

# A Review on the Critical Success Factors (CSF) Influencing Modular Integrated Construction

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**Abstract:** *By sending some of the work done on-site to fabrication facilities, modularization, a new emerging approach, can improve the construction industry. Yet, there are few uses for it in the sector. To achieve higher degrees of modularization, the Engineering, Procurement and Construction (EPC) business needs new strategies. The goal of this study is to ascertain what modifications to the current EPC procedures are required to establish the ideal conditions for a wider and more efficient application of modularization. The success criteria must be understood in order to create such an atmosphere. The success factors are to be obtained from various reputed journals. With the addition of CSF enablers, a research team with expertise in this area created a comprehensive list of the most important critical success Factors. CSF enablers are extra measures that can help.*

**Keywords:** Critical Success Factors (CSF), Modular integrated Construction (MiC)

## REFERENCES

- [1]. Akagi, K., Murayama, K., Yoshida, M., & Kawahata, J. (2002). Modularization technology in power plant construction. In Proceedings of ICON10 10th international conference on Nuclear engineering (pp. 21–27).
- [2]. Azhar, S., Lakkad, M. Y., & Ahmad, I. (2013). An investigation of critical factors and constraints for selecting modular construction over conventional stick-built technique. *International Journal of Construction Education and Research*, 9(3), 203–225. doi:10.1080/15578771.2012.723115
- [3]. Baker, J. D. (2016). The purpose, process, and methods of writing a literature review. *AORN Journal*, 103(3), 265–269. doi:10.1016/j.aorn.2016.01.016
- [4]. Baldwin, C. Y., & Clark, K. B. (2000). *Design rules: The power of modularity*, Vol. 1. Cambridge: MIT Press.
- [5]. Barlow, J., Childerhouse, P., Gann, D., Hong-Minh, S., Naim, M., & Ozaki, R. (2003). Choice and delivery in housebuilding: Lessons from Japan for UK housebuilders. *Building Research and Information*, 31(2), 134–145. doi:10.1080/09613210302003
- [6]. Benjaoran, V., & Dawood, N. (2006). Intelligence approach to production planning system for bespoke precast concrete products. *Automation in Construction*, 15(6), 737–745. doi:10.1016/j.autcon.2005.09.007
- [7]. Bryan, B. (2019, March). Prefabricated construction: 'Is off-site the future of the industry'. *NEWS*, 1–11. Retrieved from <https://bondbryan.co.uk/2019/01/29/prefabricated-construction-is-off-site-the-future-of-the-industry/>
- [8]. Carriker, M., & Langar, S. (2014). Factors affecting large scale modular construction projects. In 50th ASC annual international conference proceedings (pp. 1–8). Fort Collins: Associated Schools of Construction.
- [9]. Choi, J. O. (2014). Links between modularization critical success factors and project performance. Austin, TX: The University of Texas at Austin.
- [10]. Choi, J. O., & O'Connor, J. T. (2014). Modularization critical success factors accomplishment: Learning from case studies. *Construction Research Congress*, 1636–1645. doi:10.1061/9780784413517.167
- [11]. Construction Industry Council. (2018). About modular integrated construction. Hong Kong: Construction Industry Council. Retrieved from [www.cic.hk/eng/main/mic/whatsmic/aboutmic/](http://www.cic.hk/eng/main/mic/whatsmic/aboutmic/)

