



Construction Workers' Issues from Worldwide and Saudi Arabia Studies

Nashwan Al-Emad^{1*}, Ismail Abdul Rahman²

²Department of Building and Construction Engineering, Faculty of Civil Engineering and Built Environment, Universiti Tun Hussein Onn Malaysia, 86400 Parit Raja, Batu Pahat, Johor, MALAYSIA

¹Absal Paul Contracting Company,
Prince Muhammad Ibn Saad Ibn Abdulaziz Rd, Al Aqiq, Riyadh 13515, SAUDI ARABIA

Corresponding Author

DOI: <https://doi.org/10.30880/ijscet.2021.12.04.008>

Received 07 May 2021; Accepted 23 June 2021; Available online 29 December 2021

Abstract: Majority of the construction workers in Saudi Arabia are foreigners from several countries such as India, Pakistan, Bangladesh and others. These foreign workers are facing issues not only regarding construction demanding tasks but also facing social and climate adaptations. This review paper compiles previous research works related to construction workers issues which were carried out worldwide including Saudi Arabia. It able to extract 63 issues from worldwide studies and narrowed it to 45 issues for Saudi Arabia situation. With the issues from Saudi Arabia, it was clustered into 2 main categories which are technical and non-technical related issues. In technical category, 15 issues were assigned to 4 groups while for non-technical category, 30 issues were assigned to 7 groups. Based on frequency analysis, the 3 most frequent construction workers' issues from worldwide studies are shortage of skilled labours, low productivity level and lack of experience. While from Saudi Arabia studies the 3 most frequent construction workers' issues for both technical and non-technical groups are shortage of skilled labours, low productivity level, unqualified workforce and personal conflicts among labours, absenteeism of labours, discrimination based on nationality respectively. These preliminary findings serve as a basis for further investigation related to construction workers issues in the construction industry of Saudi Arabia.

Keywords: Construction workers, workers' issues, Saudi Arabia, construction industry

1. Introduction

Construction industry is as an economy sector which involves plans, designs, constructs, alters, maintains, repairs and eventually demolishes buildings of all kinds of civil engineering works, mechanical and electrical engineering structures and other similar works (Ofori, 1990) cited by (Mustapa, 2014). The industry is a major sector which contributes significantly to both economic and social of any country (Mustapa, 2014; Enshassi et al., 2009; Lopes, 2012); Jarad, 2012; Ofori, 2015; Al-Emad, 2016). It involves a broad range of stakeholders and has wide ranging linkages with other segments of activity such as manufacturing. Furthermore, construction industry is classified into various segments such as industrial, residential, commercial, utilities and infrastructure. Hence, construction industry involves different organizations including property developers, architects, engineers, quantity surveyors, accountants, civil engineering contractors, engineering contractors, management contractors, laborers, subcontractors and specialist trades. Due to the nature of construction industry is unique, fragmented, resources driven and others, hence issues faced by construction industry are tremendous in numbers such as delay, cost overrun, quality, productivity, workmanship, safety, waste, and human (Pramanik and Chackrabarti, 2013; Marzouk and El-Rasas, 2014; Abdelaal et al., 2014;

Masood et al., 2015; Aziz and Abdel-Hakam, 2016). Hence this paper presents issues engulfed construction workers specifically for Saudi Arabia through comprehensive literature review from previous research works.

2. Construction Workers

Construction industry is known as a labor-intensive industry which requires skills, commitment and effective organization of manpower (Morton and Ross, 2008; Nasaruddin and Rahman, 2016). In construction projects, construction workers are important elements where construction works cannot be carrying out without the involvement of skilled, semi-skilled or unskilled labors (Loosemore et al., 2003; Dutta, 2014; Ngwenya and Aigbavboa, 2017). However, with the engagement of these workers many issues may affect construction workers. These issues not only related to technical construction tasks but also external issues such as social and climate adaption on construction sites. There are 63 issues faced by construction workers have been extracted from 32 published research articles. These issues are clustered into 2 main categories that are technical and non-technical. For technical category, it encompasses of 4 groups with 17 issues which explain the issues related to construction site in terms of execution and progress, educational background of workers, communication skill possesses by construction workers and motivational related issues as presented as appendix A. While for non-technical category it has 7 groups comprised of 46 issues which are attitudes related issues, behaviors related issues, socio-psychological related issues, cultural related issues, health & safety related issues, financial related issues, authority related issues as shown as in appendix B. Besides worldwide studies, this study has extracted 45 issues for Saudi Arabia situation as presented as appendix C.

