

ENHANCING TRANSPARENCY AND EFFICIENCY IN LIFE INSURANCE THROUGH AZURE BLOCKCHAIN SERVICES

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Abstract

The research examines the way Azure Blockchain Services create more transparent systems with faster processing times and superior customer experiences for life insurance operations. The use of smart contracts through Azure Blockchain Services leads to automated claim settlements that minimize delays and minimize errors and guarantee compliance with rules. The research examines the favorable impact of secure decentralized digital technologies on consumer experiences and operational enhancement outcomes. The study shows the way blockchain effectively addresses insurance processing speed problems alongside missing security features that lead to enhanced operational trust and performance quality in life insurance operations.

Keywords: Transparency, Azure Block chain Services, Smart Contracts, Customer Experience, Operational Efficiency, Claim Processing, Decentralized Frameworks, and Life Insurance

INTRODUCTION

Transparency and efficiency are improved by simplifying data management and transaction processing by integrating Azure Blockchain Services in life insurance services. A blockchain makes records secure, tamperproof, reduces fraud and administrative costs and increases policyholder trust. Smart contracts adopt claim settlements that automate the settlement of claims without delays and errors in the process of insurances. This helps regulatory compliance, along with operational efficiency of life insurance companies, by adding enhanced security and data privacy in blockchain based systems. The focus is put on the way Azure Blockchain Services are transforming the insurance industry by increasing transparency and cutting the claim process

down. It also illustrates the ways using digital frameworks that are decentralized, secure and efficient, dramatically enhances life insurance overall customer experience.

Aim

The purpose of this research is to investigate the way Azure Blockchain Services increase transparency, claim processing speed and customer experience in the life insurance industry.

Objectives

- To analyze the way Azure Blockchain Services improve transparency in the life insurance industry
- To investigate the use of blockchain technology in accelerating claim processing in life insurance

- To determine the way decentralized and secure digital frameworks improve the consumer experience in life insurance
- To recommend ways for optimizing blockchain deployment to improve operational efficiency in life insurance

Research Questions

- What ways do Azure Blockchain Services improve transparency in the life insurance industry?
- How can blockchain technology help to accelerate claim processing in life insurance operations?
- Why do decentralized and secure digital frameworks enhance the entire consumer experience with life insurance?
- What solutions can be recommended for optimizing blockchain implementation to improve operational efficiency in life insurance?

RESEARCH RATIONALE

There are challenges of transparency, slow claim processing and poor customer service for the life Insurance industry. Security is not the norm in traditional systems which are also prone to fraud and data breaches. Settling claims too soon leads to dissatisfaction and impairment to the relationship among insurance providers and the insureds. Manual processes add to cost and bother for performing administrative work that distracts from higher value activities. Blockchain technology provides safe and secure solutions, especially stronger ways in terms of transparency, to process claims very quickly [1]. Insurance

operations speed up by accepting, verifying, and sending faster, and tamper-proof transactions with Azure Blockchain Services. This study looks at the way blockchain technology can be used to address difficulties in the life insurance industry. It investigates the way better efficiency, security, and improved customer experience help to address these concerns.

LITERATURE REVIEW

Enhancing Transparency in Life Insurance Through Azure Blockchain Services Implementation

A lack of clarity due to the convoluted policies, opaque transactions and fraudulent activities makes the life insurance industry hard to crack with transparency. Centralized databases are used by traditional systems, where data may be manipulated and accessed without authority. Insurance transactions create safe, verifiable, and tamper-proof records by introducing a decentralized ledger utilizing blockchain technology. Real time tracking of policy agreements, claims and payouts is permitted through Azure Blockchain Services to reduce disputes and inconsistencies. Policy implementation in smart contracts is automated that can conform with predefined terms, and there is no need for manual intervention [2]. Transparency has an impact on compliance as auditable records for stakeholders and authorities are established.



Fig 1: Blockchain in Insurance

Policyholders end up having more trust in the fact that their data is immutable and secure. Blockchain's ability to maintain transaction histories and verify claim veracity makes it more effective at avoiding fraud. Azure Blockchain Services improve information sharing between the insurers, insurers and reinsurance companies, while enabling synchronization and data exchange with insurance companies and regulators that are reliable [3]. The block chain's decentralized design decreases the risks associated with data silos and promotes operational accountability. Azure Blockchain Services can be leveraged by life insurance companies to create a higher transparent, efficient, and trustworthy ecosystem of all the stakeholders.

