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ARTIFICIAL INTELLIGENCE FOR SUSTAINABILITY OF QUALITY FINANCIAL REPORTING IN NIGERIA

Artificial Intelligence for Sustainability of Quality Financial Reporting in Nigeria: Re Cyber-Security

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Abstract

Research Objective: The research aimed to examine the impact of Artificial Intelligence (AI) on the sustainability of quality financial reporting in Nigeria, with a particular focus on the role of cybersecurity. The study identified Natural Language Processing (NLP), Robotics, and Computer Vision as proxies for AI, representing the independent variable, while the sustainability of quality financial reporting served as the dependent variable.

Methodology: The study adopted a descriptive survey design. Data were primarily gathered through a structured questionnaire and analyzed using arithmetic means. Hypotheses were tested using the chi-square analytical technique to determine the relationship between AI components and the sustainability of quality financial reporting.

Findings: The analysis revealed that Natural Language Processing, Robotics, and Computer Vision have a significant and negative effect on the sustainability of quality financial reporting in Nigeria. This implies that AI, when supported by robust cybersecurity measures, plays a vital role in monitoring, safeguarding, and improving the quality and sustainability of financial reporting, thereby mitigating cyber threats and financial reporting irregularities.

Conclusion: The study concluded that AI, through advanced cybersecurity measures, significantly contributes to the sustainability of quality financial reporting in Nigeria by protecting against cyber threats and ensuring reliable reporting. The negative effect observed highlights the importance of effective AI implementation in cybersecurity frameworks.

Recommendations: The study recommends that cyber management authorities and the government should adopt proper monitoring tools, establish conventional policies, enforce global best practices, and employ the latest sophisticated technologies to combat cybercrime. This will ensure appropriate sanctions for cybercrime perpetrators and protect the interests of stakeholders, thereby enhancing the quality and sustainability of financial reporting in Nigeria.

Key words: *Artificial intelligence, Financial Reporting, Quality Financial Reporting, Cyber Security.*

1.0 INTRODUCTION

The 21st century witnessed rapid radical transformation across the globe. This culminated to the adoption and use of advanced technology – Artificial intelligence in renaissance of financial system in Nigeria. As such it became necessary for every sector of the economy to embrace this novel development, a technical innovation which is developing in accelerated pace capable of upholding permanent update of strategies and plans drawn in financial reporting approach by authorities and the government.Evidences indicate that different sectors of the economy including financial sector have integrated some form of artificial intelligence in their operations to carry out their businesses instead of only human elements.

In order to attract, maintain and retain customers in the financial sector there is every need for its effective utilization. Assuredly artificial intelligence is now changing and reshaping the way transactions are made in businesses and the world at large. There is confidence in the financial system, economy, and reliability in the medium of transfer of money and other financial instruments.

Artificial Intelligence (AI) signifies computer devices designed by intelligent human beings to work in an intelligent manner like human beings. It includes technological patterns and simulates human performance and equally explains the ability of a digital computer controlled machine or robot to perform operations or tasks. Besides, Artificial Intelligence concerns itself to assume human intelligence in machines so as to carry out tasks that involve human cognitive capacity (Chen et al, 2020; Oladele, and Ogunleye, 2021). It is concerned with carrying out tasks that demand simultaneous activities. The transformation brought about by Artificial intelligence goes beyond technological shift to paradigm shift, redefining the role of auditors and as well reshaping the accounting industry in its entirety.

Artificial Intelligence therefore has compelling applications in the financial reporting process as well as powerful new capabilities to auditors. In alignment businesses expect their audit companies to be in the vanguard of embracing using it.The expectation of businesses is that auditors of their companies will click to the knowledge of artificial intelligence in order to take the lead in Artificial Intelligent (Al) transformation, inspire and also drive the transformation of financial reporting the world over.Consequent upon this there will be overcome of challenges of inaccuracy, insecurity, risk control, detection of trend and anomaly and data enabled decision making.

The ability of artificial intelligence to be able to completely transform a large number of accounting and finance sectors in addition to other sectors attracts a lot of interest. Okoye and Adetunji (2018), Adelaja and Adeyemi (2019) infer that artificial intelligence can improve the efficacy and efficiency of financial institutions by automating laborious procedures, analyzing massive volumes of data as well as offering insightful analysis.