3. Research Methodology

There are many research works have been carried out on issues engulfed construction workers. Hence, this study conducted a comprehensive review on previous research works related to construction workers issues worldwide including Saudi Arabia. It able to extract 63 works issues from worldwide studies and narrowed it to 45 issues for Saudi Arabia situation. Issues from Saudi Arabia were clustered into 2 main categories which are technical and non-technical related issues. In technical category, 15 issues were assigned to 4 groups while for non-technical category, 30 issues were assigned to 7 groups. Frequency analysis approach was adapted to extract issues from resources. Based on the frequency analysis, the most significant issues were determined that highlighted by previous researchers. This initial study was used as inputs for further investigation related to construction workers issues in the construction industry of Saudi Arabia.

4. Saudi Arabia Construction Industry

Construction industry in Saudi Arabia is considered the largest and fastest growing market in the Gulf region (Alrashed et al., 2014). It has a robust growth because more government spending on construction and infrastructure projects. Saudi Arabia is known as the largest exporter of oil in the world. As a result, the Saudi economy is constantly on the rise and the construction industry specifically has seen significant increase in activities. Alrashed et al. (2014) reported that Saudi Arabia government has allocated a huge worth for construction industry. According to Saudi Arabia Industrial Sector Overview Report in 2016, construction industry currently valued at USD 600 billion until 2020. Saudi Arabia is one of the fastest growing populations this causes higher demands for housing, healthcare, education, and transport infrastructure which stimulate the construction industry further. On the other hand, construction industry is facing financial challenges due to increase of military expenditure, fall in oil prices, weakening financial position of the country, youth unemployment and dwindling financial reserves. Besides, the construction industry of Saudi Arabia is facing chronic problems such as delay, cost overrun (Alotaibi et al., 2014; Rahman et al., 2016b; Elawi et al., 2016), poor safety (Baxendale & Jones, 2000; Rachel, 2006; Nahmens and Ikuma, 2009) and poor quality (Marosszeky et al., 2002; Hussin et al., 2012).

Construction project can be classified as successful project if completed as per initial schedule, within cost limits and with high quality (Nasaruddin and Rahman, 2016). Based on Assaf and Al-Hejji (2006), 70% of large construction projects in Saudi Arabia had time overrun with average delay of 10% to 30% of the original duration. Rahman et al. (2016a) conducted a modelling analysis of 37 delay factors engulfed Makkah's construction industry. Findings revealed that the factors related client and consultant group is the most dominant group influence the construction projects in Makkah city, Saudi Arabia. Additionally, low productivity level, shortage of skilled workforce, poor living conditions, low wages, delaying in salaries payment, non-provision of proper transportation, injuries, fatalities are issues engulfed construction workers in Saudi Arabia (Almannae, 2014; Andrieu et al., 2016). These problems subsequently have direct and indirect impacts to the overall project's performance.

5. Saudi Arabia Construction Workers

Site workers in Saudi Arabia are comprised primarily of foreigner male workers only (Andrieu et al., 2016). They are either foreign workers or immigrants born domestic workers. These site workers are classified into three classes based on the skills and their respective academic standings. The lowest class is the group of unskilled site workers, the middle

is composed of semi-skilled site workers and the highest class is the skilled site workers (Andrieu et al., 2016). Thus, construction industry requires all these three classes of workers but more desirable is the skilled category to carry out the construction tasks correctly. Based on Achoui (2009), Saudi construction industry prefers foreign workers because Saudi labour high cost; negative social and cultural perceptions and attitudes towards manual and low status jobs; expatriates are more disciplined than Saudis; job tenure to Saudis vs. job contract to expatriates; Saudis are less qualified in English language and technical skills; and finally, Saudi employees are more reluctant to change job locations. Therefore, employers prefer to hire foreign workers rather than local workers for their organizations. According to Saudi Arabia Manpower and Employment Report (2016), the total number of expatriate's workforce that is working in construction industry is 4.4 million. Table 1 presents the demography of site workers in Saudi Arabia' construction industry and it appears all of them are foreigners from different countries.