Accelerating Claim Processing in Life Insurance Using Blockchain Technology Solutions

People claim it tends to be slow, inefficient and prone to errors in the traditional life insurance claim processing system. Administration of settlement increases its costs with the need for manual verification of the documents. Blockchain technology provides a decentralized and automated

solution to the claim processing and thereby increasing operational efficiency. Insurers can securely store policyholder information that can be accessed when needed, instantly, with the verification already in place. Claim settlements are automatic actions that the smart contract can be automatically executed, once those predefined conditions are met [4]. Blockchain's unrivaled ability to deliver precise data without copying or altering. Reduction in claim processing time is very significant because verification of medical records and policy details becomes faster.



Fig 2: Automated Claim Process

Harmonization reduces disputes and ultimately allows for the insurers, hospitals, and regulators to safely and securely share claim related data. Policyholders appreciate speedier claim disbursements that increase trust and customer satisfaction [5]. One minimizes paperwork, supplementation by human intercession and overall put in force efficiency by using blockchain automation. Life insurance firms can minimize the administrative load, enhance policyholder experience by speeding up and securing transactions and accelerate claim processing using blockchain technology.

Improving Consumer Experience With Decentralized and Secure Digital Frameworks in Insurance

According to companies looking into new insurance ventures, most of the barriers to consumer experience on the insurance related buying journey tend to be slow process, lack of transparency and security concerns. Traditional insurance systems create risks from the centralized databases allowing them to be breached and accessed by unauthorized people. Blockchain technology brings about decentralized and secure overarching structures, improving trust as well as improving efficiency in the life insurance operations [6]. Azure Blockchain Services ensures policyholders secure access to their core insurance data that ensures transparency and ensures fewer disputes occur in providing access to their policyholder insurance data. Smart contracts automate policy execution, eliminating the need for middlemen and manual processing delays. The insurance records cannot be altered by unauthorized parties and the data integrity and reliability are strengthened with decentralized storage. Sensitive consumer information is protected from cyber threats and fraud by enhanced security mechanisms [7]. The seamless interface enables policyholders to approve claims more quickly and receive real-time policy changes. Secure digital frameworks allow insurers and consumers to communicate more effectively, improving service quality and engagement. Introduction of blockchain technology in insurance companies can enable them to develop a more transparent, efficient and consumer friendly ecosystem.

Innovation on blockchain drives customer satisfaction through ensuring security, automation and faster response in the life insurance process.

Optimizing Blockchain Deployment for Enhanced Operational Efficiency in Life Insurance

The main inefficiencies in the operation of life insurance relate to manual processes, fragmented data systems and high administrative costs. Blockchain technology provides the avenue to decentralize operations making it more efficient [8]. Claims processing and regulatory compliance through smart contracts and secure ledger with Azure Blockchain Services insurers can automate policy management. Errors are minimized and other operations can be performed in the operation of the insurance by eliminating intermediaries, processing time is reduced. Insurers, policyholders and regulators having the flexibility to share real-time data with each other works to coordinate and make decisions. Immutable records are used to prevent tampering of data so that transparency and accountability is ensured at transactions. Automation enabled by blockchain reduces work while saving cost and delivering better service to the insurers and customers [9]. Digital security frameworks help risk management by providing precise and verified information on policyholders. Blockchain data enables predictive analytics that is used for Insurer's optimization of underwriting processes and fraud detection. The scalability of blockchain solutions enables better time of

transactions and real time updates achieving a higher level of operational agility. Optimizing the blockchain deployment of life insurance companies brings them efficiency, reduces cost and promotes regulatory compliance [10]. Blockchain technology implementation changes insurance operations from a transparent, secure and streamlined to a more transparent, secure and streamlined system.

Literature Gap

Research on the real impact of Azure Blockchain Services in the life insurance operations on the real world is still lacking. There are scant studies carried out that evaluate blockchain's long-term impacts on operational efficiency and the reduction of cost. The lack of comprehensive research on policyholder's point of view on blockchain-based transparency and security is another issue. The adoption of blockchain needs investigation with regard to its challenges in the insurance industry and the regulatory implications.

METHODOLOGY

A **positivist philosophy** is adopted by this study to satisfy the sought of objective analysis based on empirical data and measurable outcomes. Positivism relies on observable phenomena and quantifiable evidence and this way eliminates the subjectivity and it helps in checking that Azure Blockchain Services affect life insurance positively or vice versa [11]. Theories and hypotheses on the way blockchain can affect transparency and

efficiency are tested in a deductive research approach. The use of **deductive approach** is appropriate since it starts from general blockchain ideas to particular findings in life insurance operations. A deductive approach allows the generation of logical conclusions on well-defined frameworks and hypotheses [12]. The research relies on **primary data** collection that involves the analysis of a **quantitative survey analysis** to gain first hand insights from industry professionals and policy holders. This leads to **primary analysis** because it reflects real world considerations related to blockchain use in the life insurance space. The surveys of Blockchain adoption are quantitative and help statistically analyze the transparency, claim processing speed and customer satisfaction improvement.

