

# A Blockchain approach to Smart Contracts in Banking

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**Abstract:** *Blockchain Technology is a very disruptive innovation, almost transforming every industrial sector in the current business scenario. The banking industry is vulnerable to fraudulent activities, concerned with security and cost associated with either curbing the same or strengthening the regulations leading to exhaustive efforts. Smart contracts is a silver line which is accurate, reliable, and secure and reduction in cost and remove intermediaries, ensuring a safe environment in transferring the ownership of assets digitally. The study consists sample size of 120 respondents focused on predicting the performance of the investment banks integrated with Blockchain in their smart contracts using logistic regression analysis. The results of the study confirm that the banks can be successful in performing better when adopted Blockchain-enabled smart contracts offering maximum security, reducing the cost of operations and intermediaries with enhanced automation significantly.*

**Keywords:** Smart Contract, Performance, Blockchain & Investment Banks

## 1. Introduction

The smart contract is a self-enforcing digital agreement embedded by computer programming codes between two or more parties managed by a Blockchain technology, where the data is stored on the public database leaving no scope for alterations. These contracts consist of programmed nodes in such a way that they can verify the details of the users, addresses, the value of the contract, etc. The basic ideology behind these contracts rely on the “IF” and “THEN” functions while coding having the obligation of receiving something in return after completion of transferring the required object. The study comprises a sample size of 120 respondents focused on predicting the performance of the investment banks integrated with Blockchain in their smart contracts using logistic regression analysis. Logistic Regression is a statistical model adopted to form a binary regression model based on the categorical dependent variable and to predict the probability of the objective achieving and examining the relationship between the binary dependent variable and the independent variable with any other form of data [1].

## 2. Theoretical Framework

The earlier contributions towards the implications of this technology have been immense. The authors have contributed with a model of smart contract integrated with Blockchain that facilitates in removing the barriers of the intermediaries, ensures safety. They are pioneer in formalizing the model of cryptography. The decentralized system offers parties to obtain commensurate compensation if any, breaches by the parties [2]. The emphasis is on the evaluation of adaptability of the technology in the Internet of Things (IoT) sector which was tested for sharing of

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services and resources between the devices, reducing the turnaround time of workflows. It has proven to be powerful and gets applied in business which significantly transforms the operational models [3]. The authors opine that the technology has been very impressive that can reduce the cost, efforts and encourage shared records of the transaction with each member preventing fraudulent interventions passing on the approval from all the parties which can be either altered or removed from the chain [4]. The technology promotes decentralized consensus and enlarges the contracting space mitigating informational asymmetry improving the welfare of the users. It is very disruptive in the financial industry creating innovative changes promoting better results [5].

### 3. Research Model

The study is empirical research in nature. The purpose of the study revolves around assessing the impact of achieving efficiency in the transactions of the Investment banks when Smart contracts are adopted. The dependent variable is the Performance, Independent variables considered for the study are Cost, Security and Automation. The sampling method applied for the study is the Snowball technique to collect the responses from 120 respondents belonging to the Banking industry working professionals in Investment banks operating in urban Bangalore. Primary data acts as the base of a research study. Statistical Package for Social Science (SPSS) is the statistical tool was applied to validate the hypothesis applying the Logistic Regression and examine the considered variables for the study. The hypothesis defined is that there is no significant relationship between using smart contracts and the performance of the banks.

### 4. Results

Reliability test conducted to validate the data consistency and accuracy resulted with Cronbach's Alpha ( $\alpha = 0.929$ ) for the considered items affirming the highest authenticity. Probability of successful performance when Blockchain technology gets applied in the Investment banks through Smart Contracts promotes in the application of Logistic Regression Analysis. Y refers to the dependent variable being the predictor of the equation, X1, X2 and X3 are the independent variables based on which the below logistic equation developed to evaluate the impact of the technology when applied in the business.

The table below reflects the results obtained from running the logistic regression model where the unstandardized coefficient of the independent variables security reflecting 1.270 ( $p = 0.008$ ), automation showing ( $p = 0.001$ ) and constant with ( $p = 0.000$ ) statistically significant at 0.001 per cent level and cost reflecting cost is -1.211 with ( $p = 0.032$ ) statistically significant at 0.05 per cent level. The significant regression equation derived from the obtained results reflecting the successfulness of the prediction.

$$y = b_0 - b_1X_1 + b_2X_2 + b_3X_3.$$

**Table 1. Variables in the Logistic Regression Analysis**

Variables	Unstandardized co-efficient	SE of B	Odd Ratios	P-value
Constant	-3.625	0.781	0.027	(0.000)**
X1	-1.211	0.565	0.298	(0.032)*
X2	1.270	0.480	3.560	(0.008)**
X3	1.261	0.373	3.529	(0.001)**
Chi-	89.379			

Square	
Nagelkerke R2	0.716
**Sig @ 0.001 per cent, * Sig @ 0.05 per cent level. Source: Primary data	

X1 is the cost, X2 is the security and X3 refers to the automation of the smart contracts,  $b_0$  = Constant,  $b_1$  = coefficient of variable  $x_1$ ,  $b_2$  = coefficient of variable  $x_2$ ,  $b_3$  = coefficient of variable  $x_3$ , E = random error. Hence, the equation when related to the variables result as Y (Performance) =  $-3.625 - 1.211(\text{cost}) + 1.270(\text{security}) + 1.261(\text{automation})$ . Chi-square of the equation denotes 89.379, Pseudo (R) value being 0.716 significant at 0.001 per cent level reflecting the response “yes” predicted 93.3 per cent towards the success in the performance of the banks integrated with the technology when smart contracts are used compared to conventional contracts. The odd ratios of variable constant shows 0.027, X1 0.298, X2 3.560 and X3 3.529.

## 5. Findings

A Logistic Regression model was run to determine the effects of factors 1, 2, & 3 on the probability of better performance by the Investment banks with an application of Blockchain technology through Smart Contracts which resulted being statistically significant,  $\chi^2(3) = 89.379$ ,  $p < 0.001$ . The model explains 71.6 per cent (Nagelkerke R2) of the variance in the success of effective transparency and optimal service correctly classified 93.3 per cent of the observations. The results confirm that the performance of these banks are at an optimal level with maximum enhanced security level being (1.270) and odds ratio (3.560) plays a significant role in predicting the performance among all the three independent variables.

## 6. Limitations & Scope

The research is limited to the investment banks operating in urban Bangalore, and there is scope for further study in detail the areas of real estate, entertainment industry, government elections, and health care sectors with post applications of the technology.

## 7. Conclusion

Blockchain facilitates in automating these contracts in the areas of processes in the form of execution, conveyance, payment & escrow. It makes the contract more transparent, immutable, inexpensive and decentralized. These contracts automatically control and transfer the digital assets between the parties within the regulated framework introducing a deadline in the contract. This contract provides an option to validate and approval from all the parties using multi-signature when assets get transferred between the parties. Since the contracts get stored in the Blockchain, there is scope for better safety, preventing fraudulent interventions leading to violation of computer nodes when tried to modify the transactions. The cost incurred is very less in the execution of the transactions as it rules away from the participation of intermediaries, data storage on the cloud with decentralized facilities. Hence, the study has resulted in supporting the prediction of successful performance of the investment banks with the usage of smart contracts when integrated with Blockchain technology.

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