Table 1 - Migrant workers in Gulf countries included KSA

	Bahrain (No.)	Kuwait (No.)	Oman (No.)	Qatar (No.)	Saudi Arabia (No.)	UAE (No.)	Total (No.)
Bangladesh	100444	279169	148314	220403	1309004	1089917	3147251
India	262855	730558	644704	576776	1761857	2852207	6828957
Indonesia	29553	82139	35027	64849	379632	320684	911884
Nepal	722	2006	-	1583	17918	7828	30057
Pakistan	87892	244281	117208	192860	1319607	953708	2915556
Philippine	43971	122214	21669	96487	1028802	477139	17902782
Sri Lanka	9804	27251	14091	21516	147032	106394	326088
Other	194116	540435	131019	426481	3096581	2019104	6407736
Total	729357	2028053	1112032	1600955	9060433	7826981	22357811

Units= Number (No.)

6. Conclusion

Workers in construction industry are one of the essential components to achieve success for construction projects. Saudi Arabia construction industry depends on foreign workers to carry out the construction tasks. However, there are many issues and challenges faced by construction workers in Saudi Arabia. This paper has compiled previous research works that carried out in worldwide construction industry including Saudi Arabia and found that there are 63 and 45 issues related to construction workers in worldwide and Saudi Arabia respectively. Based on frequency analysis, it has identified the most 3 significant construction workers' issues that highlighted by previous researchers as summarised as in Table 2.

Table 2 - Three most significant construction workers issues

No.	Worldwide		Saudi Arabia	
	Technical	Non- Technical	Technical	Non- Technical
1	Shortage of skilled labors	Absenteeism of labors	Shortage of skilled labors	Personal conflicts among labors
2	Low productivity level	Labors' strikes	Low productivity level	Absenteeism of labors
3	Lack of experience	Long working hours for more than ten hours per day	Unqualified workforce	Discrimination based on nationality

Hence with these findings, it provides opportunities for practitioners and also researchers to understand and explore more on the issues engulfed construction workers so as to offer better alternatives for the construction industry to deal with the workers.

Acknowledgement

The authors would like to thank and acknowledge Universiti Tun Hussein Onn Malaysia (UTHM) for the all kind of supports.

Group	Workers' Issues	Education Related Issues	Communication & Motivation Related Issues	Project Management Related Issues	Frequency
	Yankov & Kleiner (2001)	Unqualified workforce		Working out of sequence	
	Odeh & Battaineh (2002)	Low education		Unfair work distribution	
	Crépon et al. (2003)			Confiscation of workers' passports by employers	
	Koushki et al. (2005)			Lack of annual vacation given to labours	
	Ghaemi (2006)				
	Faridi & El-Sayegh (2006)				
	Sambasivan & Soon (2007)				
	Sui Pheng et al. (2008)				
	Le-Hoai et al. (2008)				
	Toor & Ogunlana (2008)				
	Enshassi et al. (2009)				
	Tabassi & Bakar (2009)				
	Hallowell (2010)				
	Soekiman et al. (2011)				
	Hamid et al. (2011)				
	Memon et al. (2011)				
	Chia (2011)				
	Ghoddousi & Hosseini (2012)				
	Sangole & Ranit (2015)				
	Pramanik & Chackrabarti (2013)				
	Memon (2013)				
	Rahman et al. (2013)				
	Ejaz et al. (2013)				
	Almannace (2014)				
	Marzouk & El-Rasas (2014)				
	Hasan et al. (2014)				
	Islam et al. (2015)				
	Zidane et al. (2015)				
	Masood et al. (2015)				
	Assbeihat (2016)				
	Hallowell & Yugar-Arias (2016)				
	Aziz & Abdel-Hakam (2016)				
					2
					1
					1
					2
					1
					2
					3
					1
					1
					2
					1

