

## Assessment of Green Supply Chain Management Practices on Sustainable Business in Ethiopia

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### Abstract

Evaluating organisational performance from the perspective of green paradigms is essential as "green" issues continue to gain global attention. This study evaluated organisational performance and green supply chain practices in Ethiopian Telecom. A mixed approach was considered to meet the study's aims. Structured interview questions and a questionnaire were used as a data gathering tool. Workers of Ethiopian Telecom who held managerial positions and were either directly or indirectly in charge of the business's supply chain operations made up the study's population. 386 of the 426 given questionnaires were correctly completed and used in the study, yielding an 87% response rate. AMOS; Statistical Package for the Social Sciences (SPSS) was used to analyze, interpret, and display the data collected via questionnaire. The methods of percentage, means, standard deviation, correlation, regression, and narrative analysis were used for inferential and descriptive analysis. Regarding survey results, conducted correlation analysis revealed a statistically significant positive association between the dimensions of green supply chain management and organizational performance, except eco design and operational performance; however, the overall survey result indicates that except for investment recovery, all of the dimensions of green supply chain management, including organizational commitment, eco-design, green purchasing. According to the SEM regression's findings, organizational dedication, eco-design, green purchasing, and environmental practices all statistically impact how well an organization performs.

**Keywords** *Green Supply Chain, Eco-Design, Green Purchasing, Green Marketing, Business Sustainability.*

### INTRODUCTION

It might be because green supply chain management techniques frequently result in lower resource usage, less waste production, and more energy effectiveness. In turn, these advantages can lessen a company's environmental impact and enhance its overall sustainability performance, both of which are crucial on a global scale (Shetty & Bhat, 2022). Green supply chain management (GSCM), according to Lerman et al. (2022), incorporates the 4R1D principle into conventional supply chains by integrating sustainable environmental processes into manufacturing, operations, and end-of-life management (reduce, reuse, recycle, reclaim and degradable). Because green supply chains can lower production costs and environmental pollution, they can also promote economic growth, give businesses a competitive edge by increasing customer satisfaction, their brand's visibility and reputation, and give them a better chance to export their goods to environmentally friendly nations (Khan et al., 2022, Wakjira & Kant, 2022).

Green supply chain management is one aspect of the larger range of operations that makes up supply chain management (Kant et al., 2022). A green supply chain is one of the three legs of a sustainable supply chain—the others being the environmental, social, and economic ones—(Gawusu et al., 2022). Green supply chain management increases a company's competitive edge by minimizing the negative effects of industrial processes. GSCM techniques enhance managerial innovation, efficiency, and brand perception for the organization (Xu et al., 2022). Green supply chain management practices in the manufacturing sector also help to strengthen the company's long-term values (Lerman et al., 2022).

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Manufacturing, purchasing, marketing logistics, and information system are all parts of the business process that must work together smoothly (Gobena & Kant, 2022). As a result, supply chain management techniques heavily emphasise customer feedback, quality, and environmental sustainability (Bag et al., 2022, Adula & Kant, 2022). At the end of supply chain management, having a competitive advantage requires identifying and selecting processes (Lin et al., 2022). Studies on large businesses and international corporations that look at how green practices like green production and purchasing, logistics, design, and distribution affect sustainable performance are widely available in the literature (Gawusu et al., 2022).

## **LITERATURE REVIEW**

According to Diane Lesley Holt (2020), one of the issues that enterprises will face in the future is the "greening" of the supply chain. Also, they stated that going forward, "organizations would have to consider environmental issues when making all supply chain choices (Kant et al., 2022). As a result, it will be thought that the current directive is to evaluate supply chains from an environmental standpoint (Kant et al., 2023). During the past ten years, Green Supply Chain Management (GSCM) has grown to be a significant component of many firms' global supply chain and environmental initiatives (Adula & Kant, 2022). Studies on the effects of green supply chain management on the economy and environment have been done in recent years (Khanal et al., 2022).

