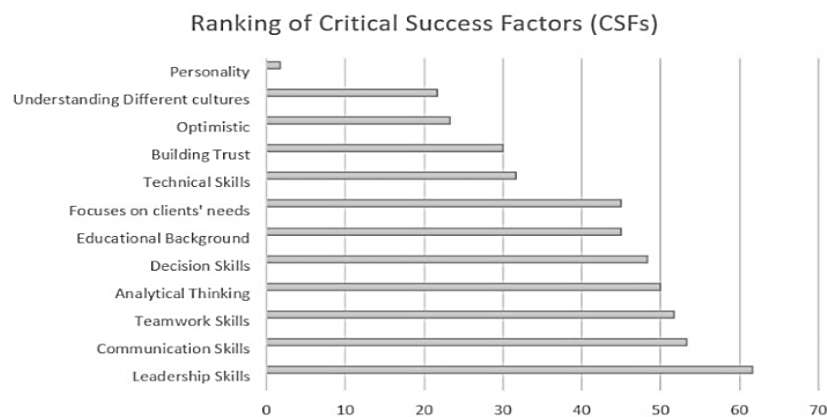


Figure 3. Ranking of CSFs for a software project manager

4. CONCLUSION

In conclusion, GVTs relies on communication, collaboration, and information exchange. Despite the advancement of technology, the project managers of these teams still are facing many challenges to communicate with their teams smoothly. So, become a successful project manager still a big challenge for them. The present literature on CSFs for software project manager identified the factors such as: leadership skills, communication skills, decision making skills, analytical thinking skills, technical skills, optimistic, education background, building trust, teamwork skills, personality, and finally, focuses on Clint's needs. Online survey was conducted to rank these factors. Future research should be conducted to find out more CSFs factors that influence software project managers in the long term because of the world pandemic.

ACKNOWLEDGEMENTS

First, I We would like to express our sincere gratitude to University of Baghdad for the continuous support of the research in our academic environment. Secondly many thanks to Universit Putra Malaysia (UPM) for all the knowledge we gain during our PhD and research journey.

