

CRUCIAL ROLE OF EFFICIENT COMMUNICATION ON CONSTRUCTION PROJECTS PROGRESS, DELIVERABLES AND CONFLICTS REDUCTION IN THE UNITED ARAB EMIRATES

Al Safarini N., Hasan A., Sakhrieh A., Alnahhal M., Al Hazza M.*

Abstract: Communication in the construction sector is complex, especially in the design phase, that if not properly handled, can reduce productivity. This topic is best studied in the United Arab Emirates (UAE) due to diverse religion, ethnicity and nationalities. The research in this area is considerably increased due to the rapid construction growth during the last two decades. In this context, this research investigates the importance of communication in the construction sector, especially in the design phase. It also investigates project managers' crucial role in utilizing communication referred to methods among their team members. A questionnaire survey was conducted where 146 respondents were collected and analysed using several statistical methods. Results revealed the importance of communication during the design stage. The most important channels of communication are those among the design team from different disciplines, then successively, consultant (site team) and contractor. The importance of best practices, such as hiring a coordinator between all design departments to reduce conflict and enhance communication, has been emphasized, and holding meetings is mostly the optimum method of communication.

Key words: Communication, construction projects, conflicts, design team, BIM.

DOI: 10.17512/pjms.2021.23.1.01

Article history:

Received January 03, 2021; *Revised* March 28, 2021; *Accepted* April 24, 2021

Introduction

Usually, projects are either extended or accelerated when delayed and therefore incur extra costs. Delays in construction projects give rise to dissatisfaction to all the parties involved. It is well known that using good communication throughout construction projects would result in smoother directing projects. However, there

* **Nada Al Safarini** MSc., RAK Research and Innovation Center (RAKRIC) , American University of Ras Al Khaimah, Ras Al Khaimah, United Arab Emirates, **Afnan Hasan** MSc., Senior Project Architect-Construction Sector, Dubai, United Arab Emirates, **Ahmad Sakhrieh**, Prof. Mechanical and Industrial Engineering Department, American University of Ras Al Khaimah, Ras Al Khaimah, United Arab Emirates, and Mechanical Engineering Department, University of Jordan, Amman, Jordan, **Mohammed Alnahhal** Dr., **Muataz Al Hazza** Dr., Mechanical and Industrial Engineering Department, American University of Ras Al Khaimah, Ras Al Khaimah, United Arab Emirates

✉ corresponding author: mohammed.alnahhal@aurak.ac.ae

✉ nada.alsafarini@aurak.ac.ae; fennojo@yahoo.com; ahmad.sakhrieh@aurak.ac.ae; muataz.alhazza@aurak.ac.ae

are many stakeholders involved in each stage of the project that might make it hard to correlate between all of them.

The Construction Sector is one of the important sectors that contribute to the UAE economic growth. In 2019, construction contributed about 86 billion United Arab Emirates dirhams (\$23.4 billion) to the preliminary estimated value of the Gross Domestic Product (GDP) of the emirate of Abu Dhabi. The total estimated GDP of the emirate for that year was about 915 billion dirhams (\$249.15 billion). The huge volume and complexity of projects in the construction sector in the UAE presents a great challenge and provides many opportunities for various construction industry companies. The construction projects are highly dynamic, with different key stakeholders with different expectations of the project outputs. This variation in the expectation may lead to high conflict. However, a concrete communication system may reduce this conflict. The importance of communication was investigated by Pundzienė et al. (2007), who investigated communication competencies that are needed during the organizational change and the most effective ways to acquire them. Communication was further discussed by Loučanová and Olšiaková (2016), who focused on the effect of communication on innovation.

The main contribution of this research is to profoundly investigate the importance of communication in the construction sector in the UAE, especially in the design phase, with the purpose to achieve proper coordination between the different disciplines involved in the design chore. The efforts shall directly contribute to limit the conflicts and diminish the discrepancies, which imply a highly negative impact on meeting project completion deadlines and controlling the cost. Moreover, the present study addresses which network channel to focus more attention by project managers. The importance of some practices, such as coordinator among different design parties and BIM, has also been investigated. This research is one of the few, if not the first, to investigate the relationship between effective communication and construction projects performance in the UAE.