Group	Workers' Issues			
	Yankov & Kleiner (2001)			
	Odeh & Battaineh (2002)			
	Crépon et al. (2003)			
	Koushki et al. (2005)			
	Ghaemi (2006)			
	Faridi & El-Sayegh (2006)			
	Sambasivan & Soon (2007)			
	Sui Pheng et al. (2008)			
	Le-Hoai et al. (2008)			
	Toor & Ogunlana (2008)			
	Enshassi et al. (2009)			
	Tabassi & Bakar (2009)			
	Hallowell (2010)			
	Soekiman et al. (2011)			
	Hamid et al. (2011)	✓		
	Memon et al. (2011)			
	Chia (2011)			
	Ghoddousi & Hosseini (2012)			
	Sangole & Ranit (2015)			
	Pramanik & Chackrabarti (2013)			
	Memon (2013)			
	Rahman et al. (2013)			
	Ejaz et al. (2013)			
	Almannace (2014)			
	Marzouk & El-Rasas (2014)	✓		
	Hasan et al. (2014)			
	Islam et al. (2015)			
	Zidane et al. (2015)			
	Masood et al. (2015)			
	Assbeihat (2016)			
	Hallowell & Yugar-Arias (2016)			
	Aziz & Abdel-Hakam (2016)			
				1
		✓		2
			✓	1
	Restrictive legislations		✓	1
				Frequency

Appendix C: Workers' issues in Saudi Arabia construction industry

Group	Sub-Group	Workers' Issues	Assaf & Al-Hejji (2006)	Al-Kharashi & Skitmore (2009)	Mahamid (2013)	Almannaee (2014)	Abdelaal et al. (2014)	Mahamid (2016)	Al-Emad & Nagapan (2015)	Alzara et al. (2016)	Al-Emad et al. (2016)	Andrieu et al. (2016)	Frequency	
Technical Related Issues	Skills Related Issues	Shortage of skilled labours	√	√	√		√	√	√	√	√		8	
		Availability of site labours					√						1	
		Lack of experience					√						1	
		Low productivity level	√	√	√		√		√		√		6	
		Re-works due to poor workmanship			√									1
	Education Related Issues	Unqualified workforce	√				√		√		√	√		5
		Ignorance and Illiteracy		√										1
		Low education				√								1
	Communication & Motivation Related Issues	Misunderstanding among labours					√							1
		Lack of a financial motivation system (Premium)					√							1
		Lack of competition between the labours					√							1
	Project Management Related Issues	Non-provision of proper transportation				√	√						√	3
		Poor relationship between managers and labours			√									1
		Confiscation of workers' passports by employers				√								1
		Lack of annual vacation given to labor				√								1
	Non-Technical Related Issues	Attitudes Related Issues	Personal conflicts among labours	√	√			√						3
Disloyalty							√						1	
Absenteeism of labours			√				√		√				3	
Labours' strikes			√						√				2	
Cultural		Discrimination based on	√	√			√						3	

