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Blockchain Characteristics as an Instrument to Deliver Social Media Parameters Required For Efficient E- Governance Services

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Abstract
The study is to provides basis to build social media blockchain adaption framework to deliver e-governance services. Blockchain basic characteristics of consensus, provenance, immutability and finality are correlated againstthe required parametersof social media for e-governance services. The survey was conducted with the help of questioner reflecting the responsiveness of social media quality parameters against the blockchain characteristics. The research work and technology evaluation along with various use cases were analysed for the adaptation of Blockchain while delivering e-governance services via social media. The research recommends the correlation among characteristics of Blockchain and the key parameters of social media for the delivery of various citizen services. The level of trust varied according to the different type of the technology savvy groups. It suggests that Blockchain has become more sophisticated and can successfully deliver e-governance services via social media. A willingness to share information among others has also identified as a major factor for the Governmentsto make value-added services. It also suggests that more integrated data management approach and open attitude toward information sharing will be more important beyond the level of technical issues. The present study is empirical in nature in which primary data has been collected from 267 experts from the various areas such as industry experts, technocrats and researchers in the relevant field. The data has been analysed with the help of multiple regression. The robustness of the regression model has been checked with the help of R square and adjusted R square. Most of the independent variables have been found significantly associated with the dependent variables. The paper empirically examines the correlation between social media parameters required for the efficient e-Governance delivery via Blockchain. It was analysed that the social recommendations, authenticity and reliability of the information are the key successful parameters for the delivery of e-governance services via social media whereas Consensus, Provenance, Immutability, Finality are the basic characteristics of Blockchain.

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I. Introduction

Governments across globe are focusing on efficient policies and newer technologies to

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deliver effective administration for the service delivery. Social media plays a critical role for the social inclusive and is crucial in transforming public administrations. With falling budgets and trust in government; social media can act like conduit to improve the quality of public service delivery with increased efficiency and transparency.

While analysing the parameters most impacted for the delivery of e-governance services via social media it was observed that Social recommendations, Authenticity and Reliability of information are the key requirements.

The services are delivered via a network of departments , organizations and businesses such as supplier, buyers, regulator and auditors . The wealth is getting generated across business networks through the flow of goods and services. Ledgers record is being maintained while accessing various services keeping the flow of assets and on the delivery of any transection. Every member during the service delivery and fulfilment has its own ledger. Every member updates its transections relevant for the service as an when any transection occurs.

Blockchain works on the characteristics of consensus, provenance, immutability and finality. It has the potential to deliver the much required functionalities of recommending services from others with in regulated framework. The authenticity of the information can be governed via Blockchain which anybody can rely without any doubts.

As per NASSCOM, an industry forum for software and services organizations in India, over 50 countries have already embarked on initiatives to integrate blockchains in their economies and to develop a strong holistic blockchain ecosystem. Global blockchain investments through venture capitalist and initial coin offerings reached over USD 20B and covered a wide range of industries, technologies and use cases.

In addition to the public sector, private enterprises across all key industries in India are also identifying different applications of blockchain. The BFSI sector has seen the highest adoption, but other industries, including healthcare, retail and logistics are also accelerating rapidly. Service providers in India, with their deep enterprise client relationships, are uniquely positioned to address a large share of the global blockchain demand. They will need to invest rapidly in talent development, IP and asset creation and process framework advancement to build solutions on blockchain.

Withthebusinessbenefitsofblockchainbecomingclearer, a sizeable share of the projects and services are expected to pass the business case evaluation barrier and move into production. The government is playing an important role not only as a regulator but also as a consumer of Blockchain solutions.

