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CAUSES AND EFFECTS OF POOR COMMUNICATION IN THE CONSTRUCTION INDUSTRY IN THE MENA REGION

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Abstract. The construction industry in the Middle East and North Africa (MENA) faces many challenges throughout the project's lifecycle; on top of these challenges is poor communication which occasionally results in project failure or at least time and cost overruns. A range of steps and methods must be taken to minimize the causes and effects of poor communication to enhance communication. The main aim of the study is to exploring poor communication in MENA construction industry and defining the causes and effects of poor communication from the perspective of consultants, clients, and contractors in small and medium enterprises in a developed region like MENA. Construction professionals from different project parties were asked to complete a questionnaire listing 32 causes and 21 effects of poor communication identified from the literature. The model was validated by Structural Equation Modelling SEM in terms of convergent and discriminant validities. The results revealed, that out of 54 cause and effect factors of poor communication, only 18 factors were retained. These causes and effects were ranked using the relative importance index RII. Results showed that all causes and effects are highly important, with RII above 0.6. The most important causes of poor communication are lack of communication procedure and training, followed by lack of adequate representation for project stakeholders. However, the least important cause of poor communication is a lack of understanding among the construction parties. Conversely, the most acute effects of poor communication are misinterpretation, followed by conflict among construction parties. However, the least important effect of poor communication is a late response to the disaster. Results and recommendations derived from this study represent the vital need of the MENA construction industry to focus on enhancing the current status of communication. The commitment of all project stakeholders to the drawn recommendations regarding the causes of poor communication will undoubtedly limit or reduce the effects of poor communication. Construction firms looking to improve their performance may benefit from the developed model.

Keywords: poor communication, MENA, construction, causes, effects, SEM, RII.

Introduction

The construction sector in the MENA area is unique from other industries in terms of organization and features. It is a fast-paced, sophisticated, and well-developed industry that contributes significantly to its Gross domestic product (GDP), particularly in the Arabian Gulf nations. Furthermore, this business used diverse cultural origins, interests, languages, and talents from native, foreign, and expatriate personnel. These qualities pointed to increased complexity and various issues, one of which is a lack of communication among project participants. Communication refers to the interchange or sharing of information, feelings, and opinions between individuals in a group or inside an institution, or between groups and organizations in general (Agarwal & Garg, 2012). Previous research has revealed that communication is a key determinant of project success (Anantatmula, 2015). Excellent communication is necessary for the success of a construction project (Dainty et al., 2007; Emmitt & Gorse, 2006). Effective communication is a key aspect of project-based management and is recognized as essential for successful project management (Yap et al., 2017). Furthermore, the quality and effectiveness of connections between contractors, subcontractors, technical people, consumers, professionals, and regulatory agencies are important to construction enterprises' success (Jimoh, 2012). A construction project's successful completion necessitates excellent collaboration and coordination among various construction specialists and the clientele (Eze et al., 2020). A construction project must have effective cooperation and information exchange among participants to fulfill its objectives, according to Akinradewo et al.

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(2017). Among Palestinian construction project managers, communication skills were recognized as the most critical competence (Omran & Suleiman, 2017). Conversely, poor communication can be termed inefficient, unsuccessful, and inadequate project information communication, which should be avoided in the construction industry (Berntzen, 1988). Poor communication among project team members is one of the leading causes of project cost increases (Mahamid, 2016). Furthermore, one of the most common project risks is a breakdown in communication (Cerić, 2003). According to Hyväri (2007), the experience of project managers in dealing with changes and their capacity to communicate is important to the success of any project. Poor communication has a range of ramifications and effects in the construction industry, including cost overruns, schedule overruns, disagreements, and project failure. It has been established that inefficient communication results in unsuccessful outcomes (Teo, 1991). The majority of troubles in the construction industry result from inadequate and improper communication (Kazi, 2005). A communication breakdown is one of the most severe issues Palestinian project managers face when managing construction projects (Omran & Suleiman, 2016). Effective communication throughout project construction can help the project accomplish its stated goals and objectives. Communication that is effective guarantees that the project's performance increases only by identifying and investigating the causes and effects of poor communication. To mitigate the adverse effects of poor communication on construction projects, construction firms must implement an effective communication management system.

This study aims to investigate the ramifications of poor communication throughout the construction sector in the MENA region and offer viable solutions for dealing with the causes and effects to enhance project performance. However, very little study has been done in this region to examine the causes and effects of poor communication in the construction business. The previous study investigated the poor communication phenomenon in various contexts, such as the United States, Europe, and Australia (Berntzen, 1988; Dainty et al., 2007; Emmitt & Gorse, 2006; Teo, 1991). However, no studies in the MENA area were conducted. Furthermore, the previous study mainly concentrated on developed nations, which constitute only one side of the globe. As a result, the current study intends to fill this knowledge gap and contribute to the literature on the causes and effects of a lack of proper communication in the booming economy of the MENA region's construction sector. Furthermore, the study's findings will provide construction organizations with information to consider when planning construction project communications.