As the world continuously evolves into a global village application of knowledge to solve problems emerges in the form of technological devices such as the computer. As a natural

fact, every development is faced with its own challenges, the development and adoption of artificial intelligence notably faced its own challenges.

To guard against undermining organizational objectives in adopting these technologies were the introduction of cyber security. Gasser (1988) asserts that Cyber security is the protection or guarding of computer systems against theft or harm to hardware, software or information as well as from interruption or misleading and incorrect commands of the services they offer. Evidence from previous research has shown that the rate of continuous attack on networks has become more complex and sophisticated on a daily basis (Nwosu, 2019).Cyber attacks in recent times are alarmingly growing. To fight against this anomaly is the introduction of cyber security in organizations to checkmate manipulations that may likely occur in its financial reporting. It aids in protecting computers, networks, programs, and data from unintended or unauthorized access, change, or destruction of cyberspace, environment or accounts. To arouse confidence in the beneficiaries is thus this study "Artificial intelligence for sustainability of quality financial reporting in Nigeria. A case of cyber security".

Objectives of the Study

The broad objective of this study is to examine the effect of artificial intelligence on sustainability of quality financial reporting in Nigeria with particular reference to cyber security while the specific objectives are to:

1. Determine the effect of natural language processing on sustainability of quality financial reporting in Nigeria.
2. Ascertain the effect of robotics on sustainability of quality financial reporting in Nigeria
3. Appraise the effect of computer version on sustainability of quality financial reporting in Nigeria.

Statement of hypothesis

1. There is no significant and negative effect of natural language processing on sustainability of quality financial reporting in Nigeria.
2. There is no significant and negative effect of robotics on sustainability of quality financial reporting in Nigeria.
3. There is no significant and negative effect of computer version on sustainability of quality financial reporting in Nigeria.

Statement of the problem

Civilization in the world today embraces all sectors of human endeavor especially business in different categories and capacities. It is to keep fit with the emerging scope to conveniently reach users of products or services far and wide steadily at a minimal cost that adopted this technology.

There is no doubt that the introduction and adoption of this technology has no negative and positive effect.Evidently, crime perpetrators took advantage of the negative impact to perform their criminal activities namely, scamming, frauds, phishing, also financial reports are manipulated. They have brought about unexpected costs, damages, financial losses, unreliability etc.

Nwosu (2019) opines that over the years immoral cyberspace user homes continued to use triggered mixed feelings of admiration and fear among the general populace along with a growing unease about the state of cyber and personal security. This calls for quick and regular intervention of network authorities and government to protect the cyber space and the beneficiaries as this will also promote their own benefit and the entire economy.

2.0 LITERATURE REVIEW

Conceptual Framework

Artificial Intelligence (AI)

Artificial intelligence is said to be that branch of computer science that studies the development of complex computer programs capable of performing tasks that typically require human intelligence and input (Timbo, 2024). He further said that the tasks range from understanding spoken language and recognizing patterns to creative problem-solving and learning from past exposure to information. In a nutshell it is a simulation of human intelligence processes, allowing machines to reason, self-correct, optimize and acquire a level of perception of their environment.

Abdulsadek (2021) opines that artificial intelligence was introduced in 1956 and it explains that knowledge shown by machines and programs to simulate human mental capabilities and patterns of work such as the ability to learn, deduce and react. This works in relation to thinking, discovery and benefiting from previous experiences (Mhlanga, 2020) . Buchanan (2019) adds that artificial intelligence is a computer device and system designed to work in a way that can be considered intelligent. This implies that its activities revolve round every aspect of knowledge better and superior than that of humans.

Natural Language Processing (NLP)

Natural language processing refers to the machine learning technology that empowers the computer to interpret, manipulate and comprehend human language. Organizations are presently concerned with large volumes of voice and text data from various communication channels such as Audio, E-mails, text messages etc. Natural language processing software automatically processes raw data gathered, analyzes the intent or sentiment in the message, and then responds in real time to human communication. It is the aspect that allows computers to understand spoken words and written text unavoidably the interactions between humans and machines. The technologies allow computers to process human language in the

form of text or voice data and understand its full meaning, compete with the speaker's or writer's intent and sentiment

Robotics (R)

Robotics signifies that branch of artificial intelligence that focuses on creating physical machines that can perform tasks autonomously. The machines range from simple industrial robots to complex human aid robots that can as well navigate and interact with their environment. It involves the integration of various AI technologies such as computer version and natural language processing, to enable robots to interact with the environment. These technologies can perform tasks that are previously impossible or too dangerous for humans, making them a valuable tool for businesses and organizations looking to improve efficiency and reduce costs.