Below are some of the most important and relevant citizen service use cases getting explored on Blockchain:

- Land title registry
- Citizen electronic health record management
- Digital certificates
- Benefit distribution
- Eliminating counterfeit drugs
- Farm insurance
- Identity management
- Power distribution
- Duty payments
- Vehicle lifecycle management
- Organ tracking for transplant
- Rationing
- e-Governance
- Chit fund operations administration
- Microfinance for Self-Help Groups (SHG)
- Cyber security
- Agriculture supply chain

The study aims to re-engineer the social media parameters required for meeting e-governance characteristics with Blockchain technology. A survey was performed with various technological experts, academicians, users of e-governance services and government official mapping the characteristics of Blockchain with parameters required to deliver e- governance services via social media. To understand the need and smooth adoption, research was focused on validating the

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social media parameters which are impacting the most for the adoption of e-governance services via social media. During the course of the study the most important characteristics of e-governance services were also prioritized .The impact of each of the parameter on the characteristics of e-governance services validate the hypothesis and can help us designing the adaptation framework.

II. Literature Review

HenuHou in 2017 studied the potential use of Blockchain technology for the use of Chinese e-government applications. He observed that Blockchain can deliver subsequent benefits which includes improvement in availability and quantity of citizen services, transparency and accessibility while delivering various services, efficient information sharing among various stakeholders and potential to support citizen credit system in China. Security , cost and reliability is seen as potential issues while implementation of Blockchain for e-governance services. Therefore building newer and innovative applications on blockchain technology is very important while setting up application standards is also very critical.

Ølnes, S., & Jansen(2017, September), states that while bitcoin and crypto currencies has become popular but the underline blockchain technology offers benefits of peer networking, consensus, security and trust to realize. They focuses that applications like digital ID management and secure document handling can be better deployed using Blockchain. It has the potential to authenticate multiple persistent documents.

Blockchain SWOT analysis is performed by M. Niranjanamurthy , he explains how any digital money transections are vulnerable for hackers attach. Blockchain validates the transections using peer to peer networking, de-centralized distributed ledger. Advantages and disadvantages of its adoption are also discussed.

Mobile, Internet of Things, social media and cloud computing has bought innovations , improved efficiency and closer customer relationships. Blockchain adoption improve security, resiliency and efficiency of systems. Bitcon is very popular based on Blockchain technology whereas Blockchain has known features to be leveraged. Excessive regulations, audits , cybercrime and fraud restricts the industrial growth.

TareqAhram (2017) updates that blockchain can enable agile value chain, innovations and tight integration with newer technologies including IOT, Artificial technologies and Cloud computing. It provides lower cost of ownership with trusted contract with limited or no regulation who don't add value to the overall operational efficiency. It work on smart contracts, engagements and consensus among different parties to protect cybercrime and fraud.

The benefits and functionalities of blockchain is helping in developing different applications most relevant in practical scenarios and scientific areas. With emergence of huge amount of diversified data driving out of multiple transections blockchain can address the concern of security and safety of data. The Blockchain characteristics of decentralization, trust, data residency and ownership can support various data driven decisions.

Elena Karafilosk (2017) updates that blockchain can help in organize and process big data which can be used to search data in most effective way. He explains the framework to deploy big data platform leveraging blockchain technology. It was observed that for network media there are issues with digital rights. It is difficult to protect the copyright and guarantee the quality of media works.

Xu, R., Zhang, L., Zhao, H., & Peng, Y. (2017, March) proposed to use Blockchain technology.

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The technology make use of crypto algorithm, consensus mechanism , trust, immutability and audit of online data. They proposed to implement blockchain for an effective production management, copyright management and transections log for network media. This will help building a sustainable ecological environment.

AntorweepChakravorty (2017) even suggested blockchain enabled social media platform which provides control, ownership, accountability and traceability for each transaction. Harnessing the properties of blockchain the proposed Ushare network rely on four key components the blockchain , encryption of shared content using hash table, relationship matrix for each user on the network and encryption of data before broadcasting to the network. The network suggested had a vision but could be achieved using some of available technologies and seems to be the replication of functionalities already available with Blockchain.