According to a study by Klassen and Mclaughlin (2018), environmental performance had a beneficial impact on a company's financial success by boosting market share and lowering costs. Also, some anecdotal data suggested that strong environmental management performance reduces manufacturing costs by eliminating waste (Allen, 2018). Hence, as we can deduce from the research above, green supply chain management is being encouraged not only by the necessity for businesses to adhere to environmental regulations, but also by the good effects of green supply chains motivated by business leaders on businesses' financial success (Asefa & Kant, 2022). While weighing trade-offs between environmental and economic performance, Walley (2019) claimed that many managers view environmental management as regulatory compliance. As a result, this circumstance demonstrated that there is confusion.

Additionally, the company has implemented various technical and strategic changes over the past few years to avoid service inconsistency and the corresponding poor telecom service caused by frequent commercial power outages. These changes include installing diesel generators as a backup in many of its infrastructures, strengthening the capacity, and expanding the services, which could not be accomplished without substantially greater utilization of dies. To the researcher's knowledge, no attempt has been taken to address the aforementioned environmental difficulties while implementing these improvements. The primary goal of this research study is to close this gap by analyzing the company's practices and performance about its green supply chain.

### ***Theoretical Foundation***

According to resource-based theory, supply chain management will frequently have traits that make it possible to be a source of long-term competitive advantage, according to Barney (2022). Internal resource development and upstream supply chain resources can be examined more closely. According to certain scholars, the characteristics of resource base theory coincide inside supply chain management and function as a competitive weapon. There have been difficulties recognizing the connection between RBT and reliable supply chain management (Peattie, 2021).

According to RBT, the needs and resources used to create the items are extremely valuable, difficult to duplicate, and non-existent, ensuring the company's long-term success (Hitt et al., 2022). Hirsch (2022) proposed utilizing institutional theory to examine how the institutional context affects organizational behavior. Oliver (1997) argues that the logic of the resource-based paradigm neglects to examine the social environment in which judgments regarding resource selection are ingrained. To address the drawbacks of the resource-based approach, Oliver (1997) proposes a theoretical framework based on the fusion of the resource-based perspective with institutional theory.

The creation of frameworks for green supply chains and the adoption of top-notch programs and technology advancements have extensively used institutional theory (Sarkis et al., 2022,

Berwal et al., 2022). The institutional theory offers a more thorough explanation when the motivation for adopting behaviors or technology comes from legitimacy (DiMaggio and Powell, 1983). We contend that institutional theory should be the second organizational theory selected because it best justifies the social and environmental aspects of supply chain sustainability performance (Seles et al., 2022).

Table 1. Categories of Green Supply Chain Management Practices

Internal environmental management	Commitment from senior management to GSCM Mid-level managers'; assistance for GSCM; collaboration across departments to improve the environment; absolute excellence in environmental management; environmental auditing and compliance initiatives; Certification to ISO 14001 Environment-management techniques.
External GSCM practices	Supplying vendors with design specifications for a purchased item that include environmental requirements collaborating with suppliers to achieve environmental goals; Internal management of suppliers conducts an environmental audit ISO14000; accreditation for suppliers; Evaluation of second-tier suppliers' environmental practices collaboration with the client on an eco-design; customer cooperation for cleaner production collaboration with clients on eco-friendly packaging.
Investment recovery	Sale of waste and used commodities, surplus capital equipment, and investment recovery (sale) of excess stocks and commodities.
Eco-design	Design products to minimize or reduce use of hazardous products and/or their production process. Design of products to reuse, recycle, recover material, and reuse parts.

Source: Researchers Own Meta Analysis (2023)

According to Wu et al. (2022), the postulated model's primary constructions are GSCM practices, with internal environmental management and green information systems serving as its antecedents and the performance of the environment, the economy, operations, and organizations serving as its consequences (Panigrahi et. al., 2022). Recent research demonstrates that adoption of internal GSCM activities with the express goal of enhancing environmental performance across the entire supply chain will be facilitated by external GSCM practices like supplier and customer collaboration (Vachon and Klassen, 2022). Collaborative connections with suppliers are especially helpful for adopting and developing internal new environmental solutions (Geffen and Rothenberg, 2021).

It's still unclear whether GSCM and corporate social responsibility policies can boost economic performance (Seuring and Muller, 2022). According to several studies, GSCM and environmental management have been demonstrated to positively impact an organization's financial performance (Rao and Holt, 2020). Inter-firm relationships often offer formal and informal procedures that enhance trust, lower risk, and ultimately increase collaboration, commitment, and profitability. Some have asserted that when GSCM procedures are used, economic performance is not realized in the short term in terms of profitability and sales performance (Bowen et al. 2021).