REFERENCES

- [1] T. Zuofa and E. G. Ochieng, "Investigating Barriers to Project Delivery using Virtual Teams," *Procedia Computer Science*, vol. 181, pp. 1083-1088, 2021, doi: 10.1016/j.procs.2021.01.304.
- [2] A. Presbitero, "Communication accommodation within global virtual team: The influence of cultural intelligence and the impact on interpersonal process effectiveness," *Journal of International Management*, vol. 27, no. 1, pp. 100809, 2021, doi: 10.1016/j.intman.2020.100809.
- [3] C. Graham and H. Daniel, "Fault Lines in Virtual Team Leadership and Team Performance in Undergraduate Virtual Team Short-Term Projects," *International Journal of e-Collaboration (IJeC)*, vol. 17, no. 1, pp. 1-14, 2021, doi: 10.4018/IJeC.2021010101.
- [4] J.L. M. Iqbal, Arun S, "Intelligent Information System for Suspicious Human Activity Detection in Day and Night," *Int. J. Informatics Commun. Technol.*, vol. 7, no. 33, pp. 117-123, 2018, doi: 10.11591/ijict.v7i3.pp117-123.
- [5] M. Al-Odeh, "What universities in the Middle East can learn from the American online education system," *International Journal of Informatics and Communication Technology (IJ-ICT)*, vol. 9, no. 1, pp. 31-39, 2020, doi: 10.11591/ijict.v9i1.pp31-39.
- [6] S. R. Baker, R. A. Farrokhnia, S. Meyer, M. Pagel, and C. Yannelis, "How does household spending respond to an epidemic? Consumption during the 2020 COVID-19 pandemic," *The Review of Asset Pricing Studies*, vol. 10, no. 4, pp. 834-862, 2020, doi: 10.1093/rapstu/raaa009.
- [7] M. I. Cheng, A. RJ Dainty and D. R. Moore, "What makes a good project manager?" *Human resource management journal*, vol. 15, no. 1, pp. 25-37, 2005, doi: 10.1111/j.1748-8583.2005.tb00138.x.
- [8] D. K. Ahadzie, D. G. Proverbs and P. O. Olomolaiye, "Critical success criteria for mass house building projects in developing countries," *International Journal of project management*, vol. 26, no. 6, pp. 675-687, 2008, doi: 10.1016/j.ijproman.2007.09.006.
- [9] K. Ahsan, M. Ho and S. Khan, "Recruiting project managers: A comparative analysis of competencies and recruitment signals from job advertisements," *Project Management Journal*, vol. 44, no. 5, pp. 36-54, 2013, doi: 10.1002/pmj.21366.
- [10] Y. Hadad, B. Keren and Z. Laslo, "A decision-making support system module for project manager selection according to past performance," *International Journal of Project Management*, vol. 31, no. 4, pp. 532-541, 2013, doi: 10.1016/j.ijproman.2012.10.004.
- [11] Z. Turskis, E. Kazimieras Zavadskas and F. Peldschus, "Multi-criteria optimization system for decision making in construction design and management," *Engineering economics*, vol. 61, no. 1, pp. 7-17, 2009.
- [12] J. Jones, "Leadership lessons from the Fast-Track programme for teachers in England," *Educational Management Administration & Leadership*, vol. 38, no. 2, pp. 149-163, 2010, doi: 10.1177/1741143209356358.
- [13] D. B. Fedor, S. Ghosh, S. D. Caldwell, T. J. Maurer and V. R. Singhal, "The effects of knowledge management on team members' ratings of project success and impact," *Decision Sciences*, vol. 34, no. 3, pp. 513-539, 2003, doi: 10.1111/j.1540-5414.2003.02395.x.
- [14] F. Mohammadi, M. Kazerooni Sadi, F. Nateghi, A. Abdullah and M. Skitmore, "A hybrid quality function deployment and cybernetic analytic network process model for project manager selection," *Journal of Civil Engineering and Management*, vol. 20, no. 6, pp. 795-809, 2014, doi: 10.3846/13923730.2014.945952.
- [15] B. AG Bossink, "Effectiveness of innovation leadership styles: a manager's influence on ecological innovation in construction projects," *Construction Innovation*, vol. 4 no. 4, pp. 211-228, 2004, doi: 10.1108/14714170410815105.
- [16] L. Yang, C. Huang and K.-Shan Wu, "The association among project manager's leadership style, teamwork and project success," *International journal of project management*, vol. 29, no. 3, pp. 258-267, 2011, doi: 10.1016/j.ijproman.2010.03.006.
- [17] K. T., R. R. O. I. Odusami, and M. M. Omirin, "The relationship between project leadership, team composition and construction project performance in Nigeria," *International journal of project management*, vol. 21, no. 7, pp. 519-527, 2003, doi: 10.1016/S0263-7863(02)00059-5.
- [18] R. Udhayakumar and P. Karthikeyan, "Integrating Project Management Tools for Augmenting the Profession of Civil Engineers In M/S Urc Construction (P) Ltd., India," *Trans Stellar, International Journal of Civil, Structural, Environmental, Infrastructure Engineering Research and Development*, vol. 4, no. 5, pp. 1-8, 2014.
- [19] S. Ogunlana, Z. Siddiqui, S. Yisa and P. Olomolaiye, "Factors and procedures used in matching project managers to construction projects in Bangkok," *International Journal of Project Management*, vol. 20, no. 5, pp. 385-400, 2002, doi: 10.1016/S0263-7863(01)00017-5.
- [20] J. R. Turner and R. Müller, "The project manager's leadership style as a success factor on projects: A literature review," *Project management journal*, vol. 36, no. 2, pp. 49-61, 2005, doi: 10.1177/875697280503600206.
- [21] S. A. Davis, "Investigating the impact of project managers' emotional intelligence on their interpersonal competence," *Project Management Journal*, vol. 42, no. 4, pp. 37-57, 2011, doi: 10.1002/pmj.20247.
- [22] J. Dolfi and E. J. Andrews, "The subliminal characteristics of project managers: An exploratory study of optimism overcoming challenge in the project management work environment," *International Journal of Project Management*, vol. 25, no. 7, pp. 674-682, 2007, doi: 10.1016/j.ijproman.2007.02.002.
- [23] M. Bevilacqua, F. Emanuele Ciarapica, M. Germani, Giovanni Mazzuto and C. Paciarotti, "Relation of project