Although we have seen successful and proven use cases of blockchain in financial sector, healthcare also has huge potential of blockchain technology. As per, Mettler, M. (2016, September) the use cases has the potential to change citizens behaviours and life. Public healthcare record management system, medial research and drug counterfeiting on blockchain technologies will yield enormous benefits.

DeepayanBhowmik(2017, August) share the challenges and demonstrated the proof the concept on tamper proof media transaction framework. At present the media distribution to exhibitors, gallery collectors or within media production workflow there no inevitable and self-retrievable information and mechanism is available. Quite often the original content gets tempered intentionally or due to creative modifications , whereas trail of updates with proper information if require. He has proposed a watermarking based multimedia framework deployed on blockchain technology. The unique feature of this would be a cryptographic hash containing transection histories and image hash that can preserve the original media content. The learning from research is to deploy traditional application with specific uses case on blockchain technology which can provide the additional immutability and traceability.

The legitimate and authentic documentation pertaining to land ownership, address proof, education marks, degree certificates, medical records and different achievements can be deployed on blockchain framework. Chen, Z., & Zhu, Y. (2017, June) envisaged an archival system which is decentralized and transparent securing personal archive service management system . Archival management system for citizen will have various artefacts with unique identification to be stored in citizen portfolio. The transections can be tagged with blockchain enabled unique identifiers validated and trusted by the issuer. The proofs can be tagged with various degree of confidentiality and severity. Social media networks, credit card approvals , citizen services entitlement or identity identification via cognitive advisor can leverage this information. Such prototype of archival service management system entitle to deliver such functionalities but are also immune to cyber threats and ID attacks.

III. Conceptual Model of the Study

The model is based on the doctrine that if the blockchain parameters have high positive influence on social media parameters that deliver e-governance, then the e-governance will be termed to beeffective. Hence the proposed model has following Dependent and Independent variables:

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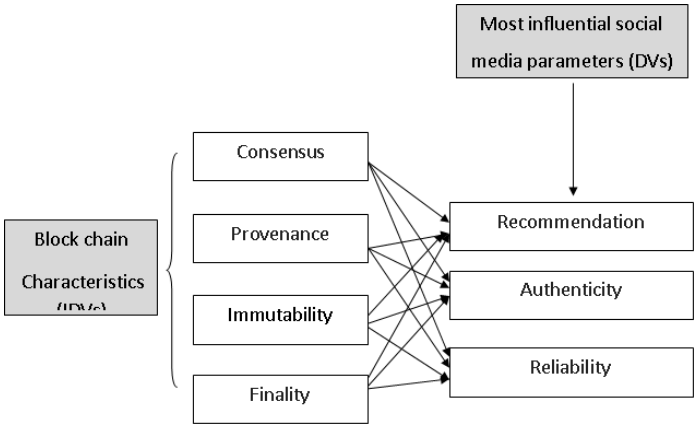

Fig 1.Conceptual Model of the Study

IV. Objectives of the Study

1. To find the impact of the Block chain characteristics on Recommendation parameter of social media
2. To measure the impact of the Block chain characteristics on Authenticity parameter of social media
3. To find the impact of the Block chain characteristics on Reliability parameter of social Media

V. Methodology

The present study is explorative in nature in which the primary data was collected through survey methodology. Survey data was collected from a sample of 267 expert of various field. An arranged questionnaire was distributed to the respondents. The sampling method was purposive sampling.

Multiple Regression

In the present study multiple regression has been applied. Multiple regression are the multivariate statistical technique which is applied when there are more than 2 independent variables and one dependent variable. In this study there are threemodels of multiple regression, in which the first dependent variable is "Recommendation", second dependent variable is "Authenticity" and the third dependent variable is "Reliability".