Literature Review

Several studies proved that communication is a method of exchanging information and a type of social interaction that increases the level of knowledge sharing for successful projects. Mitkus and Mitkus (2014) argued that the cause of conflicts and delays in construction projects is due to the lack of communication between client and contractor. Shen et al. (2013) discussed the importance of client-designer communication at the early stages of design and depicted the proper means of such a level of communication. Spillane and Oyedele (2013) stated that one of the most important management strategies in a confined construction site is “effective communication among site personnel”. Diallo and Thuiller (2005) strongly linked project success to communication and cooperation between stakeholders. Affare (2012) concluded that it is undeniable that proper communication must be implemented among all participants of the project and define the most familiar

means or channels of communication, between consultant and contractor, consultant and client, amongst the contractor's project team members and between the contractor and their suppliers or sub-contractors. Shao and Müller (2011) stated that frequent communication improves stakeholder satisfaction. Müller and Turner (2005) found that collaboration and trust between the project team and agent reduce the mistrust and conflict of interest between them. Hossain (2009) found that social networking matrixes can be used to study the link between the actors or activity carriers and the level of coordination among them. Lin et al. (2019) showed that usage of the Building Information Model enhances communication, reduces problems, and gets quick responses, especially for contractors. A qualitative study to investigate how relationship conflict affects performance and productivity among construction management professionals was conducted by Vaux and Kirk (2018). Interviews were conducted in 18 construction firms with 25 construction management professionals. They found that crucial antecedents producing relationship conflict are lack of communication, old-school attitude and lump-sum contracts. Another study that concentrated on productivity in construction was the one by Maqsoom et al. (2018), who investigated the effect of age and experience on productivity from a psychological perspective. Wu et al. (2017) studied the effects of communication-conflict interaction on the success of construction projects. They developed and validated a conceptual model using empirical data via structural equation modelling. Their results show that task conflict is positively related to project success and improves communication among teams stimulated the positive effect of task conflict. Safapour et al. (2019) studied the effect of the primary stakeholders' conflicts on the project. They identified that conflicts between different parties are a significant contributor to project delays in the design phase. They stated that in the design phase, conflicts seriously affect schedule performance. This conflict may lead to schedule delays, lowered morale and motivation, and reduced profit. They concluded that the mitigating factors are good communication and trust-building. To enhance communication, BIM can be used. However, according to Wang et al. (2020), the implementation of BIM sometimes fails to achieve expected benefits due to user resistance. Nørkjaer Gade et al. (2018) investigated the consequences of using BIM-tools in a collaborative building design setting consisting of different specialists. They used a case study to trace when BIM-tools were used in an inter-organizational design process of a naval rescue station in Denmark. A paper by Chahrour et al. (2020) claimed that there is no good previous documentation for justification, in terms of direct cost savings, for BIM implementation on real-life projects. Therefore, they proposed a methodology to prove how BIM-based clash detection leads to cost savings.

The problem of delays in the construction sector due to communication issues is a global phenomenon. Assaf and Al-Hejji (2006) identified 56 main causes of delay in Saudi large building construction projects and their relative importance. Al-Momani (2000) carried out quantitative analysis on construction delays in Jordan.

The result of this study indicated that the main causes of delay in construction of public projects are related to designers, user changes, weather, site conditions, late deliveries, economic conditions and increase in quantity. Li et al. (2012) research revealed that to maximize the chance of success in public infrastructure and construction projects in Hong Kong, there is a need to resolve most conflicts that arise throughout the project lifecycle. One of the most effective tools is to have good communication tools and techniques. Toor and Ogunlana (2008) studied the fundamental essentials for project success in Thailand construction industry. The study showed that communication in the construction sector is the main factor in the large-scale construction project's success. Ogunbayo (2013) found that conflict in construction projects is natural and inevitable and may have a positive or negative effect. Nguyen et al. (2004) studied the success factors for large construction projects in Vietnam. They categorized the success factors into four main groups: comfort, competence, commitment and communication. They found that good communication will help in clarifying and disseminating all necessary project information and status to all internal and external project stakeholders. Aaltonen et al. (2008) investigated the importance of stakeholder project management in Uruguay. According to Zulch (2016), in the context of South African construction industry, ineffective communication and poor application of communication skills in construction project management lead to project outcomes that do not meet project objectives.