- [12]. David Fransworth (2014) Modular tall building design at Atlantic yards B2, CTBUH2014 Conference proceedings.
- [13]. Freund, Y. P. (1988). Critical success factors. *Planning Review*, 16(4), 20–23. doi:10.1108/eb054225
- [14]. Gosling, J., Pero, M., Schoenwitz, M., Towill, D., & Cigolini, R. (2016). Defining and categorizing modules in building projects: An international perspective. *Journal of Construction Engineering and Management*, 1–11. doi:10.1061/(ASCE)CO.1943-7862
- [15]. Greenhalgh, T., & Peacock, R. (2005). Effectiveness and efficiency of search methods in systematic reviews of complex evidence: Audit of primary sources. *BMJ*, 331, 1064–1065. doi:10.1136/bmj.38636.593461.68
- [16]. Haas, C. T., & Fagerlund, W. R. (2002). Preliminary research on prefabrication, pre-assembly, modularization and offsite fabrication in construction. Austin, TX. Retrieved from <https://smartech.gatech.edu/handle/1853/10883>
- [17]. Hofman, E., Voordijk, H., & Halman, J. (2009). Matching supply networks to a modular product architecture in the house-building industry. *Building Research and Information*, 37(1), 31–42. doi:10.1080/09613210802628003
- [18]. Hong Kong Buildings Department. (2018). Modular integrated construction. Hong Kong. Retrieved from <https://www.bd.gov.hk/en/resources/codes-and-references/modular-integrated-construction/index.html>
- [19]. Hwang, B.-G., Shan, M., & Looi, K.-Y. (2018a). Key constraints and mitigation strategies for prefabricated prefinished volumetric construction. *Journal of Cleaner Production*, 183, 183–193. doi:10.1016/j.jclepro.2018.02.136
- [20]. Ismail, F., Yusuwan, N. M., & Baharuddin, H. E. A. (2012). Management factors for successful IBS projects implementation. *Procedia – Social and Behavioral Sciences*, 68, 99–107. doi:10.1016/j.sbspro.2012.12.210
- [21]. Jagoda, K., & Samaranayake, P. (2017). An integrated framework for ERP system implementation. *International Journal of Accounting and Information Management*, 25 (1), 91–109. doi:10.1108/IJAIM-04-2016-0038
- [22]. Jonsson, H., & Rudberg, M. (2015). Production system classification matrix: Matching product standardization and production-system design. *Journal of Construction Engineering and Management*, 141(6), 05015004. doi:10.1061/(ASCE)CO.1943-7862.0000965
- [23]. Kamar, K. A. M., Alshawi, M., & Hamid, Z. A. (2009). Industrialised building system: The critical success factors. 9th international postgraduate research conference (IPGRC) (pp. 485–497). Salford: University of Salford.
- [24]. Lau, A. K. W. (2011). Critical success factors in managing modular production design: Six company case studies in Hong Kong, China, and Singapore. *Journal of Engineering and Technology Management*, 28(3), 168–183. doi:10.1016/j.jengtecman.2011.03.004
- [25]. Li, X. (2018). Critical success factors for project planning and control in prefabrication housing production: A China study. *Sustainability*, 10(836), 1–17. doi:10.3390/su10030836
- [26]. Luo, L., Shen, G. Q., Xu, G., Liu, Y., & Wang, Y. (2019). Stakeholder-associated supply chain risks and their interactions in a prefabricated building project: A case study in Hong Kong. *Journal of Management in Engineering*, 35(2), 1–14. doi:10.1061/(ASCE)ME.1943-5479.0000675
- [27]. McGraw-Hill(2011) "Prefabricated and Modularization: Increasing Productivity in construction industry, Smart Market report
- [28]. Mydin, M. A. O., Nawati, M. N. M., Yunus, M. Y. M., & Utaberta, N. (2015). Decisive success factors in executing prefabrication system in Malaysia. *Australian Journal of Basic and Applied Sciences*, 9(97), 160–163. Retrieved from [www.ajbasweb.com](http://www.ajbasweb.com)
- [29]. O'Connor, J. T., O'Brien, W. J., & Choi, J. O. (2014). Critical success factors and enablers for optimum and maximum industrial modularization. *Journal of Construction Engineering and Management*, 140(6), 04014012. doi:10.1061/(ASCE)CO.1943-7862.0000842
- [30]. Osei-Kyei, R., & Chan, A. P. C. (2015). Review of studies on the critical success factors for public-private partnership (PPP) projects from 1990 to 2013. *International Journal of Project Management*, 33(6), 1335–1346. doi:10.1016/j.ijproman.2015.02.008

- [31]. Pan, W., & Hon, C. K. (2018). Modular integrated construction for high-rise buildings. Proceedings of the Institution of Civil Engineers – Municipal Engineer, 1–12. doi:10.1680/jmuen.18.00028
- [32]. Rashidi, A., & Ibrahim, R. (2017). Industrialized construction chronology: The disputes and success factors for a resilient construction industry in Malaysia. The Open Construction and Building Technology Journal, 11(1), 286–300. doi:10.2174/1874836801711010286
- [33]. Shahtaheri, Y., Rausch, C., West, J., Haas, C., & Nahangi, M. (2017). Managing risk in modular construction using dimensional and geometric tolerance strategies. Automation in Construction, 83, 303–315. doi:10.1016/j.autcon.2017.03.011
- [34]. Smith, R. E. (2016). Off-site and modular construction explained. Retrieved from <https://www.wbdg.org/resources/site-and-modular-construction-explained> Song, J., Fagerlund, W. R., Haas, C. T., Tatum, C. B., & Vanegas, J. A. (2005). Considering prework on industrial projects. Journal of Construction Engineering and Management, 131(6), 723–733. doi:10.1061/(ASCE)0733-9364(2005)131:6(723)
- [35]. Triumph Modular. Retrieved from <https://triumphmodular.com/permanent-modular/how-to-start/critical-success-factors/> Warszawski, A. (1999). Industrialization and Automated building systems (2nd ed.). London: E & FN Spon.
- [36]. Wuni, I. Y., Shen, G. Q. P., & Mahmud, A. T. (2019). Critical risk factors in the application of modular integrated construction: A systematic review. International Journal of Construction Management, 1–15. doi:10.1080/15623599.2019.1613212