Findings of the Study

Table 1 shows the demographic profile of the respondents that are surveyed for their gender, age, profile and their experience. In the total number of respondents 59.5% are male and 4.04% are female in which 25.1% are from the age group of 35-45 years, 27.3% are of 46-55 years, 25.5% are 56-65 years and the rest 22.1% are above 65 years of age. Among them 32.6% is Industry experts, 33.3% are technocrats and 34.1% are Researchers in the field of Blockchain and in them 21.3% had an experience of 10-15 years, 26.6% had 16-20 years of experience, 25.8% had an experience of 21-25 years and the rest 26.2% had an experience of more than 25 years.

Table 1 :Demographic profile of the respondents

Variables	No. of respondents	%age
Gender		
Male	159	59.5%
Female	108	40.4%
Total	267	100%
Age Groups		
35-45 years	67	25.1%
46-55 years	73	27.3%
56-65 years	68	25.5%
Above 65 years	59	22.1%
Total	267	100%
Profile		
Industry experts	87	32.6%
Technocrats	89	33.3%
Researchers in the field of Blockchain	91	34.1%
Total	267	100%
Experience		
10-15 years	57	21.3%
16-20 years	71	26.6%
21- 25 years	69	25.8%
More than 25 years	70	26.2%
Total	267	100%

Data Analysis and Interpretations

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Model 1 : With "Recommendation" characteristics as depended variable to social media delivery parameters

Independent Variable's = Consensus, Provenance, Immutability, Finality
Dependent Variable's = Recommendation

Null Hypothesis: There is no impact of Blockchain Characteristics namely - Consensus, Provenance, Immutability and Finality on Recommendations

Alternate Hypothesis: There is a significant impact of Blockchain Characteristics namely - Consensus, Provenance, Immutability and Finality on Recommendations

Table 2 :Model Summary – Recommendation as dependent variable

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.853[a]	.727	.723	.466
Predictors: (Constant), Consensus, Provenance, Immutability, Finality				

The model summary shows that how much variance of dependent variable is explained by the independent variables. In the present model the value of R Square is .727 hence around 73% variance is being explained which shows that the model is robust.

Table 3 :ANOVA -Recommendation as dependent variable

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	151.396	4	37.849	174.290	.000[b]
	Residual	56.896	262	.217		
	Total	208.292	266			
a. Dependent Variable: Recommendation						

The last column of the Table 3 shows the significance value as .000 which is below the .005, hence it is found that the independent variables have significant impact of dependent variable i.e. recommendation. However to find out which independent variables have significant impact, Coefficient table is to be referred.

Table 4 :Coefficients – Recommendation as dependent variable

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	.170	.141		1.206	.229
	Consensus	-.031	.044	-.031	-.701	.484
	Provenance	.287	.037	.326	7.864	.000
	Immutability	-.020	.045	-.022	-.449	.654
	Finality	.743	.059	.660	12.684	.000
a. Dependent Variable: Recommendation						

The coefficient table shows that the out of four independent characteristics, only 2 blockchain characteristics (IDVs) have significant impact on the "Recommendation".There is a significant impact of Provenance and Finality on Recommendations, however there is no significant impact of consensus and Finality on Recommendations. *Hence the null hypothesis is accepted for consensus and immutability and rejected for provenance and finality.*

Model 2 : With "Authenticity" characteristics as depended variable to social media delivery parameters

Independent Variable's = Consensus, Provenance, Immutability, Finality
Dependent Variable's = Authenticity

Null Hypothesis: There is no impact of Blockchain Characteristics namely Consensus,

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Provenance, Immutability and Finality on Authenticity

Alternate Hypothesis: There is a significant impact of Blockchain Characteristics namely - Consensus, Provenance, Immutability and Finality on Authenticity

Table 5 :Model Summary – Authenticity as dependent variable

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.839[a]	.704	.699	.499
a. Predictors: (Constant), Consensus, Provenance, Immutability, Finality				

The model summary shows that how much variance of dependent variable is explained by the independent variables. In the present model the value of R Square is .704 hence around 70% variance is being explained which shows that the model is robust.

