Construction industry's evolution is, historically, in the lowest level, if compared to other industries, such as auto manufacturing. Construction is a multidisciplinary industry, considering that designers, contractors, and owners are all involved in the same project, each one seeking their own interests. The complex environment surrounding design and construction makes the decision-makers hesitate about adopting new methodology. Building Information Modeling (BIM) is a new method and technology, which can improve both the design and the construction processes. The adoption of BIM is increasing significantly over the last years, and its effects can be seen on real-life projects. In order to understand the effect of BIM on the design and construction industry, we have created a comprehensive survey, consisting of a general questionnaire and experts' interviews. The general questionnaire concentrated on most of BIM issues, while the interviews focused on specific points derived from the general questionnaire. Most of the published papers in this area are justifying BIM adoption by focusing on BIM ROI, and the comparison between project with and without BIM. In this research, however, we tried first to understand BIM status at the AEC market, and then to measure its effects. Therefore, we have targeted all the players in the BIM field: engineers, architects, contractors, and owners. Through the general questionnaire, we have measured the relationship between the independent variables and outcome variables. The independent variables are: motivations, concerns, investment needed, software, valuable benefits, success measures, and BIM uses. The outcome variables are: companies' role, sector, specialty, market level, level of implementation, years of implementation, and experience. In the second part of the research, we have conducted a series of subject matter interviews to measure the effect of BIM uses and its intangible benefits. For the experts' interview, we designed a structured interview which covers two major areas: BIM uses, and intangible benefits. Both areas derived from the general questionnaire, and we aimed to measure their effects on real-life projects. After analyzing the general questionnaire by using Person Chi-Square test, the results show that there is a significant relationship between independent variables and outcome variables. Participants' responses showed that they share common objectives when establishing BIM such as: increase communication, reduce rework, increase coordination and collaboration between parties, improve quality, and increase productivity. We have found that the use of BIM is varied, and the large companies' are taking advantage of BIM technology. In addition, the majority of the participants indicate that BIM has a positive ROI, and its adoption generates more business. The experts' interviews found that AEC parties have common understanding about the intangible benefits, whereas they perceived their benefits differently. The diverse views of intangible benefits were influenced by the distinct role of each party. Moreover, experts share information about BIM projects, and the project outcomes are successful on the following metrics: cost, schedule, number of RFI, and number of change orders.

Keywords: construction industry, Building Information Modeling, Intangible benefits, BIM uses.

Major: Civil Engineering

Educational Career:
Bachelor's of Architecture and Planning, BS, 2005, King Faisal University
Master's of Civil Engineering, MS, 2008, California State University Fullerton

Committee in Charge:
Amr Olooufa, Chair, Civil, Environmental, & Construction Engineering
Omer, Tatari, Civil, Environmental, & Construction Engineering
Nizam, Uddin, Statistics
Mustapha, Mouloua, Psychology
Approved for distribution by Amr Oloufa, Committee Chair, on May 1, 2016.

The public is welcome to attend.