Methodology

Interviews with project managers from the consultant site team, design team and within the client-side were between 28th of April and 1st of May, 2019 to identify the critical communication issues and set up the focus area of the research. Interviews confirmed the need to explore the communication between construction project participants. The potential factors leading to successful project schedule performance extracted from the literature were therefore included in the questionnaire survey, which was conducted over 26 days, from 15th of May to 10th of June, 2019 and had 146 respondents in total.

The questionnaire was developed to assess the perceptions of clients, consultants, and contractors on the relative importance of causes and effects of delay in UAE construction sector. The questionnaire copies were sent to 500 professionals in the field of construction in the UAE. The list of professionals involved different construction stakeholders of such as employers, client representatives, consultants (design team and site team) and contractors. About 29 % of them (146) responded to the questionnaire. In most of the questions, the questionnaire uses a Likert scale of 1 to 5, where 5 means strongly agree, and 1 means strongly disagree. Statistical analysis is used to analyse the questionnaire, where six basic hypotheses were tested.

The hypotheses in this study are illustrated in table 1. The statistical methods are also shown in the table. Because the Likert scale in this study is designed to be

from 1 to 5, the number 5 means strongly agree, and the number 4 means agree. Therefore, if the average of the responses is more than 3.5, it is assumed that the importance of the item is high according to the view of the professionals in the field of construction. BIM and other methods were separated into two different categories because of the importance of BIM. BIM, a new technology, uses an intelligent 3D model-based process that gives architecture, engineering, and construction professionals the insight and tools to more efficiently plan, design, construct and manage buildings and infrastructure. For hypothesis number 3, the comparison between BIM with the other managerial methods does not mean comparing BIM with all other techniques together. It means comparing the average level of importance of the other managerial methods with BIM.

Chi-square test with Yates's correction for continuity is used to compare two different variables with category values. For example, it is possible to compare the percentage of smokers and non-smokers for males and females. The comparison is to check if there is a dependency between gender and smoking habit. For example, it is possible to find that males tend to smoke more than females. A certain variable does not need to be with only two values, such as female and male. For example, the estimation of the respondents of the questionnaire can be with three values: agree, neutral, and disagree. If each possible value has a frequency of more than 10, then Chi-square test is accurate enough. However, if there are some values' frequencies with less than 10, then other methods can be used. For example, the number of females who are non-smokers in the sample might be less than 10 women. In this case, the correction using Yates method is a possible way to handle the situation.

One-way analysis of variance (ANOVA) is used to test one variable with more than two levels. For example, a certain metal hardness test can be held at three different temperatures. The null hypothesis indicates that the hardness values will be close to each other for the three different temperatures. In this study, ANOVA is used three times. The first one is to check the importance level of the following different combinations of communication channels:

- Client- designer
- Consultant (site team) – contractor
- Consultant (site team) – client
- Consultant (site team) – designer
- Design team with different disciplines at the design stage

The null hypothesis is that all five channels of communication are of the same importance. The other two times in which ANOVA is used are to compare different types of formal and informal communication methods. Informal methods are oral (face-to-face), telephone, unrecorded meetings and presentations. The formal methods are recorded methods, emails, fax, memos, letters and reports.

Table 1. Study Hypotheses

Number	Hypotheses	Test used
1	H0: The importance of communication in general and in design stage is not so high according to the view of construction projects' professionals.	One sample t-test (one-sided)
	H1: The importance of communication in general and in design stage is so high according to the view of construction projects' professionals ($\mu > 3.5$ on Likert scale).	
2	H0: The effect of best practices including BIM to reduce conflict and barriers is not so high according to the view of construction projects' professionals.	One sample t-test (one-sided)
	H1: The effect of best practices including BIM to reduce conflict and barriers is so high according to the view of construction projects' professionals ($\mu > 3.5$ on Likert scale).	
3	H0: There is no difference between the effect of managerial methods and BIM to reduce conflict and barriers.	Paired t-test
	H1: The effect of managerial methods and the effect of BIM to reduce conflict and barriers are different.	
4	H0: There is no effect of experience, position, and gender on the professional's views of importance of communication and different best practices to reduce conflicts.	Chi square test with Yates's correction for continuity
	H1: Professionals with different experience, position, and gender have different views for importance of communication and different best practices to reduce conflicts.	
5	H0: Different construction projects communication channels have the same importance level.	ANOVA, one way
	H1: Different construction projects communication channels have different importance level.	
6	H0: Different informal/formal communication methods have the same importance levels according to professionals in construction projects.	ANOVA, one way
	H1: Different informal/formal communication methods have different importance levels according to professionals in construction projects.	