If there are shared benefits, "win-wins," or trade-offs that must be handled for both economic and environmental outcomes in sustainable supply chains, there appears to be disagreement in the literature from the previous 15 years (Seuring and Muller, 2022). Economic concerns and cost-related challenges are The main obstacles to implementing environmental management methods (Ambec and Lanoie 2022). According to research, operational performance and external GSCM procedures have a good link. Manufacturers can enhance their operational effectiveness by interacting with suppliers and consumers (Ellram, et al, 2022).

Moreover, studies have demonstrated that internal GSCM techniques, including worker participation and integrated environmental management systems, can enhance operational performance (Hanna M, WR, Newman, P. Johnson, 2021). According to some, manufacturing an ecologically friendly product may result in a finished good that is safer, less expensive, of higher, more consistent quality, and have a higher scrap value (Porter and Van der Linde 1995, Sarkis,

2021). The "lean and green" literature also stated that customer involvement in supplier business improvements to their lean performance is positively related.

However, no definite results have been regarding the coordination of internal and external practices. using the justification that both internal and external GSCM procedures have impacted operational performance. According to Srivastava (2022), green supply chain management can lessen the ecological effects of industrial activity without compromising quality, cost, reliability, performance, or energy utilization efficiency; complying with environmental regulations helps minimize ecological damage and generates overall economic gain.

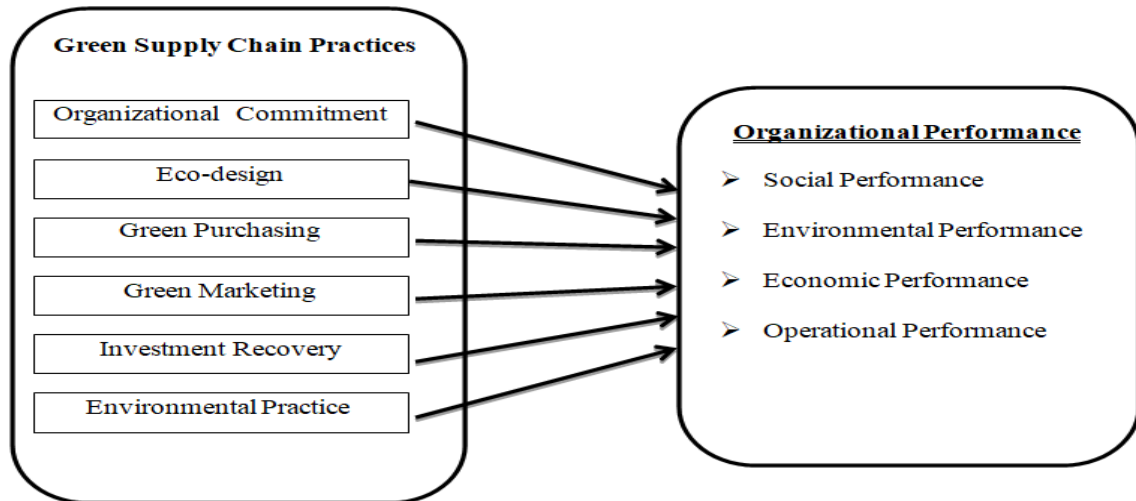


Figure 1. Conceptual model

Source: Researcher own framework (2023)

## RESEARCH METHOD

The goal of designing a research methodology was to support the goal and research questions of a study. In light of this, a workable research design that best suited the issue under study was identified using literature and techniques used in relevant research. A mixed approach that combined qualitative and quantitative research methods was used to conduct this study and respond to the research questions established in chapter one.

As a result, descriptive and explanatory research methods were used. In addition, several descriptive statistics (i.e., measures of central tendency like mean and measures of spread like standard deviation) were employed in the study along with various inferential methods to further explore the relationship. The relationship and interactions between variables were elaborated using a variety of inferential approaches. The researcher employed both qualitative and quantitative research methods.