Computer version (CV)

Computer version signifies the aspect of artificial intelligence that focuses on enabling machines to interpret and understand visual information from the environment. Such are identifying objects in an image or tracking movement in a video. It permits image processing, interpretation and understanding of visual information, from the environment. This component enables AI algorithms to accurately and reliably identify objects that the machine sees and react accordingly.

Sustainability Reporting

According to Global Reporting Initiative (GRI) (2006) Sustainability reporting is the disclosure and communication of environmental, social and governance (ESG) goals as well as a company's progress towards them. It added that it is a practice through which firms reveal the most significant economic, environmental and social consequences of their business actions and are held accountable for managing these impacts. Junior et al (2013) asserts that sustainability reporting signifies the tool through which businesses communicate their operations such as economic, social and environmental implications to various stakeholders both internal and external. This became necessary as culture demanded increasing demand for better corporate governance and increased need for organizational accountability towards all stakeholders.

Financial Reporting

Financial reporting on the other hand is the review of financial data at various intervals such as monthly, quarterly or yearly towards attaining better business outcomes. It is therefore an accounting process for communicating financial information to both internal and external users through financial statements such as statement of comprehensive income, statement of financial position and statement of cash flows (Russo, 2022). He further maintained that financial reporting is vital for the purposes of raising capital, reassurance, financial analysis

and compliance and Law. Financial reporting therefore provides insight and transparency into a company's financial position and its operations.

Quality Financial Reporting

This entails periodic and comprehensive disclosure of financial transactions of business organizations devoid of bias to both internal and external interested users for decision making. The system communicates the outcome of operational activities of a corporate entity to its shareholders. A quality financial report attests to provision of relevant information, complete and unbiased information visa-vice qualities of a good financial report such as relevance, reliability, objectivity, ability to understand, comparability, realism, consistency, timeliness, economy of presentation and completeness. These are salient in making economic decisions.

Cyber Security

Cyber Security infers the process of securing the networks, systems and applications of digital networks (Sani et al, (2023). Besides, it concerns itself with safeguarding information and managing risks related to its use, processing, storage and transfer as well as the systems and procedures that employ it (Wang et al, (2023). The field of cyber security exists to meet the challenges of understanding and protecting against attacks such as attempting to steal data, corrupt software, disrupt operations, physical damage hardware and networked infrastructures (Duane, 2021). It is evident today that challenges abound as usage of the internet through cell phones, wearable devices, home appliances and so on extend across every human activities and organizations.

Theoretical Framework

The study was based on the following two theories below:

Resource Based View (RBV) Theory

This theory was propounded by Penrose (2009) who first proposed a model on the effective management of firms' resources, diversification strategy and productive opportunities. The theory explains the relationship existing between information technology and firm performance. It relates to capacity, competence and skills (Caldeira and Ward, 2011). Firms capability tells how it manages its resources both human and non-human resources. Competence is in terms of how well those resources are managed while skills are associated with skills such as technical, managerial and general management skills. Resource based View theory infers that excellent company performance is related to the effective use of resources. Managers are encouraged to effectively manage their firm's resources in order to maximize performance.

System Theory

The father of general system theory is Ludwig Von Bertalanffy (1901-1972) due to his contributions as regards open systems and steady state that is flux equilibrium. The system

was developed to explain historical development as a dynamic process. Development in information technology (IT) leads to advancement in technology to a more sophisticated tool and knowledge. He argued that everything is interconnected and accounting is equally interconnected.

The system theory is most related to this study because the methods proposed are to model complex entities created by multiple interactions of components concentrating on the dynamics that define the characteristics, functions, properties and relationships that are internal or external to the system. There it is the theory to which the study was based.