Results and Analysis

The survey respondents represent diversified segments of stakeholders, where project managers were with much experience. They pay remarkable attention to successful project management during the project life cycle by endeavour to reach the optimum project schedule performance. This is done through utilizing effective communication methods and implementation of best managerial practices, such as assigning coordinator personnel to control design different disciplines during design stage and adopting advanced software like BIM, which leads to successful cost, progress and quality management.

Descriptive statistics show that the highest percentage of respondents is for contractors (31%) because they are the main party that is directly affected in case of conflicts occurrence. The second party is the consultant supervision team (25%) due to the responsibility of managing the site work and solve problems that result mostly out of first stage planning discrepancies. Consultants (design teams) are 19%, employers are 15%, and client representatives are 10%. In regard to the gender of the respondents, 82.2% are males, and 17.8% are females because the majority of engineers working in the construction field in UAE are males. One-fourth of the respondents are young with experience of less or equal to 5 years. The largest percentage of respondents (35%) is with 6-15 years of experience. Those with 16-25 years of experience are 28%, and the rest (12%) have more than 25 years of experience.

Table 2 shows the results of hypotheses number 1 and number 2 in table 1 about the importance of communication in general and design stage; and the effect of best practices including BIM to reduce conflict and barriers. In the table, one-sample t-test is used to check if the average values given by the 146 respondents are greater than 3.5 or not on the Likert scale. This is because the number 3 mean “neutral”, and 4 and 5 mean “agree” and “strongly agree”. The alternative hypotheses (greater than 3.5) were accepted for all of them. That means that communication according to the views of professional in UAE is very important as general and during design stage. All the listed methods were found to be important since the p-values are far lower than 0.05. For example, it is a good idea to have design team and mechanical, electrical, and plumbing (MEP) departments in the same company to reduce conflict.

Table 2. Importance of communication and best practices to enhance communication

Communication / best practices	Subgroups	Item	One sample t-test ($\mu > 3.5$)
Importance of communication	Overall importance	Importance of communication	p-value = 0.00
	Design stage and design team	Importance of design stage to minimize conflicts	p-value = 0.00
		Importance of communication between different disciplines during the design stages	p-value = 0.00
		Importance of communication between design team parties	p-value = 0.00
Best practices	Managerial methods to reduce conflict and barriers	Having the design team for the architecture and MEP departments in the same company to reduce conflict	p-value = 0.00
		Meetings to reduce communication barriers	p-value = 0.00
		Hiring a coordinator between all design departments	p-value = 0.00

		Utilize the best communication tool in order to accelerate the given tasks	p-value = 0.00
	Software to reduce conflict	Building Information Modeling system to reduce conflict	p-value = 0.00

In table 2, there are two subgroups containing more than one item. Table 3 shows the Cronbach's Alpha and the one sample t-test. Cronbach's Alpha is used to measure the internal consistency of the items inside the subgroup. It should usually be more than 0.7. In table 3, it is obvious that this internal consistency is high, and the importance levels of design stage and managerial methods are high. The difference between the effect of managerial methods and the effect of BIM on reducing conflict, and barriers were tested using paired t-test as shown in Figure 1.

