



## **Smart Contract Based Conceptual Model for Optimizing Risk Distribution in Construction Industry**

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### **Abstract**

Construction contracts are recognized as the most effective tools of risk sharing between parties in project. Also, recent developments of blockchain technology and smart contracts can bring many advantages and useful mechanisms for construction contract management because provide beds of autonomous implementation of predefined and pre-agreed legal terms and conditions based on network coding. In this research we explored characteristics of smart contracts and potential applications of this technology for contract risk management. Finally, using a questionnaire and obtaining expert opinions, a blockchain based model is proposed for contract administration with focus on risk distribution balancing.

**Keywords: Smart Contract, Construction Industry, Blockchain Technology, Risk Balance, Law.**

### **1. Introduction**

Construction industry can consider as a vertical market with a wide range of players because construction projects success basically are based on multi-tier stakeholder relationship and collaboration between them influenced by ICT technologies. Vertical market is a group of companies that serve each other's specialized needs and do not serve a broader market [1]. Using paper to document related data and specifications have considered as a first wave of mode of relations in construction industry. Afterwards digital planning and design and then emerging building information modeling (BIM) technology, entirely revolutionized collaboration between key stakeholders in construction industry [2]. However recent researches have tried to improve traditional paper contracting methods to paperless and digital contracts which are more systematic, well organized and more trusted [3, 4].

In the other hand, recent developed technology, known as Blockchain, potentially can bringing many advantages in any relationship include creating trust, transparency, certainty, decentralization, simplicity, immediacy, elimination of intermediaries, automate transactions, unalterable records, democratizes transactions and being widespread, exchange of values over a network, read only reports (ledgers) [5-7]. Trust as a critical problem in all human-based relationships can point by application of blockchain due to its decentralization that constitute a transparent and immutable system. The other problems occur in internal and external relations of organization are validation of transactions and interactions and in the same time managing data and information which can effectively addressed by this new technology [6]. Therefore trust will build on this multilevel data sharing and the inherent ability to managing the records equipped us with novel powerful tool of knowledge management which potentially can decrease contractual disputes and claims. Blockchain is considered as a disruptive technology that acts as a new paradigm in economy and will alter all businesses value transmitting. This technology known as a revolution especially in finance, meanwhile other areas of knowledge investigate about possible usage of such innovation [8-10] and its three main characteristics of trust, transparency and disintermediation [11]. Therefore it seems that blockchain technology potentially can revolutionize stakeholders and companies in construction industry including lawyers, contractors, engineering consultants, special contractors, contract managers and operation managers. In this study blockchain technology is examined in order to develop a contract model that can balance risks between different parties in a construction contract.