Empirical Review

Oyewobi and Bana (2023) carried out research on computerized accounting information systems, innovation and financial reporting quality on sustainability of anti-graft agencies in emerging economies in Nigeria. Data were gathered from financial records of the independent corrupt practices commission and anti-graft agency ranging from 2012 to 2021. It was analyzed using descriptive statistics and panel regression. Its findings were that the computerized accounting information system has a positive and significant effect on the quality of financial reports of anti-corruption agencies in Nigeria.

Williams and Isaac (2021) assessed the impact of computerization of financial reporting practices of the six registered international non-governmental organizations in Ghana. It adopted correctional research design and applied bivariate analysis to discover that there is a highly significant practice relationship between computerization and financial and reporting practices.

Ali and Ainoi (2022) appraised the factors influencing the implementation of computerized accounting systems in small and medium size firms in Somalia. Data gathered were primary, used regression analysis.It found that management commitment, human capital efficiency, business user competency and cost capabilities are significant factors in implementing computerized accounting systems (CAS) and that they increase accuracy of financial statements and speedup that integration.

Akamanwama (2022) carried out a research on the influence of computerized accounting systems on financial reporting quality in small and medium enterprises in Nigeria. Data were gathered using a web based self-completed questionnaire. Analysis was by the use of descriptive statistics and structural equation modeling. Its findings were that CAS usage has a significant positive influence on financial reporting quality in terms of relevance, faithful representation, comparability, verifiability and understandability.

Yunusa-Acho (2021) declared to study the impact of computerized accounting systems on the performance of the banking sector in Nigeria. Description research survey design was adopted, linear regression analysis was the analytical tool used. It was unveiled that the

computerized accounting system (CAS) has enhanced the performance of the banking sector in Nigeria.

Owonifari et al (2023) conducted research on artificial intelligence and efficacy of audit practice in Nigeria. It is a survey design research that adopted the use of well-structured questionnaires to gather data. The data was analyzed using descriptive and regressive analysis. The findings were that data mining machine learning and image recognition exhibited a significant positive relationship with audit practice in Nigeria.

Zwaid and Mohammed (2023) investigated the impact of artificial intelligence systems and technology on the sustainability of the quality of financial reports in Iraq. Organized questionnaires were used to gather data. The analysis disclosed that artificial intelligence is one of the most important technologies that have the impact of the value and usefulness of the information shown by financial reports in a fast way and with a distinctive presentation. Also, its application is said to be important and inevitable in accounting as a field of study that leads to a high quality and continuity in the validity of information, sustainability and quality of financial reports.

Dalabih (2018) examined the impact of the use of accounting information systems in accounting dimensions. (Nature, introduction and security of account information systems) on the quality of financial statements applied to service companies in the Ammam securities exchange. Its result of analysis indicated a statistically significant positive impact of the nature and security of accounting information systems on quality of financial statements.

Simon (2018) on the study of the impact of primary operation and the use of artificial intelligence on the accounting profession involved that the accountant will use automation for routine tasks instead of replacement as tasks that require critical thinking are more difficult to operate primarily.

Chude et al (2022) studied the effect of a computerized accounting system on the organizational performance of oil and gas firms in Port-Harcourt, Nigeria. Based on primary data, analysis was done using descriptive and inferential statistics. It showed a positive significant effect of accounting software usage on accountability, productivity and cost control in oil and gas firms.

Oyeniyi et Al (2024) examined the influence of artificial intelligence on financial reporting quality: A critical review and analysis. The study transversed the evolution of financial reporting, the foundational principles of artificial intelligence and the symbolic relationship between artificial intelligence applications and financial analytics, culminating in understanding of artificial intelligence potential to revolutionize financial reporting. The findings were that artificial intelligence significantly enhances reporting accuracy, analytical debt and efficiency. It also unveiled challenges that are related to ethical considerations, regulatory compliance and the potential for biases.

Goel et al (2023) explored the use of artificial intelligence for predictive analytics in financial management. The focus was on its potential to handle vast volumes of data, identify patterns, and produce high accuracy forecasts. It embraced areas such as credit risk analysis, portfolio management and fraud detection showing the ability of AI to transform financial forecasting and decision making processes.

Albassam (2023) investigated the transformative power of artificial intelligence (AI) in recruitment, offering a lens through which to view AI's broader capabilities in data analysis and strategic decision making. The application of artificial intelligence in recruitment approaches such as screening and predictive analytics, indicates its potential in financial reporting to shift through vast datasets, identify patterns, and as well make predictions with a level of efficiency and accuracy that cannot ordinarily be attained by humans.