Table 3. Cronbach's Alpha and t-test for design stage and managerial methods

Subgroups	Cronbach's Alpha	One sample t-test ($\mu > 3.5$)
Design stage and design team	0.902	p-value = 0.00
Managerial methods to enhance communication	0.835	p-value = 0.00

<p>t = -0.25517, df = 145, p-value = 0.799 alternative hypothesis: true difference in means is not equal to 0 95 percent confidence interval: -0.1497550, 0.1155084 mean of the differences: -0.01712329</p>

Figure 1: Paired t-test to compare BIM with other best practices

The figures show the importance of all the methods since the p-value is much larger than 0.05, which means that they have the same importance. The effect of experience, gender, and position on the importance of communication and different best practices to reduce conflicts can be shown in table 4, where Chi-square test with Yates's correction for continuity was used. The table shows the p-values, where only "hiring a coordinator between all design departments" is affected. That means that position, experience, and gender have no effect on the perception of construction projects' professionals on the importance of communication in general, communication for design, and on the other best practices.

Table 4. Effect of position, experience, and gender on the perception of professionals for communication importance and best practices (p-values)

Item	Position	Experience	Gender
Importance of communication	0.550	0.106	0.994
Importance of design stage to minimize conflicts	0.173	0.317	0.475

Importance of communication between different disciplines during the design stages	0.280	0.077	0.682
Importance of communication between design team parties	0.788	0.231	0.256
Having the design team for the architecture and MEP departments in the same company to reduce conflict	0.283	0.066	0.541
Meetings to reduce communication barriers	0.660	0.570	0.364
Hiring a coordinator between all design departments	0.044	0.045	0.150
Utilize the best communication tool in order to accelerate the given tasks	0.858	0.471	0.701
Building Information Modeling system to reduce conflict	0.860	0.593	0.733

To show exactly the effect of position and experience on hiring a coordinator between all design departments, tables 5 and 6 are used.

It is obvious from table 5 that the young professionals with experience of less or equal to 5 years have less perception about the importance of hiring a coordinator between all design departments. Table 6 shows that the client representative is the most interested party in hiring a coordinator between all design departments. However, it is clear that most of the respondents from all the different parties and experience levels are aware of the importance of hiring a coordinator between all design departments.

Table 5. The opinions of professionals with different experience about hiring a coordinator between all design departments

Experience	Strongly agree/ Agree	Neutral	Strongly disagree/ disagree
1-5 years	61.1 %	27.8 %	11.1 %
16-25 years	80.5 %	12.2 %	7.3 %
6-15 years	90.2 %	5.9 %	3.9 %
more than 25 years	77.8 %	22.2 %	0.0 %

Table 6. The opinions of professionals with different positions about hiring a coordinator between all design departments

Position	Strongly agree/ Agree	Neutral	Strongly disagree/ disagree
Client representative	85.7 %	14.3 %	0.0 %
Consultant (design team)	82.1 %	14.3 %	3.6 %
Consultant (site team)	81.1 %	13.5 %	5.4 %
Contractor	80.0 %	6.7 %	13.3 %
Employer	63.6 %	36.4 %	0.0 %

Different communication channels among different parties in construction projects can have different levels of importance. Figure 2 shows the results of single-factor ANOVA test, where the p-value is less than 0.05. That means that some of these channels are more important than others. To show exactly this relationship, Figure 3 is used, where the most important two channels are:

- Consultant (site team)- contractor
- Design team with different disciplines at the design stage

ANOVA: Single Factor						
Source of Variation	SS	df	MS	F	P-value	F crit
Between Groups	22.7863	4	5.696575	4.133244	0.002561	2.384216
Within Groups	999.2192	725	1.378233			
Total	1022.005	729				