References

- Ofori, G. (1990). *The construction industry: aspects of its economics and management*. Singapore University Press.
- Mustapa, F. D. (2014). *Managing immigrant construction workers in peninsular Malaysia: the economic perspective*. Loughborough University: PhD Thesis.
- Enshassi, A., Al-Najjar, J., & Kumaraswamy, M. (2009). Delays and cost overruns in the construction projects in the Gaza Strip. *Journal of Financial Management of property and Construction*.
- Lopes, J. (2012). *Construction in the economy and its role in socio-economic development. New Perspectives on Construction in Developing Countries*. Spon, Abingdon.
- Jarad, G. H. (2012). *The construction manager leading characteristics for the success of construction projects in the Gaza Strip*. The Islamic university of Gaza: M.Sc. Thesis.
- Ofori, G. (2015). Nature of the construction industry, its needs and its development: A Review of four decades of research. *Journal of Construction in Developing Countries*, 20(2), pp. 115.
- Al-Emad, N. (2016) *Structural Relationships Model of Delay Factors In Makkah Construction Industry*. Universiti Tun Hussein Onn Malaysia: M.Sc. Thesis.
- Pramanik, S., and Chackrabarti, S. N. (2013). A study on problems of site workers in West Bengal based on neutrosophic cognitive maps. *International Journal of Innovative Research in Science, Engineering and Technology*, 2(11), pp. 6387.
- Marzouk, M. M., and El-Rasas, T. I. (2014). Analyzing delay causes in Egyptian construction projects. *Journal of Advanced Research*, 5(1), pp. 49.
- Abdelaal, M., Farrell, P., and Emam, H. (2014). Factors Affecting Productivity in GCC Construction Projects. *Smart, Sustainable and Healthy Cities*, pp. 557.
- Masood, R., Ali, M., Shafique, F., Shafique, M. A., Zafar, B., Maqsoom, A., and Ullah, Z. (2015). Investigating the Delay Factors of Construction Projects in Metropolitan City of a Developing Country. *Journal of Civil Engineering and Architecture Research*, 2(9), pp. 947.
- Aziz, R. F., and Abdel-Hakam, A. A. (2016). Exploring delay causes of road construction projects in Egypt. *Alexandria Engineering Journal*, 55(2), pp.1515.
- Morton, R., and Ross, A. (2008). *Construction UK: Introduction to the industry*. United Kingdom: Wiley-Blackwell.
- Nasaruddin, N. A. N., and Rahman, I. A. (2016). Leadership Quality for Malaysia Construction Leader to Steer a Success Construction Project. In *MATEC Web of Conferences*, 47.
- Loosemore, M., Dainty, A., and Lingard, H. (2003). *Human resource management in construction projects: strategic and operational approaches*. Taylor and Francis.
- Dutta, A. B. (2014). Study of labour factor in construction: a review. *International journal of management and social sciences*, 3(2), pp. 147.
- Yankov, L., and Kleiner, B. H. (2001). Human resources issues in the construction industry. *Management Research News*, 24(4), pp.101.
- Odeh, A. M., and Battaineh, H. T. (2002). Causes of construction delay: traditional contracts. *International Journal of Project Management*, 20(1), pp. 67.
- Crépon, B., Deniau, N., & Pérez-Duarte, S. (2003). *Wages, productivity and worker characteristics: A French perspective*. INSEE.