A critical success factors for software project manager in GVTs within covid-19 ... (Ali Yahya Gheni)

- managers' personality and project performance: An approach based on value stream mapping," *Journal of Industrial Engineering and Management*, vol. 7, no. 4, pp. 857-890, 2014, doi: 10.3926/jiem.1005.
- [24] R. Burke and S. Barron, *Project management leadership*, Burke publishing, 2007.
- [25] I. Love and L. F. Klapper, *Corporate governance, investor protection, and performance in emerging markets*, The World Bank, 2002.
- [26] C. M. Wang, B. Bing Xu, S. Juan Zhang and Y. Qiang Chen, "Influence of personality and risk propensity on risk perception of Chinese construction project managers," *International Journal of Project Management*, vol. 34, no. 7, pp. 1294-1304, 2016, doi: 10.1016/j.ijproman.2016.07.004.
- [27] L. Zhang, and W. F., "Improving performance of construction projects," *Engineering, Construction and Architectural Management*, vol. 20, no. 2, pp. 195-207, 2013, doi: 10.1108/09699981311303044.
- [28] P. Honey, *Face to face skills: a practical guide to interactive skills*, Gower Publishing Company, Limited, 1990.
- [29] H. Singh and P. S. Williams, "A Guide to the Project Management Body of Knowledge: PMBOK (®) Guide," Project Management Institute, 2021.
- [30] R. L. Kliem and I. S. Ludin, *The people side of project management*, Gower Publishing Company, 1992.
- [31] H. J. Thamhain, "Linkages of project environment to performance: lessons for team leadership," *International Journal of project management*, vol. 22, no. 7, pp. 533-544, 2004, doi: 10.1016/j.ijproman.2004.04.005.
- [32] R. D. Milton, M. Rosenau and G. Githens, "Successful project management," 1998.
- [33] R. K. Wysocki, *Effective project management: traditional, agile, extreme*, John Wiley & Sons, 2011.
- [34] M. Beck, and S. Robins, "Face Numbers and the Dehn–Sommerville Relations in Ehrhartian Terms," In *Computing the Continuous Discretely*, pp. 101-111, Springer, New York, NY, 2015, doi: 10.1007/978-1-4939-2969-6_5.
- [35] H. Kerzner, *Project management: a systems approach to planning, scheduling, and controlling*, John Wiley & Sons, 2017.
- [36] R. R. Blake, and J. Srygley Mouton, "Theory and research for developing a science of leadership," *The Journal of Applied Behavioral Science*, vol. 18, no. 3, pp. 275-291, 1982, doi: 10.1177/002188638201800304.
- [37] R. Likert and S. Perkins Hayes, eds. *Some applications of behavioural research*. Unesco, 1957.
- [38] A. K. Munns, "Potential influence of trust on the successful completion of a project," *International Journal of project management*, vol. 13, no. 1, pp. 19-24, 1995, doi: 10.1016/0263-7863(95)95699-E.
- [39] E. S. Wong, D. Then and M. Skitmore, "Antecedents of trust in intra-organizational relationships within three Singapore public sector construction project management agencies," *Construction Management and Economics*, vol. 18, no. 7, pp. 797-806, 2000, doi: 10.1080/014461900433087.
- [40] V. S. Anantatmula, "Project manager leadership role in improving project performance," *Engineering management journal*, vol. 22, no. 1, pp. 13-22, 2010, doi: 10.1080/10429247.2010.11431849.
- [41] A. Kadefors, "Trust in project relationships—inside the black box," *International Journal of project management*, vol. 22, no. 3, pp. 175-182, 2004, doi: 10.1016/S0263-7863(03)00031-0.
- [42] N. J. McNeese, M. Demir, E. K. Chiou, and N. J. Cooke, "Trust and Team Performance in Human–Autonomy Teaming," *International Journal of Electronic Commerce*, vol. 25, no. 1, pp. 51-72, 2021, doi: 10.1080/10864415.2021.1846854.
- [43] J. S. Lurey and M. S. Raisinghani, "An empirical study of best practices in virtual teams," *Information & Management*, vol. 38, no. 8, pp. 523-544, 2001, doi: 10.1016/S0378-7206(01)00074-X.
- [44] M. Babaeian Jelodar, T. Wing Yiu, and S. Wilkinson, "A conceptualisation of relationship quality in construction procurement," *International Journal of Project Management*, vol. 34, no. 6, pp. 997-1011, 2016, doi: 10.1016/j.ijproman.2016.03.005.
- [45] L. Lee-Kelley and T. Sankey. "Global virtual teams for value creation and project success: A case study," *International journal of project management*, vol. 26, no. 1, pp. 51-62, 2008, doi: 10.1016/j.ijproman.2007.08.010.
- [46] J. F. Yeung, A. P. Chan and D. W. Chan. "Developing a performance index for relationship-based construction projects in Australia: Delphi study," *Journal of management in engineering*, vol. 25, no. 2, pp. 59-68, 2009, doi: 10.1061/(ASCE)0742-597X(2009)25:3A2(59).
- [47] R. A. Noen and S. L. Wilk, "Investigation of the factors that influence employees' participation in development activities," *Journal of applied psychology*, vol. 78, no. 2, pp. 291, 1993, doi: 10.1037/0021-9010.78.2.291.
- [48] M. Raisinghani, A. Arora, Erice Baylor, Shelley Brown-Philips, Cerie Coleman and Kelvin Craig, "Virtual project management of globally outsourced IT projects," *International Journal of Management & Information Systems (IJMIS)*, vol. 14, no. 5, pp. 1-7, 2010, doi: 10.19030/ijmis.v14i5.7.
- [49] G. Kiely, T. Butler, and P. Finnegan, "Global virtual teams coordination mechanisms: building theory from research in software development," *Behaviour & Information Technology*, pp.1-21, 2021, doi: 10.1080/0144929X.2021.1909141.
- [50] J. Rajasekar, Ahmed Al-Asfour and E. Kentiba, "Exploring the relationship between cultural intelligence and employees' demographic profiles: insights gained from a cross-cultural study in Oman," *Review of International Business and Strategy*, 2021, doi: 10.1108/RIBS-09-2020-0107.
- [51] D. O. V Dvir, A. Sadeh and A. Malach-Pines, "Projects and project managers: The relationship between project managers' personality, project types, and project success," *Project Management Journal*, vol. 37, no. 5, pp. 36-48, 2006, doi: 10.1177/875697280603700505.
- [52] MF. A. Al Sbou, "A survey of arabic text classification models." *International Journal of Electrical and Computer Engineering*, vol. 8, no. 6, pp. 4352-4355, 2018, doi: 10.11591/ijece.v8i6.pp4352-4355.