Figure 2: ANOVA test for different communication channels

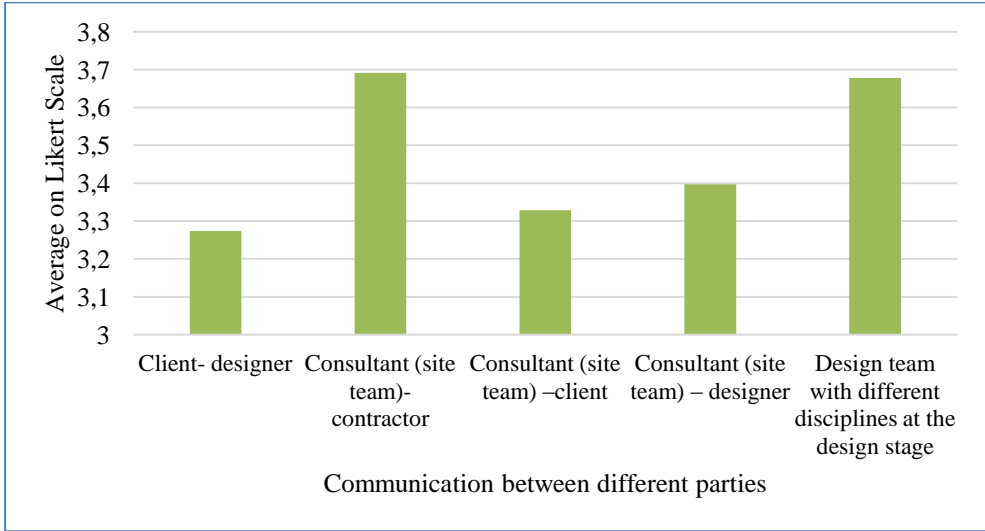


Figure 3: Communication channels with different importance

Respondents emphasise formal communication methods, where 72 % of respondents see that formal methods are more efficient. In spite of being more efficient, formal communication cannot be enough. Informal communication is also needed. For each type of communication (formal and informal), there are several methods. ANOVA test was used to test the differences between the methods of informal communication. P-value was found to be less than 0.05 (0.001), where face-to-face conversation and presentations have higher importance levels than the other methods (telephone and unrecorded meetings). Different importance levels for the formal communication methods were tested using ANOVA test where p-values were found to be very low (almost zero), which

means that the different methods have different importance. The fax was the least important way that is used, while recorded meetings are the most important one, which is a significant tool to respond to any expected claim that might raise by any stakeholder. The results of this study are consistent with the findings in previous studies. In their research, Ali Khan et al. (2020) set a hypothesis to test project communication management's relationship to construction projects' success in the UAE. The results showed that communication had a positive and significant influence on the successful delivery of projects. Yu et al. (2006) found that about 36% of respondents identified open and effective communication as the most frequently mentioned critical factor in the construction projects' briefing phase. The study covered three regions: Hong Kong, the United States, and the United Kingdom, and the results showed that open and effective communication is classified as the essential leading factor for briefing in all three regions. Gunduz and Yahya (2018) stated in their review-based research that effective communication between stakeholders is one of the top critical factors contributing to completing the construction project successfully.

The decision-maker can use this study to enhance their communication, especially in the design phase using BIM tools to enhance the performance in the construction industry. Another change that managers can make to align with the results of the study is to have a coordinator between all design departments. Moreover, the channels that are the most important can be emphasized. It is also a good idea to have design team and MEP departments in the same company to reduce conflict.

Conclusion

In this study, the importance of communication, especially in the design stage and the importance of different best practices, including BIM, are tested based on the opinions of construction projects' professionals with different positions, such as consultants, clients and contractors. Statistical analysis was done, where several methods were used to test six different hypotheses. It was obvious that communication, especially during the design stage, is essential for all the categories of professionals in construction projects in order to implement cost and quality management efficiently. However, position and experience were found to affect the perception of professionals about the importance of hiring a coordinator between all design departments. BIM was found to be important according to the opinions of the professionals as the importance of the other best practices. Moreover, formal methods of communication were found to be more important than informal methods.

Future research can focus on other best practices of communication during the design stage. Moreover, future research can focus on defining possible causes of failure to use BIM in the right way to enhance communication. Stakeholder engagement in the design phase is critical for project success as one of the main factors in reducing conflict. Therefore, examining the effect of communication

channels on key stakeholder engagement is highly recommended in the design phase. Moreover, the effect of culture on the effectiveness of the communication channels is recommended in the UAE, where most of the people living in the country are not citizen and come from different countries.