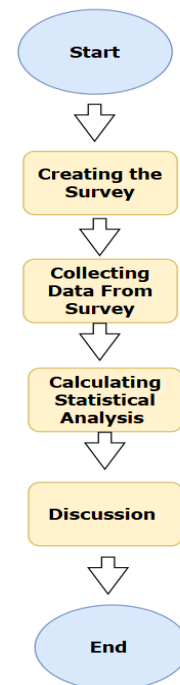


Fig 3: Flow Chart

This research used ten questions to assess AI chatbot efficiency and automation, including two demographic questions and eight closed-ended questions. SPSS Software can run the correlation, patterns of a regression and strong trends on the survey data [13]. This format allows for quantifying the respondent's perception on the role played by blockchain in the improvement of operational efficiency. This questionnaire attempts to assess the impact of blockchain on life insurance services as perceived by the survey respondents in terms of transparency, security and automation. Processing large dataset and getting interesting insights out from quantitative responses, this is where SPSS comes in place.

DATA ANALYSIS

		Correlations				
		Azure Blockchain Services improve transparency in life insurance transactions	Blockchain technology enhances the efficiency of claim processing in life insurance	Smart contracts in blockchain-based life insurance systems effective in reducing fraud and errors	The adoption of Azure Blockchain Services can increase customer trust in life insurance companies	Blockchain technology enhances data security and privacy in life insurance transactions
Azure Blockchain Services improve transparency in life insurance transactions	Pearson Correlation	1	.077	.209	-.168	-.250
	Sig. (2-tailed)		.687	.269	.374	.182
	N	30	30	30	30	30
Blockchain technology enhances the efficiency of claim processing in life insurance	Pearson Correlation	.077	1	-.845	-.399	.063
	Sig. (2-tailed)	.687		.013	.029	.739
	N	30	30	30	30	30
Smart contracts in blockchain-based life insurance systems effective in reducing fraud and errors	Pearson Correlation	.209	-.845	1	.210	.223
	Sig. (2-tailed)	.269	.013		.264	.235
	N	30	30	30	30	30
The adoption of Azure Blockchain Services can increase customer trust in life insurance companies	Pearson Correlation	-.168	-.399	.210	1	.196
	Sig. (2-tailed)	.374	.029	.264		.298
	N	30	30	30	30	30
Blockchain technology enhances data security and privacy in life insurance transactions	Pearson Correlation	-.250	.063	.223	.196	1
	Sig. (2-tailed)	.182	.739	.235	.298	
	N	30	30	30	30	30

*. Correlation is significant at the 0.05 level (2-tailed).

Fig 4: Correlation Analysis

There are many insights into the relationship of variables in the correlation analysis. There is a weak correlation between Azure Blockchain Service's transparency and Blockchain technology's efficiency with Pearson $r = 0.077$. Smart contracts have a strong negative correlation of -0.399 with

customer trust in life insurance companies. The Blockchain technology enhancing security has a moderate negative correlation as measured by correlation of -0.250 with transparency, however none of the correlation is statistically significant at 0.05 level. Weak to moderate relations between variables are observed from the correlation analysis. There is a weak positive relation between the variables Azure Blockchain Services and efficiency, with the correlation of 0.077 ($p = 0.687$). There is a weak but significant positive correlation of 0.05 ($p = 0.267$) with the efficiency side of smart contracts.

Case Processing Summary

	Valid		Cases Missing		Total	
	N	Percent	N	Percent	N	Percent
Gender * Azure Blockchain Services improve transparency in life insurance transactions	30	100.0%	0	0.0%	30	100.0%

Gender * Azure Blockchain Services improve transparency in life insurance transactions Crosstabulation

		Azure Blockchain Services improve transparency in life insurance transactions				
		2	3	4	5	Total
Gender	1	1	10	1	1	13
	2	7	9	0	0	16
	3	0	1	0	0	1
Total		8	20	1	1	30

Chi-Square Tests

	Value	df	Asymptotic Significance (2-sided)
Pearson Chi-Square	7.020 ^a	6	.319
Likelihood Ratio	8.404	6	.210
Linear-by-Linear Association	4.145	1	.042
N of Valid Cases	30		

a. 10 cells (83.3%) have expected count less than 5. The minimum expected count is .03.