1. Literature review

Many academics and construction professionals have studied the topic of poor communication in the construction industry. It is one of the most common reasons for project failure (Abdul Rahman et al., 2013), with rework resulting in cost and schedule overruns (Ahmad et al., 2019; Emuze & James, 2013) and miscommunication among construction partners (Lee & Bernold, 2008). Interference or distortion during message transmission across the medium or channel of communication causes miscommunication or communication problems (Obonadhuze et al., 2021). The lack of communication between construction partners was listed as the 11th and 12th most important reasons for Iran and Nigeria. This was presented in Oshodi Olalekan and Rimaka's comparative research on the causes and impacts of delay in Iranian and Nigerian construction projects (Oshodi Olalekan & Rimaka, 2013). These findings highlighted the importance of effective communication in reducing time and cost overrun in construction works. Consequently, Darvik and Larsson's (2010) study on the effect of material delivery fluctuations on construction project costs and performance discovered that quality flaws and material delivery deviations were caused by a lack of communication and communication failure among key stakeholders. Construction workers have a wide range of communication skills that are impacted by their education and cultural background. Throughout the delivery process, these discrepancies cause misunderstanding (Cheng et al., 2001). In mega construction projects, poor communication is a prevalent issue, and it is frequently mentioned as the root cause of project failure. As part of the study, a comprehensive literature analysis was conducted to identify 30 causes and 20 implications of poor communication in the construction sector (Hussain et al., 2018). A study by Mailabari (2014) highlighted that deferring perception, poor listening and hasty evaluation, inconsistent nonverbal and verbal communication, poorly phrased message, noise, job experience, suspiciousness, emotional reaction, and information overload are all significant causes of poor communication in the construction industry. Notably, Gamil and Abdul Rahman (2017) conducted a theoretical examination of the causes and effects of poor communication. It was ascertained that the most commonly listed factors in the literature are: a lack of effective communication between construction personnel, a lack of an effective communication channel and platform, poor communication skills, language difficulties, lack of support for advanced communication, and construction teams with varying levels of education. Time overruns, disagreements among construction partners, cost overruns, rework and redesign events, high accident rates, project failure, and demotivated workforces are among the most prevalent consequences of poor communication claimed by contractors (Gamil & Abdul Rahman, 2017). Poor communication among construction partners is a significant source of construction project delays and expense overruns. Uncertain communication goals, poor reporting systems, unclear communication channels, inadequate communication among project stakeholders, language issues, and stereotyping are all factors that lead to communication ineffectiveness, as highlighted by Tipili et al. (2014). Equally, Vdovin (2020) identifies the following as common factors of poor workplace communication: uncertain objectives, poor leadership, workplace cultural diversity, discouraged personnel, personal issues, and employee hurdles. According to experts, poor communication on construction sites is caused by a lack of leadership skills, disengaged employees, undertrained workers, unclear objectives and duties, restricted feedback, and virtual teams (Brookins, 2020). Uncertain goals and a lack of training, increased numbers of disengaged workers, bad management style, a lack of readiness, and jargon use all contribute to ineffective workplace communication (Poppulo, 2020). Fear of communicating, delaying notice of the change, a lack of sector knowledge, individual barriers (habits), insufficient progress monitoring, contractual hurdles (restrictions), and poor communication skills are some of the major causes of ineffective communication (Abdul Rahman & Gamil, 2019). In order to boost project success and output, academics and researchers should dedicate more time and effort to inventing innovative and more effective techniques and ways for dealing with poor communication. Ineffective communication can take various forms, including ineffective communication pathways, inappropriate design, slow information transmission, and inaccurate interpretations (Dainty et al., 2007; Love & Li, 2000; Sambasivan & Soon, 2007). Because of the industry's complexity, a lack of efficient channeling to control and regulate the communication process causes multiple concurrent communication challenges (Fichet & Giraud, 2007). According to Lee and Bernold (2008), efficient construction communication is hampered by a lack of suitable data channels, improper data channels, and wrong data transfers. Imprecise communication channels, according to Tipili et al. (2014), increase project delays. As a result, standardized communication channels in the construction industry are crucial for expediting and simplifying communication.