- Koushki, P. A., Al-Rashid, K., and Kartam, N. (2005). Delays and cost increases in the construction of private residential projects in Kuwait. *Construction Management and Economics*, 23(3), pp. 285.
- Ghaemi, H. (2006). *Building towers, cheating workers: Exploitation of migrant site workers in the United Arab Emirates*. New York: Human Rights watch.
- Faridi, A.S., and El-Sayegh, S.M. (2006). Significant factors causing delay in the UAE construction industry. *Construction Management and Economics*, 24(11), pp. 1167.
- Sambasivan, M., and Soon, Y. W. (2007). Causes and effects of delays in Malaysian construction industry. *International Journal of Project Management*, 25(5), pp. 517.
- Sui Pheng, L., Jun Ying, L., and Shan Shan, S. (2008). Chinese foreign workers in Singapore's construction industry. *Journal of Technology Management in China*, 3(2), pp. 211.
- Le-Hoai, L., Lee, Y. D., and Lee, J. Y. (2008). Delay and cost overruns in Vietnam large construction projects: A comparison with other selected countries. *KSCE Journal of Civil Engineering*, 12(6), pp. 367.
- Toor, S. U. R., & Ogunlana, S. O. (2008). Problems causing delays in major construction projects in Thailand. *Construction management and economics*, 26(4), pp. 395.
- Tabassi, A. A., and Bakar, A. A. (2009). Training, motivation, and performance: The case of human resource management in construction projects in Mashhad, Iran. *International Journal of Project Management*, 27(5), 471.
- Hallowell, M. R. (2010). Worker fatigue. *Professional safety*, 55(12), pp. 18.
- Soekiman, A., Pribadi, K. S., Soemardi, B. W., & Wirahadikusumah, R. D. (2011). Factors relating to labor productivity affecting the project schedule performance in Indonesia. *Procedia engineering*, 14, 865.
- Hamid, A. R. A., Singh, B., Yusof, A. M., and Abdullah, N. A. M. (2011). The employment of foreign workers at construction sites. In *2nd International Conference on Construction and Project Management*, 15, pp. 126.
- Memon, A. H., Rahman, I. A., & Azis, A. A. A. (2011). Preliminary study on causative factors leading to construction cost overrun. *International Journal of Sustainable Construction Engineering and Technology*, 2(1).
- Chia, S. Y. (2011). Foreign Labor in Singapore: Rationale, Policies, Impacts, and Issues. *Philippine Journal of Development*, 38(1/2), 105.
- Ghoddousi, P., & Hosseini, M. R. (2012). A survey of the factors affecting the productivity of construction projects in Iran. *Technological and Economic Development of Economy*, 18(1), 99.
- Sangole, A. & Ranit, A., (2015). Identifying Factors Affecting Construction Labour Productivity in Amravati. *International Journal of Science and Research (IJSR)*, 4(5), pp.2013.
- Memon, A. H. (2013). *Structural Modelling of Factors Causing Cost Overrun in Construction Industry*. Universiti Tun Hussein Onn Malaysia: Ph. D Thesis.
- Rahman, I. A., Memon, A. H., Abdullah, N. H., & Azis, A. A. A. (2013). Application of PLS-SEM to Assess the Influence of Construction Resources on Cost Overrun. *Applied Mechanics and Materials*, 284, pp. 3649.
- Ejaz, N., Ali, I., & Tahir, M. (2013). Assessment of delays and cost overruns during construction projects in Pakistan. Viewed on 13 May 2015, <http://www.civil.mrt.ac.lk/ICSECM 2011/SEC-11-69.pdf>.
- Almannae, R. (2014). *Migrant Workers in the Construction Industry in United Arab Emirates (UAE): The role of the Ministries of Labour and Foreign Affairs in enforcing fair payments and minimum wages*. International Institute of Social Studies, Hague Netherlands: Master Thesis.
- Hasan, R., Suliman, S. M. A., & Malki, Y. Al. (2014). An investigation into the delays in road projects in Bahrain. *International Journal of Research in Engineering and Science (IJRES)*, 2(2), 38.