Fig 5: Chi-Square Test Analysis

Second one runs the Chi-Square Test and determines that none are significant with

gender. There was no significant relationship between gender and the perception that Azure Blockchain Services makes transparency in life insurance easier ($p = 0.319$). The Likelihood Ratio test also shows no significant association ($p = 0.210$). The Linear-by-Linear Association test reveals a significant association ($p = 0.042$). This is far enough in a linear relation between gender and perceptions of transparency and there is a weak but statistically significant association.

Case Processing Summary

	Valid		Cases Missing		Total	
	N	Percent	N	Percent	N	Percent
Age * Blockchain technology enhances the efficiency of claim processing in life insurance	30	100.0%	0	0.0%	30	100.0%

Age * Blockchain technology enhances the efficiency of claim processing in life insurance Crosstabulation

		Blockchain technology enhances the efficiency of claim processing in life insurance					Total
		1	2	3	4	5	
Age	1	1	0	4	0	2	7
	2	0	2	5	0	3	10
	3	1	0	4	3	2	10
	4	0	1	1	0	0	2
	5	0	0	1	0	0	1
Total		2	3	15	3	7	30

Chi-Square Tests

	Value	df	Asymptotic Significance (2-sided)
Pearson Chi-Square	15.435 ^a	16	.493
Likelihood Ratio	17.289	16	.367
Linear-by-Linear Association	.133	1	.715
N of Valid Cases	30		

a. 23 cells (92.0%) have expected count less than 5. The minimum expected count is .07.

Fig 6: 2nd Chi-Square Test Analysis

The results of the Chi-Square Test show no significant association between age and perception of blockchain technology's efficiency in the claim processing ($p = 0$,

493). No significant relationship is indicated by the Likelihood Ratio test ($p = 0.367$). The Linear-by-Linear Association test ($p = 0.715$) shows that the perception of age does not significantly affect the opinion of blockchain technology on the improvement of claim processing.

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.282 ^a	.080	-.026	1.357

a. Predictors: (Constant), The adoption of Azure Blockchain Services can increase customer trust in life insurance companies, Azure Blockchain Services improve transparency in life insurance transactions, Blockchain technology enhances the efficiency of claim processing in life insurance

ANOVA^a

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	4.145	3	1.382	.751	.532 ^b
	Residual	47.855	26	1.841		
	Total	52.000	29			

a. Dependent Variable: Integrating Azure Blockchain Services in life insurance provides a seamless and user-friendly experience for policyholders

b. Predictors: (Constant), The adoption of Azure Blockchain Services can increase customer trust in life insurance companies, Azure Blockchain Services improve transparency in life insurance transactions, Blockchain technology enhances the efficiency of claim processing in life insurance

Coefficients^a

Model		Unstandardized Coefficients		Standardized Coefficients Beta	t	Sig.	95.0% Confidence Interval for B		Collinearity Statistics Tolerance	VIF
		B	Std. Error				Lower Bound	Upper Bound		
1	(Constant)	1.198	1.694		.707	.486	-.284	4.690		
	Azure Blockchain Services improve transparency in life insurance transactions	.592	.395	.286	1.501	.145	-.219	1.403	.972	1.029
	Blockchain technology enhances the efficiency of claim processing in life insurance	-.004	.238	-.003	-.016	.987	-.493	.485	.841	1.189
	The adoption of Azure Blockchain Services can increase customer trust in life insurance companies	.044	.195	.047	.226	.823	-.357	.446	.822	1.217

a. Dependent Variable: Integrating Azure Blockchain Services in life insurance provides a seamless and user-friendly experience for policyholders

Collinearity Diagnostics^a

Model	Dimension	Eigenvalue	Condition Index	Variance Proportions			
				(Constant)	Azure Blockchain Services improve transparency in life insurance transactions	Blockchain technology enhances the efficiency of claim processing in life insurance	The adoption of Azure Blockchain Services can increase customer trust in life insurance companies
1	1	3.726	1.000	.00	.00	.01	.01
	2	.198	4.338	.00	.01	.14	.46
	3	.061	7.819	.01	.40	.55	.17
	4	.015	15.571	.99	.59	.30	.36

a. Dependent Variable: Integrating Azure Blockchain Services in life insurance provides a seamless and user-friendly experience for policyholders