Purposive sampling, a non-probability sampling technique, is the sample strategy used in this study. Purposive selection, judgment selection, and non-probability selection are all terms used to describe methods that include judgment (Kenesa Kebede et. al., 2023). Instead of using random sampling methods, the researchers were purposefully choose the items for the sample in this sort of sampling. It is often referred to as judgment or purposeful sampling. This ensured the use of professional judgment when choosing examples that would best satisfy the study question and objective.

With the understanding that managers and officers in the Departments and Sections, the researcher disseminated the questionnaire to all designated officers and managers in the Divisions, Departments, and sections.

## FINDINGS AND DISCUSSION

The KMO measure of sampling adequacy is a test to determine whether factor analysis should be used on the given data set. The variables in the population correlation matrix are tested for sphericity using Bartlett's test to rule out the null hypothesis that they are uncorrelated. A statistical test called the Kaiser-Meyer-Olkin (KMO) test evaluates the suitability of data for factor

analysis. The test evaluates whether sampling is adequate for the entire model and individual variable. The statistic represents how much of the variance among the variables may be common variance.

Table 1. KMO and Bartlett's Test

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.907
Bartlett's Test of Sphericity	Approx. Chi-Square	10616.155
	df	1431
	Sig.	.000

All relevant data are evaluated simultaneously using the KMO and Bartlett tests. Significant correlation was found in the data because the KMO value was greater than 0.5 and the Bartlett's test's significance level was lower than 0.05. The degree to which one variable was associated with other variables is known as variable collinearity. This test statistic has  $k-1$  degrees of freedom and a Chi-Square distribution. Meaning,  $B^2 X^2 (k-1)$ . We can reject the null hypothesis and come to the conclusion that not all groups have the same variance if the p-value associated with the test statistic is less than a certain threshold of significance (like = 0.05).

Table 2. Total Variance Explained

Component	Initial Eigenvalues			Extraction Sums of Squared Loadings			Rotation Sums of Squared Loadings			
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %	
dimension 0	1	15.179	28.110	15.179	28.110	28.110	7.277	13.477	13.477	
	2	5.340	9.888	5.340	9.888	37.998	6.807	12.605	26.082	
	3	2.799	5.184	43.182	2.799	5.184	43.182	6.153	11.395	37.476
	4	2.164	4.008	47.190	2.164	4.008	47.190	3.639	6.739	44.215
	5	1.952	3.615	50.805	1.952	3.615	50.805	2.913	5.394	49.609
	6	1.823	3.376	54.181	1.823	3.376	54.181	2.469	4.572	54.181

Extraction Method: Principal Component Analysis.

Source: SPSS, 2023

The sum of the variances of each primary component founded as 54.181 makes up the overall variance. The proportion of a principal component's variation to the total variance manifested as 54.181 was the fraction of variance explained. Divide the sum of the variances of the several primary components by the overall variance. The two components that make up the total variance are the common variance and the unique variance, the latter of which comprises the specific and error variance. The communality is and the unique variance is  $1 - h^2$  if the total variance is 1.

### Confirmatory Factor Analysis (CFA)

The researchers used a statistical method called confirmatory factor analysis (CFA) to confirm the factor structure of a collection of observed data. The researchers examined the idea that there is a connection between the observed variables and the latent constructs that underlie them using CFA.