- Islam, M.S., Trigunaryyah, B., Hassanain, M., & Assaf, S. (2015). Causes of Delay in Construction Projects in Bangladesh. *The 6th International Conference on Construction Engineering and Project Management (ICCEPM 2015), Oct. 11 (Sun) - 14 (Wed) 2015, Paradise Hotel Busan, Busan, Korea.*
- Zidane, Y. J., Johansen, A., Andersen, B., & Hoseini, E. (2015). Time-thieves and bottlenecks in the Norwegian construction projects. *Procedia Economics and Finance, 21*, 486.
- Assbeihat, J. M. (2016). Factors Affecting Delays On Private Construction Projects. *Technology, 7(2)*, 22.
- Hallowell, M. R., & Yugar-Arias, I. F. (2016). Exploring fundamental causes of safety challenges faced by Hispanic construction workers in the US using photovoice. *Safety science, 82*, 199.
- Alrashed, I., Alrashed, A., Saud A., Taj S. A., Phillips, M. and Kantamaneni K. (2014). Risk Assessments for Construction projects in Saudi Arabia. *Research Journal of Management Sciences, Vol. 3(7)*, 6.
- Saudi Arabia – Industrial Sector Overview Report. (2016). Retrieved from <http://www.jeg.org.sa/data/modules/contents/uploads/infopdf/2887.pdf>.
- Alotaibi, N., Sutrisna, M., & Chong, H. (2014). *Managing Critical Factors Causing Delays in Public Construction Projects In Kingdom Of Saudi Arabia*. Curtin University: Ph. D Thesis.
- Rahman, I. A., Al-Emad, N., and Nagapan, S. (2016b). Categorization of Saudi Arabia's Construction Delay Factors Using Factor Analysis Technique. *Proceedings of the 3rd International Conference on Civil, Offshore and Environmental Engineering*. Malaysia. pp. 23.
- Elawi, G. S. A., Algahtany, M., & Kashiwagi, D. (2016). Owners' Perspective of Factors Contributing to Project Delay: Case Studies of Road and Bridge Projects in Saudi Arabia. *Procedia Engineering, 145*, 1402.
- Baxendale, T., & Jones, O. (2000). Construction design and construction management safety regulations in practice - *Progress and implementation. International Journal of Project Management, 18(1)*, 33.
- Rachel, L. W.-c. (2006). Effectiveness of safety management system on Hong Kong construction industry under factories and industrial undertakings (safety management) regulation.
- Nahmens, I., and Ikuma, L. H. (2009). An empirical examination of the relationship between lean construction and safety in the industrialized housing industry. *Lean Construction Journal, 1(6)*, pp. 8.
- Marosszeky, M., Thomas, R., Karim, K., Davis, S., & McGeorge, D. (2002). Quality management tools for lean production: moving from enforcement to empowerment. In *Proceedings IGLC (Vol. 10)*.
- Hussin, J. M., Rahman, I. A., & Memon, A. H. (2012). The Way Forward in Sustainable Construction: Issues and Challenges. *International Conference on civil and Environmental Engineering for Sustainability (IconCEES2012)*.
- Assaf, S. a., & Al-Hejji, S. (2006). Causes of delay in large construction projects. *International Journal of Project Management, 24(4)*, 349.
- Rahman, I. A., Al-Emad, N., & Nagapan, S. (2016a). Projects Delay Factors of Saudi Arabia Construction Industry Using PLS-SEM Path Modelling Approach. In *MATEC Web of Conferences (Vol. 81, p. 07001)*. EDP Sciences.
- Andrieu, J.-B., Ucla, A. and Lee, M. (2016). *Addressing Workers' Rights in the Engineering and Construction Sector – Opportunities for Collaboration*. Working Paper. San Francisco, USA, pp. 12.
- Saudi Arabia –Manpower & Employment, Talent Management, and Compensation. 2016. Retrieved <http://www.jeg.org.sa/data/modules/contents/uploads/infopdf/2872.pdf>
- Achoui, M. M. (2009). Human resource development in Gulf countries: an analysis of the trends and challenges facing Saudi Arabia. *Human Resource Development International, 12(1)*, pp. 35.
- Al-Kharashi, A., and Skitmore, M. (2009). Causes of delays in Saudi Arabian public sector construction projects. *Construction Management and Economics, 27(1)*, pp. 23.

Mahamid, I. (2013). Contributors to schedule delays in public construction projects in Saudi Arabia: owners' perspective. *Journal of Construction Project Management and Innovation*, 3(2), 608.

Mahamid, I. (2016). Micro and macro level of dispute causes in residential building projects: Studies of Saudi Arabia. *Journal of King Saud University-Engineering Sciences*, 28(1), pp. 12.

Al-Emad, N. H., and Nagapan, S. (2015). Identification of Delay Factors from Mecca's Construction Experts Perspective. *International Journal of Sustainable Construction Engineering and Technology*, 6(2), pp. 16.

Alzara, M., Kashiwagi, J., Kashiwagi, D., and Al-Tassan, A. (2016). Using PIPS to Minimize Causes of Delay in Saudi Arabian Construction Projects: University Case Study. *Procedia Engineering*. pp.939.

Al-Emad N. Rahman, I. A., Nagapan, S and Gamil, Y. (2016). Ranking of Delay Factors for Makkah's Construction Industry. *International Conference on Sustainable Construction and Structures*. Melaka, Malaysia. pp.5-6.