Fig 7: Regression Analysis

The regression analysis results in poor relationships between the predictors and the

dependent variable, integration of Azure Blockchain Services. The result of the coefficient for Azure Blockchain Services improving transparency is 0.592 ($p = 0.145$) that is not significant. On the other hand, Blockchain technology that speeds up the processing of claims ($B = -0.004$, $p = 0.987$) as well as customer adoption of trust ($B = 0.044$, $p = 0.823$) has no effect. The model has low R^2 and high p values, making the model's predictive power weak although the VIF values indicate lack of multicollinearity. The regression analysis shows that the integration of Azure Blockchain Services has not shown a strong level of power to predict [14]. Only 80% of variance is explained and thus an R^2 of 0.080 is indicated. There are no predictors including transparency improvement ($B = 0.592$; $p = 0.145$) and customer trust ($B = 0.044$; $p = 0.823$) that significantly predicts the dependent variable.

One-Sample Statistics

	N	Mean	Std. Deviation	Std. Error Mean
The adoption of Azure Blockchain Services can increase customer trust in life insurance companies	30	3.10	1.423	.260
Blockchain technology enhances the efficiency of claim processing in life insurance	30	3.33	1.155	.211
Smart contracts in blockchain-based life insurance systems effective in reducing fraud and errors	30	3.47	1.106	.202

One-Sample Test

Test Value = 0						
	t	df	Sig. (2-tailed)	Mean Difference	95% Confidence Interval of the Difference	
					Lower	Upper
The adoption of Azure Blockchain Services can increase customer trust in life insurance companies	11.934	29	.000	3.100	2.57	3.63
Blockchain technology enhances the efficiency of claim processing in life insurance	15.811	29	.000	3.333	2.90	3.76
Smart contracts in blockchain-based life insurance systems effective in reducing fraud and errors	17.170	29	.000	3.467	3.05	3.88

One-Sample Effect Sizes

		Standardizer ^a	Point Estimate	95% Confidence Interval	
				Lower	Upper
The adoption of Azure Blockchain Services can increase customer trust in life insurance companies	Cohen's d	1.423	2.179	1.510	2.836
	Hedges' correction	1.461	2.122	1.471	2.762
Blockchain technology enhances the efficiency of claim processing in life insurance	Cohen's d	1.155	2.887	2.060	3.703
	Hedges' correction	1.186	2.811	2.007	3.606
Smart contracts in blockchain-based life insurance systems effective in reducing fraud and errors	Cohen's d	1.106	3.135	2.251	4.008
	Hedges' correction	1.136	3.053	2.192	3.904

a. The denominator used in estimating the effect sizes.
Cohen's d uses the sample standard deviation.
Hedges' correction uses the sample standard deviation, plus a correction factor.

Fig 8: One-Sample T test Analysis

The results of the One Sample T test suggest that all three variables have significant differences from the test value of 0. Regarding the mean difference of the two, the t-value is 11.934 meaning the customer trust in blockchain is 3.100 and it is significant at $p < 0.001$. The mean difference for blockchain's efficiency in claim processing is 3.333 t-value 15.811 ($p < 0.001$). The mean difference for smart contracts to reduce fraud is 3.467 and t-value is 17.170 ($p < 0.001$). The statistically significant positive effects appear for all variables. All variables have significant differences as shown in the Results of the One Sample T test. The difference in customer trust is a mean difference 3.100 ($t = 11.934$, $p < 0.001$). The mean difference is found to be 3.333 ($t = 15.811$, $p < 0.001$) across all the claims in terms of efficiency in processing claims. Mean difference on the smart contracts is 3.467 ($t = 17.170$, $p < 0.001$), and it is significantly positive.

FUTURE DIRECTIONS

The research continues with future research on the long-term impact of Azure Blockchain services on operational

efficiency in life insurance. The factors that contribute to the customer trust and satisfaction can be further studied. Researchers can also look into the scalability and affordability of blockchain solutions in world insurance markets [15]. Future studies can involve overcoming regulatory hurdles in deploying blockchain technology in different countries and studying the effects on fraud prevention and risk management in the insurance business.

CONCLUSION

Both Azure Blockchain Services have weak correlations and little predictive power as predictors of life insurance. It turns out that the regression model performs little in terms of predicting transparency improvements or operational efficiency. The Chi-Square and One Sample T-Test on gender and age verify that there are no significant relationships between gender or age and blockchain's perceived impact. The results for the One Sample T Test yield positive, statistically significant mean differences for customer trust, efficiency and fraud reduction. Future study is required to investigate blockchain's long-term impact, scalability, and regulatory obstacles in the global life insurance business. This can contribute to the practical implementation and efficacy of blockchain in the sector.

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