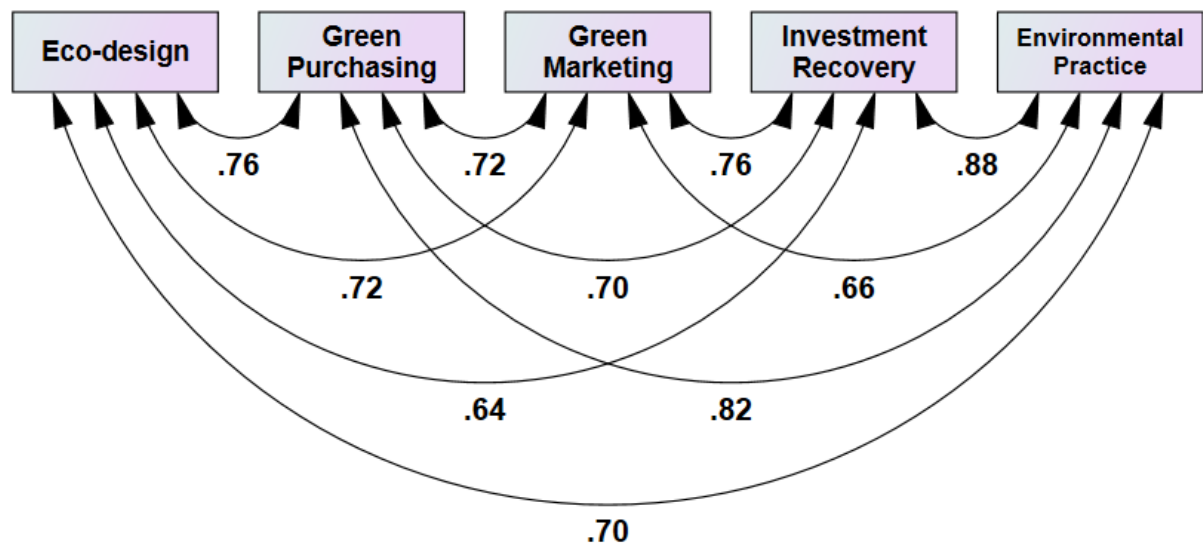


Figure 1. CFA, AMOS, 2023

All measurable variables were founded related to all latent variables in exploratory factor analysis. The number of factors needed in the data and which measurable variable was associated to which latent variable were in both be specified by researchers when using confirmatory factor analysis (CFA).

Table 3. Confirmatory factor analysis (CFA) indices

Model	NPAR	CMIN	DF	P	<u>CMIN/DF</u>
Default model	38	500.785	98	.000	3.110
Model	RMR	GFI	AGFI	PGFI	
Default model	.088	<u>.903</u>	.902	.893	
Saturated model	.000	1.000			
Independence model	.248	.326	.236	.287	

Table 4. RMSEA indices

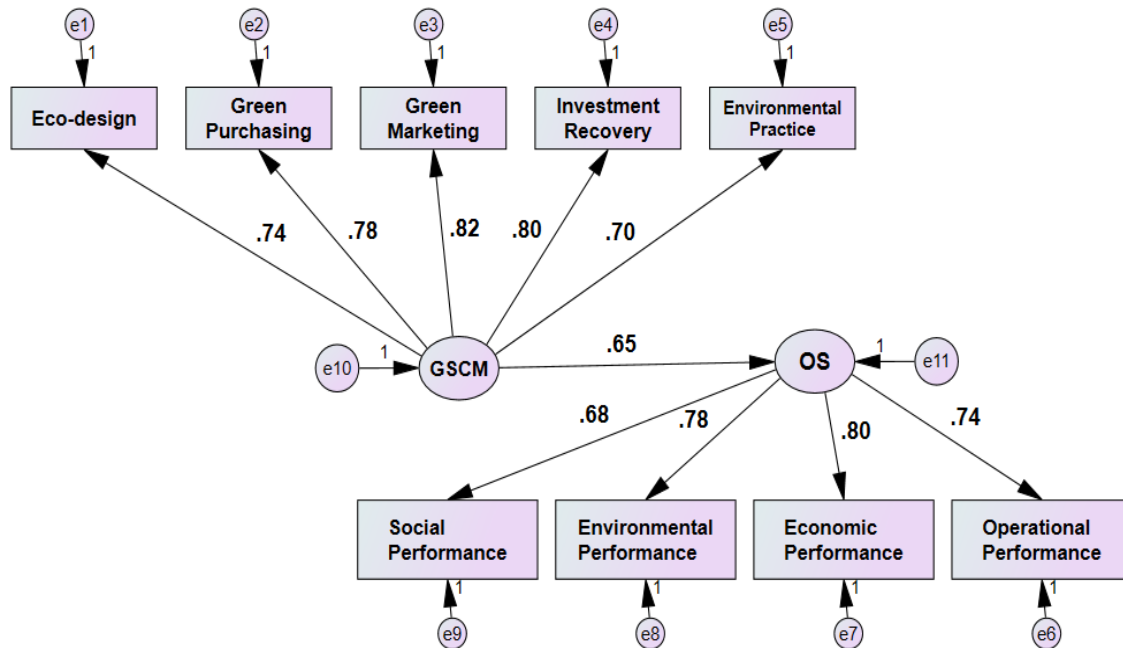
Model	RMSEA	<u>LO 90</u>	HI 90	PCLOSE
Default model	.074	.103	.123	.000
Independence model	.259	.251	.268	.000