According to available studies, construction time and expense overruns are most often caused by poor communication. Time overrun is a prevalent problem in the construction industry, and it has a detrimental influence on project success (Faridi & El-Sayegh, 2006). Delays are likely if stakeholders are not properly informed about the aim (Sunday & Afolarin, 2013). According to the research, one of the primary reasons for building delays is a lack of communication (Abdul Rahman et al., 2013). Zidane and Andersen (2018) concluded that poor communication and coordination between parties is in the top 10 universal delay factors in the Norwegian construction industry. One of the leading reasons for schedule overruns has been identified as poor communication among construction parties (Gamil & Abdul Rahman, 2017). Arantes and Ferreira (2021) propose a set of delay mitigation measures in construction where communication plays an important role. Delays caused by inadequate communication include improper communication channels, slow information flow, inaccurate design, erroneous interpretation, reworks, among others (Dainty et al., 2007; Love & Li, 2000; Sambasivan & Soon, 2007; Tipili et al., 2014). Cost overruns have the most impact on the Egyptian construction industry during the design phase. They are caused by the lack of proper communication and cooperation among design players from varied backgrounds (Bassioni et al., 2013). Poor communication among building partners was also one of the causes of cost overruns in Saudi Arabia (Alhomidan, 2013). Yap et al. (2018) examine the influence of project communication management and project learning as preventive measures to mitigate time-cost overruns. According to Sunday and Afolarin (2013), if good communication is not a goal of the stakeholders, it may result in delays. Equally, as stated by Rahman et al., poor communication is a major cause of construction project time overruns (Memon et al., 2012). According to a Malaysian study, the top ten effects of communication problems are cost overrun, high stress in the workplace, disputes or overlapping of information among construction parties, incorrect execution of project activities, poor project planning, poor project information management, poor risk management, time overrun, and worsening relationship among construction personnel (Abdul Rahman & Gamil, 2019). Furthermore, Yakubu et al. (2019) discovered that ineffective communication causes expense overruns, project schedule delays, project abandonment and reduces professional performance. Effective communication has a range of beneficial effects on project performance, such as time savings, better productivity, and enhanced client satisfaction. When communication is inefficient, there will be time overruns, a loss in productivity, and client dissatisfaction. Disagreements are common in the construction industry. Many experts have concluded that poor communication within the construction industry is one of the leading reasons for disputes. As a result, it is a significant outcome of inadequate communication. One of the fundamental causes of conflict has been identified as a lack of communication among construction partners (Chan & Kumaraswamy, 1997). A lack of communication skills is viewed as the most crucial distributing aspect that leads to conflict in the construction industry (Loosemore & Muslmani, 1999). Furthermore, as identified by Enshassi et al. (2009), the danger of construction disputes should be a motivation to emphasize the need for excellent communication in developing relationships among members of construction project teams. Defects in quality requirements and variances in material delivery are caused by communication failure and inadequate communication among the various stakeholders (Darvik & Larsson, 2010). The parties are required to make efforts to improve communication consistency, methods, and tactics. Poor communication channel management has resulted in concurrent communication across several departments and units due to the complexity of building projects. According to Lee and Bernold (2008), challenges to successful communication on construction projects include a lack of proper data channels, improper data channels, and inaccurate data transmission. When the cost of a project exceeds the contract amount, it produces significant controversy and litigation, resulting in the project being abandoned or failing. Sunday and Afolarin (2013) discovered 41 reasons for cost overruns in various road construction projects in Saudi Arabia. Internal administrative concerns, decision-making delays, payment deferral, and poor communication among construction partners were identified as the most important factors contributing to cost overruns. According to Abd El-Razek et al. (2008), throughout the Egyptian construction sector's design process, coordination among design participants from various backgrounds and a lack of communication had a more proportional influence on cost overruns. A study confirmed that one of the biggest reasons for cost overruns is poor communication among building partners (Gamil & Abdul Rahman, 2017).

According to the findings of the previous literature, a large number of academics have investigated the importance of communication in the construction industry in various contexts and a variety of countries. These studies focused on the issue of poor communication and found a link between it and project time and cost overruns, as well as project failure in some cases. Construction project failure, disputes, and other problems should serve as a motivator to emphasize the importance of communication in the development of relationships among members of construction project which will undoubtedly have a positive effect on the success of the projects, thereby benefiting the entire construction sector and, by extension, the entire economy of the country.

2. Research methods

This study is based on a questionnaire survey designed to efficiently collect critical information from many construction stakeholders in the MENA region. Figure 1 shows the methodology of the study from collecting the causes and effects of poor communication from literature review then performing the required data analysis, finding the results and finally drawing the conclusions and recommendations. The survey has 53 criteria (31 causes and 22 effects) established utilizing connected research from the literature review and feedback, modification, and revisions from local experts. Tables 1 and 2 show the origins of these causes and effects and the actual causes and consequences. The survey was divided into two parts. The first part analyzed the causes and implications of poor communication on construction projects. On a five-point Likert scale (5 highly agreeing, and 1 being significantly disagreed), respondents were asked to rate their level of agreement. The second section gathers information on the respondent's firm as well as personal information. Closed-ended questions were employed in the questionnaire. To make it easier for respondents to participate, the questionnaire was created in both Arabic and English. Google forms were used to collect the information. Client, contracting, and consulting construction firms were given the questionnaire, and they were directed to complete the questionnaire by their project management professionals, who have considerable experience with project management and associated issues, particularly poor communication. Close personal engagement and help from several professional groups on social media were used to increase survey response rates.