In furtherance, De Villers (2023) studied the impact of artificial intelligence on sustainability reporting in relation to financial disclosures. Its highlight was on the dual-edge nature of artificial intelligence in generating and processing text for sustainability reports in analytical dept, reporting efficiency and challenges such as risk of facilitating green washing.

Ghanoum and Alana (2020) conducted a study on integration of artificial intelligence in auditing: The effect of audit process.It is a qualitative research that adopted abductive approach on data collection through a semi-structured interview among auditors that have adopted AI-based tools in audit process in Sweden. It was discovered that the use of Artificial intelligence systems enhance effectiveness in all strategies adopted in the audit process and also increase professionalism and compliance with audit standards.

Eno (2022); studied the integration of Artificial intelligence application for financial process innovation by commercial banks in Nigeria. The study adopted descriptive survey research design and used a researcher based questionnaire to gather data which was analyzed using mean, standard deviation and t-test analysis.Its findings were that artificial intelligence can be applied for credit risk management and personalized banking experience.

3.0 METHODOLOGY

The design of the study was descriptive research design due to the fact that the data collected were primary data. The population of the study was infinite and that paved the way for using the topman sample size determination formula to determine the sample size.

Thus, $= \frac{Z^2 pq}{e^2}$

Where:

n = sample size

z = Zee score at 95% level of confidence

p = Assured success rate

q = Assured error margin

Then substituted below:

n = 1.96

p = 0.9

q = 0.1

e = $(0.05)^2$

$n = \frac{(1.96)^2(0.9)(0.1)}{0.05}$

$n = \frac{3.8416x0.09}{0.0025}$

$n = \frac{0.345744}{0.0025}$

n = 138.2976

n = 138

The instrument used to gather data was a well structured questionnaire. It was used to gather information or raw data from one hundred and thirty eight respondents. This follows the administration of that same questionnaire to various accounting practitioners and auditors considered as experts in the field to certify the credibility before actual administration to the actual respondents. Such indicated reliability. The responses were on a modified four (4) point Likert scale of strongly Agree (SA), Agree (A), Disagree (D) and Strongly Disagree (SD) respectively. Arithmetic mean was the analytic technique while chi-square were used to test hypotheses.

Analysis of Responses

The data arising from the modified 4 point Likert scale was presented on tables and analyzed with the aid of arithmetic mean.

Table 1: Effect of natural language processing on sustainability of quality financial reporting in Nigeria: Re cyber security.

ITEMS	SA	A	D	SD	TOTAL
Performs large scale analysis	58 232	48 144	17 34	15 15	138 425
Arrives at more objective and accurate analysis	49 196	45 135	21 42	23 23	138 396
Improves customer satisfaction	54 216	52 156	28 56	4 4	138 432

Empowers employees	38 152	48 144	33 66	19 19	138 381
Enhances better understanding of market	47 188	45 135	24 48	22 22	138 393

Researcher's field work (2024)

Table 2: Effect of robotics in sustainability of quality financial reporting in Nigeria: Re cyber security

ITEMS	**SA**	**A**	**D**	**SD**	**TOTAL**
Assistance in monitoring and compliance in business operations	49 196	56 168	28 56	5 25	138 445
Reduces cycle time at lower cost than other information software	55 220	57 171	12 144	14 14	138 549
Costs savings and efficiency	46 184	46 138	33 66	13 13	138 401
Speed, agility and ease of development	38 152	52 156	26 52	22 22	138 382
Rapid digitize processes	53 212	51 153	36 72	18 18	138 455
Enhancement of productivity	47 188	48 144	23 46	30 30	138 408
Unproven data analysis	42 168	48 144	27 54	21 21	138 387

Researcher's field work (2024)

Table 3: Effect of computer version on quality financial reporting in Nigeria. Re cyber security

ITEMS	**SA**	**A**	**D**	**SD**	**TOTAL**
Enhances financial record keeping for greater accuracy	49	49	20	21	138