BIOGRAPHIES OF AUTHORS

Dr. Ali Yahya Gheni, he holds his PhD from Universiti Putra Malaysia (UPM) in Information Systems, Faculty of Computer Science and Information Technology, Department of Software Engineering and Information Systems, Malaysia. He holds his MSc. from University College of Technology and Innovation (UCTI) in Information Technology Management, Department of Information Technology Management, Malaysia. He holds his BSc. in Computer Science from University of Baghdad, Department of Computer Science, Iraq. He is currently worked as a senior lecturer in University of Baghdad, Department of Co. Science. His research interest includes Information Systems, Information Technology Management and Software Engineering.



Mrs. Hiba Adel Yousif holds her MSc. from Universiti Putra Malaysia (UPM) in Software Engineering, Faculty of Computer Science and Information Technology, Department of Software Engineering and Information Systems, Malaysia. She holds his BSc. in Computer Science from University of Baghdad, Department of Computer Science, Iraq. She is currently work as a lecturer in University of Baghdad, Department of Co. Science. Her research interest includes Software Engineering and Information Systems.



Dr. Yusmadi Yah Jusoh received the Ph.D. degree in System Science and Management from the National University of Malaysia (UKM) in 2008. Currently, she is an Associate Professor at Universiti Putra Malaysia (UPM), Faculty of Computer Science and Information Technology. Her research interest is in Management Information System, Information System, Information Technology Strategic Planning, and Software Project Management. Yusmadi is also a certified software tester and an academician at Department of Software Engineering and Information System, Faculty of Computer Science, and Information Technology, UPM since 1998. In 2008 she received her PhD in System Science and Management from UKM. She teaches software project management, team software project management, information systems, and management information systems. Her research interest includes software project management, information systems, performance measurement, and management information system.