Before presenting the survey to the remaining sample, a pilot study was undertaken to examine the relevance and validity of the questions posed and determine whether any additional adjustments to the items and structure were necessary. To test the questionnaire's validity, 10 samples were collected from prominent professionals with more than ten years of experience in the building industry. Respondents were asked to evaluate the survey instrument's causes and effects components, highlighting those they considered were insignificant, and to suggest other critical competencies they thought were relevant. Based on their feedback, respondents suggested that more criteria be included in the questionnaire. Before reviewing the survey data, the dependability of the questionnaire was evaluated to ensure that the study was carried out accurately. A high alpha coefficient indicates that the items in each category are more consistent and that the measurements are accurate. The Cronbach's coefficient alpha was calculated using SPSS version 17.0. As a result, as shown in Table 3, it was discovered in this investigation that all of the Cronbach's coefficient alpha values examined were greater than the 0.7 minimum acceptable value (Nunnally, 1978). The reliability of the questionnaire is judged to be quite high.

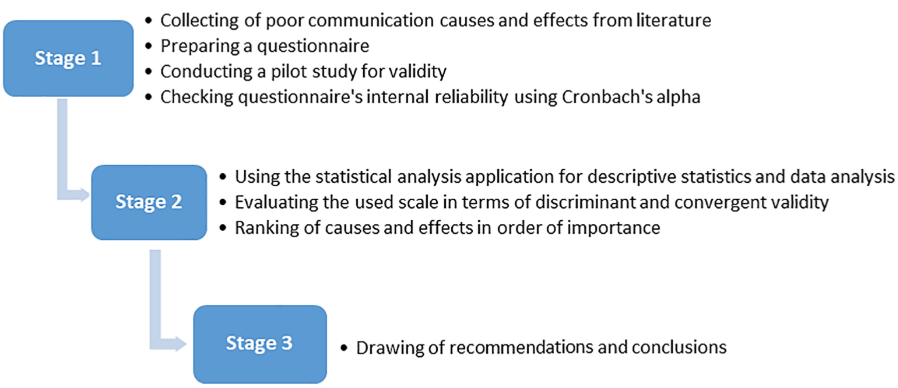

Figure 1. Methodology of the study

Table 1. Sources of cause factors of poor communication

Factors	Source
1) Lack of effective communication between construction parties	Dainty et al. (2007); Gamil and Abdul Rahman (2017); Abdul Rahman et al. (2013)
2) Lack of effective communication system and platform	Dainty et al. (2007); Gamil and Abdul Rahman (2017)
3) Poor communication skills	Dainty et al. (2007); Gamil and Abdul Rahman (2017); Abdul Rahman et al. (2013)
4) Language barrier	Dainty et al. (2007); Gamil and Abdul Rahman (2017)
5) Improper communication channels	Dainty et al. (2007); Gamil and Abdul Rahman (2017)
6) Possessing different levels of education among construction teams	Dainty et al. (2007); Gamil and Abdul Rahman (2017)
7) Lack of support for advanced communication technologies	Dainty et al. (2007); Gamil and Abdul Rahman (2017)
8) Diversity of culture and ethics among construction teams	Emuze and James (2013)
9) Personal barrier	Dainty et al. (2007); Gamil and Abdul Rahman (2017)
10) Technology malfunction	Dainty et al. (2007); Gamil and Abdul Rahman (2017)
11) Possessing differed skills levels among construction teams	Emuze and James (2013)
12) The complexity of the construction industry	Dainty et al. (2007); Gamil and Rahman (2017)
13) Lack of communication plan	Lee and Bernold (2008)
14) Lack of appropriate communications medium	Dainty et al. (2007a); Gamil and Abdul Rahman (2017)
15) Inaccessibility of information	Khahro and Ali (2014)
16) Slow information flow between parties	Abdul Rahman et al. (2013)
17) Frequent changes of project contract	Dainty et al. (2007); Gamil and Abdul Rahman (2017)
18) Improper communication time management	Dainty et al. (2007); Gamil and Abdul Rahman (2017)
19) Poor planning and coordination	Dainty et al. (2007); Gamil and Abdul Rahman (2017)
20) Poor communication management	Dainty et al. (2007); Gamil and Abdul Rahman (2017); Abdul Rahman et al. (2013)
21) Lack of clear objectives	Dainty et al. (2007); Gamil and Abdul Rahman (2017)
22) Lack of mutual respect and trust among construction teams	Dainty et al. (2007); Gamil and Abdul Rahman (2017)
23) Weak organizational structure	Tai et al. (2009)
24) Inaccurate delivery of project information	Lee and Bernold (2008)
25) Unavailability of information in the time of need	Thorpe and Mead (2001)
26) Lack of communication procedure and training	Khahro and Ali (2014)
27) Contractual barrier	Dainty et al. (2007); Gamil and Abdul Rahman (2017)
28) Lack of adequate representation for project stakeholders	Thomas et al. (1998)
29) Lack of understanding among parties	Baguley (1994)
30) Noise interruption	Aulich (2013)
31) Poor detailed drawing	Aulich (2013)
32) Incorrect instructions or technical information	Waziri and Khalfan (2014)
33) Gender differences	Khahro and Ali (2014)