Table 6 :ANOVA - Authenticity as dependent variable

Model		Sum of Squares	Df	Mean Square	F	Sig.
1	Regression	155.270	4	38.817	155.585	.000[b]
	Residual	65.367	262	.249		
	Total	220.637	266			
a. Dependent Variable: Authenticity						
a. Predictors: (Constant), Consensus, Provenance, Immutability, Finality						

The last column of the Table 6 shows the significance value as .000 which is below the .005, hence it is found that the independent variables have significant impact of dependent variable i.e.Authenticity.However to find out which independent variables have significant impact, Coefficient table is to be referred.

Table 7:Coefficients – Authenticity as dependent variable

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	.071	.151		.468	.640
	Consensus	-.097	.047	-.096	-2.051	.041
	Provenance	.106	.039	.117	2.701	.007
	Immutability	.053	.048	.056	1.089	.277
	Finality	.911	.063	.786	14.504	.000
a. Dependent Variable: Authenticity						

The coefficient table shows that the out of four independent characteristics, only 2 blockchain characteristics (IDVs) have significant impact on the Authenticity. There is a significant impact of Provenance and Finality on Authenticity, however there is no significant impact of consensus and Finality on Authenticity. *Hence the null hypothesis is accepted for consensus and immutability and rejected for provenance and finality.*

Model 3 : With "Reliability" characteristics as depended variable to social media deliveryparameters

Independent Variable's = Consensus, Provenance, Immutability, Finality
Dependent Variable's = Reliability

Null Hypothesis: There is no impact of Blockchain Characteristics namely - Consensus, Provenance, Immutability and Finality on Reliability.

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Alternate Hypothesis: There is a significant impact of Blockchain Characteristics namely - Consensus, Provenance, Immutability and Finality on Reliability.

Table 8: Model Summary – Reliability as dependent variable

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.844[a]	.712	.707	.487
a. Predictors: (Constant), Consensus, Provenance, Immutability, Finality				

The model summary shows that how much variance of dependent variable is explained by the independent variables. In the present model the value of R Square is .712 hence around 71% variance is being explained which shows that the model is robust.

Table 9 :ANOVA – Reliability as dependent variable

Model		Sum of Squares	Df	Mean Square	F	Sig.
1	Regression	153.205	4	38.301	161.540	.000[b]
	Residual	62.120	262	.237		
	Total	215.326	266			
a. Dependent Variable: Reliability						
a. Predictors: (Constant) : Consensus, Provenance, Immutability, Finality						

The last column of the Table 9 shows the significance value as .000 which is below the .005, hence it is found that the independent variables have significant impact of dependent variable i.e. reliability. However to find out which independent variables have significant impact, Coefficient table is to be referred.

Table 10:Coefficients – Reliability as dependent variable

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	.129	.148		.872	.384
	Consensus	-.126	.046	-.125	-2.720	.007
	Provenance	.228	.038	.255	5.973	.000
	Immutability	.169	.047	.182	3.577	.000
	Finality	.693	.061	.605	11.318	.000
a. Dependent Variable: Reliability						

The coefficient table shows that the out of four independent characteristics, only 2 blockchain characteristics (IDVs) have significant impact on the Reliability**.** There is a significant impact of Provenance and Finality on Reliability, however there is no significant impact of consensus and Finality on Reliability. *Hence the null hypothesis is accepted for consensus and immutability and rejected for provenance and finality.*

VI. Conclusion

In the present study multiple regression has been applied where there are threemodels of multiple regression, in which the first dependent variable is "Recommendation", second dependent variable is "Authenticity" and the third dependent variable is "Reliability". There are four Independent variables Consensus, Provenance, Immutability, and Finality.

Through this study it is concluded that there is a significant impact of Provenance and Finality on Recommendations, Authenticity and Reliability

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and there is no significant impact of consensus and Finality on Recommendations, Authenticity and Reliability.Hence the null hypothesis is accepted for consensus and immutability and rejected for provenance and finality.

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