References

- Aaltonen, K., Jaakko, K. and Tuomas, O., (2008). Stakeholder salience in global projects. *International Journal of Project Management*, 26(5), 509–516.
- Affare, M., *An assessment of project communication management on construction projects in Ghana (Thesis)*. (2012, September).
- Ali Khan, A. A. N., Singh, J. S. K., Kaur, D. and Arumugam, T., (2020). The Success of Construction Projects: Empirical Evidence from the United Arab Emirates. *Global Business & Management Research*, 12(3), 47-59.
- Al-Momani, A. H., (2000). Construction delay: a quantitative analysis. *International Journal of Project Management*, 18(1), 51–59.
- Assaf, S. A., Al-Hejji, S., (2006). Causes of delay in large construction projects. *International Journal of Project Management*, 24(4), 349–357.
- Chahrour, R., Hafeez, M. A., Ahmad, A. M., Sulieman, H. I., Dawood, H., Rodriguez-Trejo, S., Kassem, M., Naji, K. K. and Dawood, N., (2020). Cost-benefit analysis of BIM-enabled design clash detection and resolution. *Construction Management and Economics*, 39(1), 55–72.
- Diallo, A., Thuillier, D., (2005). The success of international development projects, trust and communication: an African perspective. *International Journal of Project Management*, 23(3), 237–252.
- Duy Nguyen, L., Ogunlana, S. O. and Thi Xuan Lan, D., (2004). A study on project success factors in large construction projects in Vietnam. *Engineering, Construction and Architectural Management*, 11(6), 404–413.
- Gunduz, M., Yahya, A. M. A., (2018). Analysis of project success factors in construction industry. *Technological and Economic Development of Economy*, 24(1), 67-80.
- Hossain, L., (2009). Communications and coordination in construction projects. *Construction Management and Economics*, 27(1), 25–39.
- Li, T. H. Y., Ng, S. T. and Skitmore, M., (2012). Conflict or consensus: An investigation of stakeholder concerns during the participation process of major infrastructure and construction projects in Hong Kong. *Habitat International*, 36(2), 333–342.
- Lin, Y. C., Jung, S. and Su, Y. C., (2019). Construction Database-Supported and BIM-Based Interface Communication and Management: A Pilot Project. *Advances in Civil Engineering*, 2019, 1–12.
- Loučanová, E., Olšáková, M., (2016). Open innovation system in e-business with inbound marketing and logistic using. *International Scientific Journal about Logistics*, 3(3), 15-19.
- Maqsoom, A., Mughees, A., Safdar, U., Afsar, B. and Badar ul Ali, Z., (2018). Intrinsic psychosocial stressors and construction worker productivity: impact of employee age and industry experience. *Economic research-Ekonomska istraživanja*, 31(1), 1880-1902.

- Mitkus, S., Mitkus, T., (2014). Causes of Conflicts in a Construction Industry: A Communicational Approach. *Procedia - Social and Behavioural Sciences*, 110, 777–786.
- Müller, R., Turner, J. R., (2005). The impact of principal–agent relationship and contract type on communication between project owner and manager. *International Journal of Project Management*, 23(5), 398–403.
- Nørkjaer Gade, P., Nørkjaer Gade, A., Otrek-Cass, K. and Svidt, K., (2018). A holistic analysis of a BIM-mediated building design process using activity theory. *Construction Management and Economics*, 37(6), 336–350.
- Ogunbayo, O., (2013). Conflict Management in Nigerian Construction Industry: Project Managers' View. *Journal of Emerging Trends in Economics and Management Sciences (JETEMS)*, 4(2), 140–146.
- Park, J.-G., Lee, J., (2014). Knowledge sharing in information systems development projects: Explicating the role of dependence and trust. *International Journal of Project Management*, 32(1), 153–165.
- Pundzienė, A., Alonderienė, R. and Buožiūtė, S., (2007). Managers' change communication competence links with the success of the organisational change. *Inžinerinė ekonomika*, (4), 61-69.
- Safapour, E., Kermanshachi, S., Nipa, T. J. and Kamalirad, S., (2019, June). Investigation of Conflict Impacts on Engineering, Procurement, and Construction Schedule Performance. CSCE Annual Conference, Laval, Canada.
- Shao, J., Müller, R., (2011). The development of constructs of program context and program success: A qualitative study. *International Journal of Project Management*, 29(8), 947–959.
- Shen, W., Zhang, X., Qiping Shen, G. and Fernando, T., (2013). The User Pre-Occupancy Evaluation Method in designer–client communication in early design stage: A case study. *Automation in Construction*, 32, 112–124.
- Spillane, J., Oyedele, L. O., (2013). Strategies for effective management of health and safety in confined site construction. *Construction Economics and Building*, 13(4), 50–64.
- Toor, S.-R., Ogunlana, S. O., (2008). Critical COMs of success in large-scale construction projects: Evidence from Thailand construction industry. *International Journal of Project Management*, 26(4), 420–430.
- Vaux, J. S., Kirk, W. M., (2018). Relationship Conflict in Construction Management: Performance and Productivity Problem. *Journal of Construction Engineering and Management*, 144(6), 04018032.
- Wang, G., Wang, P., Cao, D. and Luo, X., (2020). Predicting behavioural resistance to BIM implementation in construction projects: an empirical study integrating technology acceptance model and equity theory. *Journal of Civil Engineering and Management*, 26(7), 651–665.
- Wu, G., Liu, C., Zhao, X. and Zuo, J., (2017). Investigating the relationship between communication–conflict interaction and project success among construction project teams. *International Journal of Project Management*, 35(8), 1466–1482.