Table 2. Sources of effect factors of poor communication

Factors	Reference
1) Time overrun	Enshassi et al. (2009)
2) Conflict among construction parties	Dainty et al. (2007); Gamil and Abdul Rahman (2017); Abdul Rahman et al. (2013)
3) Cost overrun	Sambasivan and Soon (2007)
4) Rework and redesign occurrence	Dainty et al. (2007)
5) High accident rate	Assaf et al. (2015)
6) Failure of the project	Dainty et al. (2007)
7) Demotivated workforces	Dainty et al. (2007); Gamil and Abdul Rahman (2017); Abdul Rahman et al. (2013)
8) Poor teamwork	Emuze and James (2013)
9) Late response to disaster	Dainty et al. (2007)

End of Table 2

Factors	Reference
10) Low productivity	Dainty et al. (2007)
11) Misunderstanding	Emuze and James (2013)
12) Misinterpretation	Emuze and James (2013)
13) Design errors	Sambasivan and Soon (2007)
14) Low level of satisfaction among parties	Sambasivan and Soon (2007)
15) Waste generation	Alwi et al. (2002)
16) Frequent adjustments in the design and planning	Dainty et al. (2007)
17) Unclear channels	Dainty et al. (2007)
18) Poor risk management	Tipili et al. (2014)
19) Poor project documentation	Cerić (2010)
20) Poor planning	De Lessio et al. (2009)
21) Affects design process	De Lessio et al. (2009)

Table 3. Reliability of the survey instrument

Subscale	No. of Items	Reliability (Cronbach's Alpha)
Causes	33	0.93
Effects	21	0.93
Total Scale	54	0.95

The surveys were analyzed using SPSS Version 17.0 and SmartPLS 3.0 sequentially. The analytical methods comprised converting the finished survey instrument data into a useable format, inserting the data in statistical analysis software for data investigation, and analyzing the results. After entering the data into the statistical analysis application, descriptive statistics such as means and frequencies were used to explore the respondents' firms' overall profile and the respondents' backgrounds.

The analysis then proceeded on to uncover the causes and effects of the MENA construction industry's poor communication components. The researchers used a Confirmatory Factor Analysis (CFA) on all components examining the causes and effects of poor communication dimensions to evaluate the used scale in terms of discriminant and convergent validity (Worthington & Whittaker, 2006). Convergent validity assesses whether or not several items designed to evaluate the same notion agree. Hair Jr. et al. (2013) highlighted that this study used composite reliability, factor loadings, and Average Variance Extracted (AVE) to assess convergent validity. The relationship between the variables and the factors is referred to as standardized factor loading. On the flip side, AVE measures convergence amongst a set of items reflecting a latent construct in Structural Equation Modeling (SEM). Hair Jr. et al. (2013) presented that it is determined as the average percentage of variance explained among the constituents of a construct.

As defined in SEM, composite reliability is a measure of item dependability and internal consistency that reflects a latent idea. As measured by empirical criteria, discriminant validity relates to how distinct a construct is from other constructs (Hair Jr. et al., 2013). The presence or lack of cross-loading across constructs and error variation across and within constructs are used to justify discriminant validity (Hair Jr. et al., 2010). The Fornell-Larcker approach is used to examine the scale's discriminant validity. According to Hair Jr. et al. (2013), discriminant validity is fulfilled when the square root of the component's average variance extracted (AVE) values is larger than any inter-component correlations' variance. The concept has been expressed as a higher-order construct in a reflective-reflective method due to its multidimensional nature (Ringle et al., 2012). Each item was created as a mirror of a first-order cause or effect component. Using the indicator-repeated approach, each item was represented as a reflecting indication of the necessary higher-order components (Wetzels et al., 2009). Modeling higher-order construct models need the repeated technique because all latent variables in a structural equation model, including higher-order constructs, must have at least one measurement model (Ringle et al., 2012). Consequently, the measuring tool was built as a hierarchical component model with reflective (sub)-constructs and reflective indications. Using CFA, the acquired factor scores were used to estimate each second-order model separately first and then the whole model concurrently. The measuring methods will be used to evaluate the first-order constructs and their related second-order constructs. After carrying the CFA, the researcher performed the final stage, ranking the factors according to their level of importance using the relative importance index (RII).

3. Results

3.1. Background of the respondents and construction firms

The respondents were asked different questions and their years of experience, position, type of firm, specialization of the firm, firm's years of experience, and the nationality of firms. Results shown in Table 4 show approximately the same percentage of the type of organization, half of the respondents are site engineers, 60% of organizations are specialized in building construction, more than half of respondents possess less than 10 years of work experience, 39% of firms has more than 20 years of experience, and finally, the respondents are from different countries of the Middle-East region, 38% from Jordan and 42% from the Gulf region.