Two tables were combined to report the findings of a confirmatory factor analysis. The goodness-of-fit indicators for each factor model were detailed in the first table. Each factor's factor loading, or relative weight, is detailed in the second table. We should consider the standards of the various model fit indices before talking about the model fit of CFA. According to certain theories, RMSEA levels under 0.05 are considered good, those between 0.05 and 0.08 are considered acceptable, those between 0.08 and 0.1 are considered marginal, and those over 0.1 are considered poor. As results showed RMSEA was 0.074, indicated a good fit.

### STRUCTURE EQUATION MODEL

Scientific studies are using structural equation modeling (SEM), a potent multivariate approach, more frequently to investigate and assess multivariate causal linkages. Since SEMs test the direct and indirect impacts on hypothesized causal linkages, they differ from other modeling methodologies. A group of statistical methods known as structural equation modeling (SEM) are

used to quantify and examine the connections between latent and observable variables. It explores linear causal links among variables while concurrently considering measurement error, making it similar to but more effective than regression analysis.



Source: AMOS, 2023

To examine such data, structural equation modelling (SEM) is frequently utilised. Researchers may quickly make up and accurately assess fictitious links between theoretical constructs as well as those between the constructs and their observed indications using SEM when there are enough participants (N). In SEM, researchers discovered that variations and associations among observed variables gleaned from the provided data result in the inference of causality inside the model. The correlation coefficient and standard deviation are typically used to measure association and variance. According to scholars, the goal of structural equation modelling (SEM) is to create a theoretical causal model that consists of a set of expected covariances between variables and then determine if it is credible in light of the observed data.

GSCM enhances the company's competitive advantage by minimising the detrimental effects of industrial processes. GSCM procedures strengthen managerial innovation leadership, boost organisational efficiency, and enhance the company's reputation. By ensuring that goods are delivered on schedule and in accordance with standards of quality, supply chain visibility seeks to enhance overall performance. By increasing the effectiveness of your production operations, boosting supply chain visibility reduces manufacturing costs. Practices in supply chain management affect an organization's competitive edge as well as overall organisational success. By price/cost, quality, delivery dependability, time to market, and product innovation, they are anticipated to increase an organization's competitive edge.

## CONCLUSIONS

Supply chain management enables businesses to deliver goods more rapidly, guarantee product availability, minimise quality concerns, and easily handle returns, eventually increasing value for both the business and its clients. It contributes to fewer errors, lower expenses, less waste, and time and money savings. Organizations must employ Supply Chain Management tools and software to improve and optimise all of the processes in the supply chain hierarchy. Supply chain managers will swiftly gain the competitive edge if they can maximise the value of their labour, inventory, and transportation budgets while lowering risk. Organizations can deliver goods more rapidly, guarantee product availability, minimise quality concerns, and handle returns with simplicity thanks to supply chain management, which ultimately enhances value for the company and its clients. It assists in minimising errors, lowering expenses, minimising waste, and saving both time and money. Organizations must adopt Supply Chain Management tools and software for enhancing and optimising all processes in the supply chain hierarchy. Supply chain managers that

can maximise the return on their labour, inventory, and transportation investments while reducing risk will gain an immediate competitive edge. As a result, value is increased for both the company and the client. Supply chain management enables businesses to deliver goods more quickly, guarantee they are available, minimise quality issues, and easily manage returns. Errors, expenses, waste, and time and money savings are all benefits. Organizations are required to employ supply chain management tools and software for enhancing and optimising all processes throughout the supply chain hierarchy. Leaders in the supply chain who can maximise the return on their labour, inventory, and transportation investments while lowering risk will soon gain the upper hand in the market.

### LIMITATION & FURTHER RESEARCH

Poor instruments may result from the equation containing too many latent variables. The latent variable's scope is not known. In SEM, it is necessary to give both parameter estimates and model fit. Large sample sizes are always required for SEM. The study's design, methodology flaws, or limits affected or influenced how your research's results were interpreted. The number of knowledge gaps that arise from our findings should be suggested by additional study, or the study itself should be extended and put to further examination.

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