Yu, A. T., Shen, Q., Kelly, J. and Hunter, K., (2006). Investigation of critical success factors in construction project briefing by way of content analysis. *Journal of Construction Engineering and Management*, 132(11), 1178-1186.

Zulch, B., (2016). A proposed model for construction project management communication in the South African construction industry. *Acta Structilia*, 23(1), 1–35.

PODSTAWOWA ROLA SKUTECZNEJ KOMUNIKACJI W PROJEKTACH BUDOWLANYCH POSTĘP, REALIZACJA I REDUKCJA KONFLIKTÓW W ZJEDNOCZONYCH EMIRATAH ARABSKICH

Streszczenie: Komunikacja w sektorze budowlanym jest złożona, zwłaszcza w fazie projektowania, która, jeśli nie jest odpowiednio obsługiwana, może obniżyć produktywność. Ten temat najlepiej studiować w Zjednoczonych Emiratach Arabskich (ZEA) ze względu na zróżnicowaną religię, pochodzenie etniczne i narodowości. Badania w tym zakresie ulegają znacznemu nasileniu ze względu na szybki rozwój budownictwa w ostatnich dwóch dekadach. W tym kontekście badanie to bada znaczenie komunikacji w sektorze budowlanym, zwłaszcza na etapie projektowania. Bada również kluczową rolę kierowników projektów w wykorzystywaniu metod komunikacji między członkami zespołu. Przeprowadzono ankietę, w ramach której zebrano i przeanalizowano 146 respondentów za pomocą kilku metod statystycznych. Wyniki ujawniły znaczenie komunikacji na etapie projektowania. Najważniejszymi kanałami komunikacji są te pomiędzy zespołem projektowym z różnych dziedzin, a następnie kolejno konsultant (zespół roboczy) i wykonawca. Podkreślono znaczenie najlepszych praktyk, takich jak zatrudnienie koordynatora między wszystkimi działami projektowymi w celu ograniczenia konfliktów i usprawnienia komunikacji, a organizowanie spotkań jest przeważnie optymalną metodą komunikacji.

Słowa kluczowe: komunikacja, projekty budowlane, konflikty, zespół projektowy, BIM.

高效通信在阿拉伯联合酋长国建设项目进展, 可交付成果和减少冲突方面的作用

摘要: 建筑行业中的通信非常复杂, 尤其是在设计阶段, 如果处理不当, 则会降低生产率。由于宗教, 种族和民族的多样性, 因此最好在阿拉伯联合酋长国(UAE)研究该主题。由于过去二十年中建筑业的快速发展, 对该领域的研究大大增加了。在这种情况下, 本研究调查了通信在建筑部门中的重要性, 尤其是在设计阶段。它还调查了项目经理在利用团队成员之间的沟通方法方面的关键作用。进行了问卷调查, 收集了146位受访者并使用几种统计方法进行了分析。结果揭示了在设计阶段进行沟通的重要性。最重要的沟通渠道是来自不同学科的设计团队之间的沟通渠道, 然后依次是顾问(现场团队)和承包商。强调了最佳实践的重要性, 例如在所有设计部门之间聘请协调员以减少冲突并增进交流, 而召开会议通常是最佳的交流方法。

关键词: 沟通, 建设项目, 冲突, 设计团队, BIM。