Table 4. Background of respondents and construction firms

Item	Percent
Type of the organization	
Client	34
Contracting	35
Consulting	31
Position of respondents	
Senior design engineers	18
Company owners	12
Project managers	22
Site engineers	48
Specialization of organization	
Buildings	60
Water & Sewerage	2
Highway	13
All	25
Respondents' experience in years	
0–5	37
6–10	22
11–15	14
16–20	12
More than 20	15
Organization experience in years	
0–5	16
6–10	11
11–15	21
16–20	13
More than 20	39
Firm nationality	
Jordan	38
UAE	10
Saudi Arabia	16
Kuwait	16
Syria	20

3.2. Convergent validity results

The cause and effect factors for poor communication are made up of 54 items (measurement model). The dimension was validated by Smart PLS 3.3.3 in terms of convergent and discriminant validities (Ringle et al., 2014). The PLS algorithm was rerun to ensure that the items were properly loaded. Loading that was less than 0.7 was immediately removed. Loading above 0.7 was investigated to see if it should be removed or kept for theoretical reasons. To increase the average variance extracted (AVE) value, some items with low loading were removed. The valid items that satisfied the convergent validity of the poor communication causes and effects constructs are shown in Figure 2. The AVE and composite reliability of the poor communication causes and effects construct are shown in Table 5. These values were found satisfied (CR > 0.7 and AVE > 0.5). Therefore, the convergent validity of the construct was achieved.

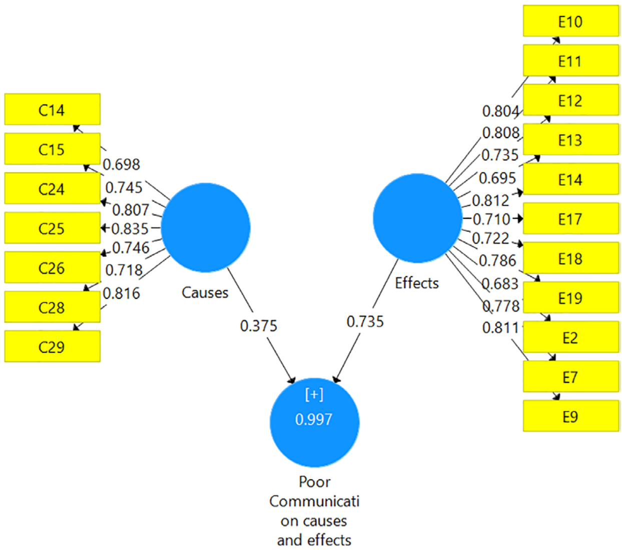

Figure 2. Structural modeling and loadings of the Cause and effect factors of poor communication

3.3. Discriminant validity results

When the square root of the AVE values from the component is greater than the variance of any inter-component correlations, the scales' discriminant validity is satisfied, according to the standards recommended by Fornell and Larcker (1981). The AVE values on the diagonal are greater than the correlation coefficient of that component with all other components (Table 6). In addition, there is no cross-loading between items and other constructs, as shown in Table 7, implying that items are more strongly associated with their construct in the model. As a result, discriminant validity was met for all components, and the measurements met the criteria set forth by Hair Jr. et al. (2013). The convergent and discriminant validity of the poor communication construct used in the study is supported by these findings.

Table 5. Results summary of item loading, AVE and composite reliability of causes and effects of poor communication construct

Construct	AVE	Composite Reliability
Causes	0.590	0.909
Effects	0.578	0.937

Table 6. Discriminant validity-variable correlation of Causes and effects of poor communication construct

	Causes	Effects
Causes	0.768	
Effects	0.575	0.760

Table 7. Discriminant validity-cross loading of items

Item	Causes	Effects
Lack of appropriate communications medium C14	0.698	0.439
Inaccessibility of information C15	0.745	0.512
Inaccurate delivery of project information C24	0.807	0.446
Unavailability of information in the time of need C25	0.835	0.454
Lack of communication procedure and training C26	0.746	0.429
Lack of adequate representation for project stakeholders C28	0.718	0.365
Lack of understanding among parties C29	0.816	0.429
Low productivity E10	0.494	0.804
Misunderstanding E11	0.475	0.808
Misinterpretation E12	0.411	0.735
Design errors E13	0.252	0.695
Low level of satisfaction among construction parties E14	0.485	0.812
Unclear channels E17	0.278	0.710
Poor risk management E18	0.288	0.722
Poor project documentation E19	0.394	0.786
Conflict among construction parties E2	0.506	0.683
Demotivated workforces E7	0.591	0.778
Late response to disaster E9	0.541	0.811

To sum up, the convergent and discriminant validity of the poor communication construct used in the study was met for all components by the CFA findings. The results revealed, that out of 54 cause and effect factors of poor communication, only 18 factors were retained for ranking investigation in the following section.

3.4. Ranking of the causes and effects of poor communication

The purpose of this section is to rank the retained 7 cause and the 11 effect factors of poor communication in order of importance. In this study, an ordinal measurement scale was used, which is a ranking of rating data that uses integers in ascending or descending order. A relative importance index (RII) was used to analyze data on an ordinal scale. The RII is a simple but effective technique for measuring attitudes toward surveyed variables that are widely used in construction research. On a five-point Likert scale, respondents were asked to rank the causes and effects factors in order of importance (1 = strongly disagree; 2 = disagree; 3 = neutral; 4 = agree; 5 = strongly agree). The RII was calculated based on the survey response using the RII equation (Enshassi et al., 2007; Omran & Suleiman, 2017; Salem & Suleiman, 2020) as shown in the following formula (1):

$$\text{RII} = \frac{\sum W}{\left(A^{*}N\right)}, \quad (1)$$

where RII denotes relative importance index; W denotes respondents' weighting of each factor (ranging from 1 to 5); A denotes the highest weight (in this case, 5); and N denotes the total number of respondents. The RII value ranged from 0 to 1 (inclusive); the higher the RII, the more significant the cause or effect. After that, the RIIs were ranked, and the results are presented in Tables 8 and 9.