	192	147	40	21	400
Records and tracks financial transactions	51 264	43 129	23 46	11 11	138 390
Saves time, money and other resources	48 192	50 150	21 42	19 19	138 403
A tool for book keeping and other financial transactions	48 192	46 128	25 50	20 21	138 391
Minimizes errors and shelves discrepancies	56 224	52 156	17 34	13 13	138 427
It aids easy retrieval of stored data	504 200	156 168	19 38	12 12	 418

Source: Researcher's field work (2024)

Testing of Hypotheses

Hypothesis I

Natural language processing has no significant and negative effect on sustainability of financial reporting in Nigeria. Re cyber security

Table 4: Testing on whether Natural language processing has significant and negative effect on sustainability of quality financial reporting in Nigeria. Re-Cyber security

O	E	o-e	$(o-e)^2$	$\frac{(o-e)}{e}$
424	405	20	400	0.98
396	405	-9	81	0.20
432	405	-27	729	1.80
381	405	-24	600	1.48
393	405	12	144	0.36
2027				4.82

Source: Researcher's computation (2024)

Result:

X^2 cal = 482; X^2tab = 3.841

X^2cal > x^2 tab. Null hypothesis is rejected which means that natural language processing has a significant and negative effect on the sustainability of financial reporting in Nigeria. Re cyber

security.

Hypothesis 2:

$H0_2$: Robotics have no significant and negative effect on sustainability of quality financial reporting in Nigeria: Re-cyber security.

Table 5: Testing on whether robotics have significant and negative effect on sustainability of quality financial reporting in Nigeria: Re-cyber security.

O	E	o-e	$(o-e)^2$	$\frac{(o-e)}{e}$
445	432	13	169	0.39
549	432	117	13689	31.69
401	432	-31	961	2.22
382	432	-50	2500	5.79
455	432	23	529	1.22
408	432	-24	576	1.33
387	432	-45	2025	4.69
2027				47.33

Source: Researcher's computation (2024)

Result:

$X^2cal = 47.33$; X^2 tab = 3.841

$X^2cal > X^2$ tab. The null hypothesis is therefore rejected which means that robotics have significant and negative effect on sustainability of quality financial reporting in Nigeria: Re-cyber security.

Hypothesis 3:

Computer versions have no significant and negative effect on sustainability of financial reporting in Nigeria: re-Cyber security.

Table 6: Testing on whether computer versions have significant and negative effect on sustainability of financial reporting in Nigeria re cyber security

O	E	o-e	$(o-e)^2$	$\frac{(o-e)}{e}$
400	486	-86	7396	15.22
390	486	-96	9216	18.96
403	486	83	6889	14.17
391	486	-95	9025	18.57

427	486	59	3481	74.08
418				

Source: Researcher's Computation (2024)

Result:

X^2cal = 74.08; X^2tab =3.841

X^2 cal 7 X^2 tab: The null hypothesis is rejected meaning that computer versions have significant and negative effects on sustainability of quality financial reporting in Nigeria. Re-Cyber security.

4.0 DISCUSSION OF FINDINGS

The proxies of Artificial Intelligence (Natural language processing, Robotics and Computer Version) revealed significant and negative effects on sustainability of quality financial reporting in Nigeria with focus on Cyber security. This implies that although there may be some demerits in the short run there exist quite a number of merits of adoption of Artificial intelligence in sustainability of quality financial reporting in Nigeria considering effective security of internet operations. According to Oyeniyi et Al (2024) Artificial Intelligence significantly enhances financial reporting accuracy, analytical Dept, ethical considerations and regulatory compliance. In addition, Albassam (2023) pointed out that application of Artificial Intelligence indicates its potential in financial reporting to shift through a large number of data sets, identity patterns as well as efficiently and accurately make predictions that cannot ordinarily be attained by humans.

5.0 CONCLUSION AND RECOMMENDATION

5.1 Conclusion

The evidence from the analysis and results of the Hypotheses tested affirm that there is significant and negative effect of Artificial Intelligence on sustainability of quality financial reporting in Nigeria in relation to Cyber security. The study therefore concludes that Artificial Intelligence is a technological advancement that can reliably and adequately enhance and maintain sustainability quality financial reporting in Nigeria.

5.2 Recommendations

Based on the result of the study the following recommendation was made:

1. The management of business organizations should not hesitate to continue applying the services of machine language processing as it is a great relief in dealing with large volumes of voices and text data from various communication channels.

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