



## **FACTORS AFFECTING CONSTRUCTION LABOUR PRODUCTIVITY IN IRAQ USING BASRA CITY AS A CASE STUDY**

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### **ABSTRACT**

The construction industry has a multifaceted relationship with most sectors of the economy in all nations, as well as playing a vital role in social and economic development. One of the main factors that affect the development of the construction industry is labour productivity. The aim of this paper is to identify and rank the importance of the factors perceived in the literature to influence labour productivity in the Iraqi construction industry using Basra city as a case study. From the literature a total of 59 main factors were identified that may affect labour productivity on construction sites. These factors were classified into ten primary groups: (1) Managerial; (2) Environmental; (3) Manpower; (4) materials and equipment; (5) Schedule; (6) Safety; (7) Quality; (8) Motivation; (9) Technical; (10) External. The statistical analysis of these factors was prepared by using the Relative Importance Index (RII) and SPSS 23 programme. The grades obtained made it possible to assess the comparative importance of the factors as perceived by respondents.

The study provides comprehensive and explicit data for the construction contractors working in Iraq before providing the proposal for the bids taking in account the risks and the challenges mentioned in the study. Also it observed that the Iraqi government authority enforcement is essential to ensure that the construction labour productivity is fulfilled without losing in time and money. A structured questionnaire survey was sent to construction project managers, as a target group and the results showed in order to improve labour productivity in Basra city in particular and in Iraq in general. The results are show that the ten essential factors affect on construction labour productivity with different level of importance. In addition, all types of corruption must be considered to be serious problems affecting labour productivity. Enforcement, conduct education and training for manpower by using new techniques are decreasing the difference between estimated and actual labour productivity.

**KEYWORDS:** Construction Industry, Factors, Improvement, Labour productivity, Iraq, Basra

# Bond the Gap between Academic and Industry Requirements for Undergraduate Civil Engineering Students in Iraq

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**Abstract.** In the last twenty years, civil engineering industry has been improved significantly due to the expanded use of technology and innovations in project management. This progress represented as a challenge to universities to provide competence engineers with the right capabilities to be fit in the new job requirements and able to lead this industry to the new era. As this problem considered a global issue, it has a particular situation in Iraq. This resulted from the sharp change in the Iraqi construction industry after recent political change in 2003. This study aims to investigate the current industry expectation from graduated civil engineers and compare it with actual competences that engineers learned from their study in Iraqi universities. This research implements both a qualitative and quantitative approach to collect valuable and reliable data. This has been achieved by sending an online questionnaire to senior engineers working for both public and private organizations. In addition, another set of questions send to students to evaluate their knowledge to identify the gap. This study identified a considerable gap between current civil engineering education and industry expectation, which mainly resulted in project management skills. This gap needs to be addressed in the near future to make sure that Iraqi civil engineers maintain their chances to get hired from foreign companies and be able to lead the Iraqi construction industry to the global market.

**Keywords:** Civil, engineering, education, industry, knowledge

## 1. Introduction

Progressively, Iraqi engineers are facing several kinds of challenges including speedy technological innovation, foreign companies with different responsibilities and the needs to compete globally [1-2]. Therefore, industry, Local authorities and even the central government announced to universities lecturers to review their traditional way of teaching and start to prepare civil engineering students by improving not only technical competencies but also include professional capabilities [3-5]. This trend is a global issue, where most of the recent researches try to identify those competencies that may include: communication skills, business skills, teamwork skills, creativity, lifelong learning skills, and problem-solving skills [3].

Despite the importance of this topic, there are few research and case studies which try to highlight this problem [6-8]. To emphasize this current situation, [9] stated that in 2004 almost a quarter of employers in the USA informed that engineering alumni were less capable in problem-solving and fewer responsive



# The Applicability of Using Automation in Construction in Iraq

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## Abstract

Several governments around the world announced new strategies regarding their construction industry. These strategies focus on reducing construction projects' time, cost and improving their impact on the environment. To achieving these goals within the proposed time scale, these authorities advise their stakeholders to start to implement different methods in project delivery such as Building Information Modeling (BIM), Integrated Project Delivery (IPD), Geographic Information System (GIS), and many more. All these new technologies and methods will reduce human errors in the project lifecycle which will lead to reducing project waste. In addition, this will pave the road to automation in construction. Automation will help to mitigate the huge number of clashes and mistakes. Iraq an oil-dependent country suffering from economic crises due to the considerable reduction in oil prices. This struggle must enforce the government to use this opportunity to solve current project problems such as project delays and budgets overrun and rethink how to reduce construction project time and cost. However, the applicability and understanding of these new methods and technologies need to be explored first among the Iraqi construction industry. This paper will investigate the understanding of automation in construction among different disciplines working with different experiences in the Iraq construction industry. The method of survey was used to sightsee their view regarding automation in construction understanding, benefits, and the challenges. The results reveal that there a positive view in terms of understating the meaning of automation in construction. In addition, several benefits are identified as the most effective gains if these new methods are implemented. Furthermore, more than a few challenges also have been acknowledged that need to be considered to increase the successfulness of implementing automation in construction.

**Keywords:** Automation, Construction, Iraq, BIM, GIS, IPD

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## 1. Introduction

Construction automation and robotics (CAR) is on a global level progressively documented as an innovative technology that may assist the construction industry to bridge the gap with the other industries [1]. There no single definition for automation in construction due to its involvement in all project life cycles from planning to operation and maintenance [2]. Automation of construction will address different and serious difficulties associated with construction. For instance, final product not matching the proposed quality, skilled labor crises, safety accidents, extreme weather, short project delivery, and lack of funds [3]. However, the term automation in construction is applied regarding information processing. In the civil engineering industry, the implementation of this kind of technology is approved via using computer aid design, drafting, estimation, scheduling, and accounting [3]. Several governments around the world such as UK, Germany, Australia, Canada, the USA, and Sweden have been published strategic plans to improve construction industry production via implementing different kinds of technologies and methods of construction [4]. For example, UK construction strategy targets can be summarized in four points:

1. Reduce whole-life greenhouse gas emissions in the built environment by 50 %.
2. Reduce construction time (measured from conception to completion) by 50 %.
3. Reduce whole-life costs for built assets by 33 %.

4. Reduce the trade gap on construction products by 50 %, which can be classified as environment, cost, time and production issues. These governments comprehended that these goals can be achieved or at least realized by implementing automation in construction principles [5].

Oil price instability is extending Iraq's economic difficulties. GDP tight sharply in 2020 driven by a sharp decline in oil production and non-oil output. Economic attitude is subject to oil market developments and reforms implementation World bank [6]. These issues prevent the governments from proceeding with their plan to improve Iraq's infrastructure systems (water, sewage, electricity networks) [7]. In addition, CAR can be used to solve current construction project problems such as project delays and budgets overrun [8]. All forth mentioned factors are forced the Iraqi authorities to think smartly in terms of reducing construction projects' cost and time. Areej and Redvan [9] stated that using modern technologies and methods of construction will help Iraqi construction projects to mitigate the risks early and reduce the total cost and time.

This research will investigate the applicability of using the new technologies and methods in the Iraq context through examine the common sense of these methods among Iraqi construction industry professionals.

The aim of this study will be met via sending several questionnaires to different practitioners who work for private and public projects. These questions have been divided into three parts. The first part discusses their understanding of the