Table 8. RII and ranking of the causes of poor communication

Causes	RII	Overall ranking
Lack of communication procedure and training	0.704	1
Lack of adequate representation for project stakeholders	0.648	2
Inaccurate delivery of project information	0.646	3
Unavailability of information in the time of need	0.646	4
Inaccessibility of information	0.630	5
Lack of appropriate communications medium	0.624	6
Lack of understanding among parties	0.617	7

Table 9. RII and ranking of the effects of poor communication

Effects	RII	Overall ranking
Misinterpretation	0.702	1
Conflict among construction parties	0.700	2
Misunderstanding	0.693	3
Low level of satisfaction among construction parties	0.680	4
Low productivity	0.678	5
Design errors	0.674	6
Demotivated workforces	0.672	7
Poor risk management	0.665	8
Poor project documentation	0.665	9
Unclear channels	0.639	10
Late response to disaster	0.637	11

4. Discussion

The results of the previous section are discussed in detail in the following sections. In this section, we will go over the findings of our investigation into the cause factors that contribute to poor communication. Second, we will discuss the findings of the study into the effect factors of poor communication. Again, it is crucial to remember that, according to the results of convergent and discriminant validity, the retained number of cause factors is 7, and the number of effect factors is 11.

4.1. Causes of poor communication

Out of 33 causes of poor communication, only 7 causes retained after the confirmatory factor analysis. Results show that all the cause factors are highly important as supported by Lee and Bernold (2008), Abdul Rahman and Gamil (2019), Thomas et al. (1998), and they are as shown in Table 8: (1) Lack of communication procedure and training (RII = 0.704), (2) Lack of adequate representation for project stakeholders (RII = 0.648), (3) Inaccurate delivery of project information (RII = 0.646), (4) Unavailability of information in the time of need (RII = 0.646), (5) Inaccessibility of information (RII = 0.630), (6) Lack of appropriate communications medium (RII = 0.624), and finally (7) Lack of understanding among parties (RII = 0.617). The first and the most important cause of poor communication according to all respondents in the MENA is lack of communication procedures and training; It was an expected result, as many practitioners of construction clarified that there are no clear and specific procedures for communication, they also stressed that they did not receive any communication training, whether during their academic or while practicing the engineering profession. In addition, this result was found by Poppulo (2020) who consider it one of the seven factors that influence ineffective communication, along with a lack of employee training, implying that employees are getting their information from the wrong sources or are missing it entirely. They claimed that if the problem grows bigger, their interpretation of the data will be repeated internally and externally, becoming the absolute truth. Lack of adequate representation for project stakeholders was considered as the second most important cause of poor communication. Thomas et al. (1998) found the same cause in their research while identifying and measuring critical communications variables during the execution phases of EPC projects. The reason for this problem is that most project stakeholders were appointed one representative for them at the beginning of the project. However, later it is changed for several reasons, such as the incompetence of the representative or preoccupation with other projects. In order to address the third cause of poor communication, which is inaccurate project information delivery, Lee and Bernold (2008) recommended using web-based communication technologies, which provide a rich set of new tools for bridging those chasms. They have demonstrated that effective communication is severely hampered in the construction industry by a lack of appropriate data channels and inaccurate data transfers. Availability of information in the time of need and inaccessibility of information was considered one of the keys to project success (Thorpe & Mead, 2001). They stated that today's project communication is becoming increasingly complex, and that timely transmission of project information is critical to project success; and they recommended using Project-specific Web sites (PSWSs), which provide construction personnel with new ways to gather information for today's complex projects. Lack of appropriate communications medium is one of the most important causes of poor communication according to respondents. Dainty et al. (2007) emphasize the importance of different communication mediums like oral, body language, written, paper, electronic etc. Poor communication platforms, according to Hussain et al. (2018) imply that the specified locations where information is exchanged are inefficiently performing their connective central role. Several researchers suggested using new communication ways in construction projects to overcome the poor and ineffective communications (Lee & Bernold, 2008; Thorpe & Mead, 2001).

4.2. Effects of poor communication

Confirmatory factor analysis CFA was performed on the 21 effects of poor communication; 11 effects retained. Results show that all the effect factors are highly important, the same results were found by Emuze and James (2013), Gamil and Abdul Rahman (2017), Hussain et al. (2018) and Khahro and Ali (2014). The effect factors are shown in Table 9 and they are as follow: (1) Misinterpretation (RII = 0.702), (2) Conflict among construction parties (RII = 0.700), (3) Misunderstanding (RII = 0.693), (4) Low level of satisfaction among construction parties (RII = 0.680), (5) Low productivity (RII = 0.678), (6) Design errors (RII = 0.674), (7) Demotivated workforces (RII = 0.672), (8) Poor risk management (RII = 0.665), (9) Poor project documentation (RII = 0.665), (10) Unclear channels (RII = 0.639). The first and the third effects were also considered some of the effects of poor communication (Emuze & James, 2013). They showed the extent to which respondents perceive that incidences of miscommunication and misinterpretation occur on site. They found that a high percentage of respondents indicated that "miscommunication and misinterpretation" sometimes (41.3%) or often (30.2%) occur on site. Conflict among construction parties is the second most important effect of poor communication according to the results of RII. This result is emphasized by Gamil and Abdul Rahman (2017), who found that the second most effective factor resulting from the problem of poor communication in the construction industry is conflict among the construction parties, which was repeated in 14 research. Also, Khahro and Ali (2014) considered poor communication as a direct cause leading towards conflicts in construction projects. The fourth most important effect of poor communication is the low level of satisfaction among construction parties. This effect was found by Pérez Gómez-Ferrer (2017), who stated low level of satisfaction among construction parties would bring to light if there is poor communication between the project parties, especially with the client. According to this study, low productivity and design errors are among the top ten effects of poor communication. A variety of factors can cause low productivity, but one of the most common is a lack of communication. It's made in terms of quality and quantity, which directly impacts the project's success (Hussain et al., 2018). Demotivated workforces result from poor communication; it could be connected and lead to low productivity, as explained previously. Demotivated workers may result in project failure if they reach a point where their continuation or success is no longer in their best interests (Hussain et al., 2018). Furthermore, the results assure the importance of communication in projects, as poor communication will cause poor risk management. This conclusion was found by Hussain et al. (2018), who stated that poor risk management could be rooted in poor communication of instruction. According to the results of this study, the problem of poor project documentation and information transfer and storage will arise in a project due to poor communication. Dainty et al. (2007) emphasize the importance of clear channels in projects. They affirmed that construction is an established sector that has refined processes and protocols to facilitate communication. An element of uncertainty always exists that can undermine the communication channels necessary for project success. Project parties to establish firm and permanent communication channels that accord with all of the stakeholders involved.

Conclusions and recommendations

After applying the CFA technique, it is clear from the model that out of 54 causes and effects the retained are 18 causes and effects of poor communication. These factors were identified and ranked from most important to least important using the RII technique. Results showed that all causes and effects factors are highly important, with RII above 0.61. The most important causes of poor communication are lack of communication procedure and training, followed by lack of adequate representation for project stakeholders. However, the least important cause of poor communication is lack of understanding among parties. On the other side, the most important effects of poor communication are misinterpretation, followed by conflict among construction parties. However, the least important effect factor of poor communication is late response to the disaster. Several conclusions may be derived from this study's findings. Effective communication is critical to project success; it will boost project outcomes while also resolving or minimizing a variety of construction project challenges. Poor communication is a significant issue in the construction sector in the MENA area due to the complexity and changing nature of building projects. As a result, excellent communication is challenging to achieve in the construction industry. A variety of efforts must be taken to mitigate the causes and repercussions of the lack of proper communication in the construction industry. Because effects are the product of causes, eliminating the causes may result in zero effects. The causes and effects of poor communication in the construction industry have played a significant role in the construction industry's communication problem. This demonstrates how critical it is for the construction industry to address the current state of communication right away. The structural equation modeling SEM results show that the indicators fulfilled the requirements, reliability, and convergent validity had been guaranteed individually. In conclusion, the analysis of the measurement model shows that the measure used is reliable and valid.

Based on the results, the following recommendations could be drawn regarding the causes and effects of poor communication in construction projects in the MENA region: Effects of poor communication are results of causes; hence eliminating the causes can result in no effects. The commitment of all project stakeholders to these recommendations regarding the causes of poor communication will undoubtedly limit or reduce the effects of poor communication. All project parties should focus on implementing training courses to improve communication methods; this responsibility falls on everyone's shoulders, starting with universities that must have some specialized courses concentrating on communication methods and management and engineering associations, contractors, consultants, etc. All those involved in construction projects should pay attention to clarifying and defining communication procedures and channels. They must devote more attention to improving communication regularity, means, and methods. Moreover, the project parties should have awareness in finding an appropriate mechanism to document information, collect and deliver it to those who are needed promptly and with appropriate details and allow access to this information most easily; they should choose the appropriate means for everyone and benefit from modern technology. The clear and appropriate methods and channels of communication and ensuring the correct flow of information will inevitably lead to the absence of misunderstanding, wrong interpretations between project parties, and no conflict or frustration for any party. One of the critical problems in projects is the weakness or absence of a representative of one of the parties to the project, so everyone involved in the project must name a representative and make sure that he/she is devoted to following up the project and ensuring his ability to communicate with the rest of the parties successfully and effectively. It is recommended that all project stakeholders, especially site managers, site employees, and workers, realize the importance of effective communication and strive to become effective communicators.

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