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An empirical study of successful adoption of LED bulb by marketing strategies of government of India and LED bulb companies with special reference to Indore city of Madhya Pradesh in India

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Abstract

This research paper aims to investigate the impact of marketing strategies of Government of India and various LED companies on adoption of LED bulbs by the customers of Indore city, Madhya Pradesh in India. After the discovery of white Light Emitting Diode bulb by Shuji Nakamura in 1994 in Japan, it gained significant popularity due to their energy efficiency and environmental benefits. However, the adoption of this new technology of Bulb required great efforts by governments of various countries and electric bulb corporates to invest and make technology affordable for masses. The government of India launched UJALA yojna in 2014 to make LED Bulb technology available to people of India with the two fold objectives of reducing carbon emission by more efficient technology of light and providing people of India with better lighting by reducing electricity bill. The share of LEDs in the lighting market was less than 1% in the year 2013-14 and 77 crores ICLs and about 30 crores CFLs were sold. The electric light bulb companies also invested in LED Bulb production technology and lowered the cost of LED bulb by almost 4 to 5 times in duration of 5 years. The retail price of LED Bulb was Rs. 450-500 in 2013-14 and it is reduced to Rs. 90-100. Thus the efforts of Government of India and Corporates made available LED bulbs for common people in India. Understanding customer psyche is crucial for both manufacturers and policymakers to ensure the continued adoption and improvement of LED lighting technologies in India. The study employs a mixed-methods approach, including surveys and interviews, to gather data on customer perceptions, preferences, and satisfaction levels. The findings contribute to understanding the factors influencing customer for adoption of LED bulbs in Indore, thus providing valuable insights for stakeholders in the lighting industry.

Keywords: LED bulbs, customer, UJALA, Indore, Madhya Pradesh, energy efficiency, environmental benefits

Introduction

This research paper aims to investigate the impact of marketing strategies of Government of India and various LED companies on adoption of LED bulbs by the customers of Indore city, Madhya Pradesh in India. After the discovery of white Light Emitting Diode bulb by Shuji Nakamura in 1994 in Japan, have gained significant popularity due to their energy efficiency and environmental benefits. However, the adoption of this new technology of Bulb required great efforts by governments of various countries and electric bulb corporates to invest and make technology affordable for masses. The government of India launched Unnat Jyoti by Affordable LEDs for All (UJALA) Yojna on 5th January 2015 to make LED Bulb technology available to people of India with the two fold objectives of reducing carbon emission by more efficient technology of light and providing people of India with better lighting by reducing electricity bill. Government launched massive marketing programme of procuring LED Bulbs from manufacturers, promoting through mass media and distribution to public through Energy Efficient Service Limited (EESL), a government undertaking under the power ministry. The EESL distributed to electricity home customers through the various electricity boards of the states and till date 36.8 crores LED bulbs distributed. The price of LED Bulb was kept very low, about Rs. 86 for 9 Watt LED Bulb which is almost 5 times lower of Rs. 500 in market. Thus UJALA Yojana became one of the most successful scheme of government of India and also any government for electric light in the world.

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The electric light bulb companies also invested in LED Bulb production technology and lowering the cost of LED bulb by almost 4 to 5 times in a duration of 5 years. Thus the efforts of Government of India and Corporates made LED bulbs for common people available in India.

If we analyse the adoption of LED Bulb in India and particularly in Indore city on Product Life Cycle (PLC) and Marketing strategies on various stages of PLC adopted by government of India and LED Bulb companies then we can easily understand the success story of LED Bulb adoption in India by consumers.

Understanding customer psyche is crucial for both manufacturers and policymakers to ensure the continued adoption and improvement of LED lighting technologies in India. The study employs a surveys method for gathering primary data of customer perceptions for adopting new technology. The findings contribute to understanding the factors influencing customer for adoption of LED bulbs in Indore, thus providing valuable insights for stakeholders in the lighting industry.

In recent years the market for led bulbs in Indore has witnessed significant growth driven by factors such as increasing awareness of energy conservation, government initiatives promoting energy-efficient lighting and advancements in led technology. Orient Electric a prominent brand in the electrical appliances sector has been offering a range of led bulbs catering to the evolving needs of consumers.

Review of the Literature

There has been a partial adoption of LED Bulb for a number of reasons, e.g. both CFL & LED lamps are characterized by high initial cost for customers, and this serves as a barrier to their adoption. It is found in various studies that assessing product quality is important for purchase of product because there is a need to reduce the perceived risk of purchase (Olson, & Jacoby, 1972) ^[23] but consumers lack expertise and thus the ability to assess quality. It can be assumed that the higher the quality of LED bulbs, the higher will be their rate of adoption. There are also a numbers of durable products which people tends, more often to keep until they break beyond repair. The useful life of LED light is based on the number of operating hours until the LED emits 70% of its initial light output. Top quality LED Bulb is expected to have a useful life of 30,000 to 50,000 hours, significantly higher than the 1000 hours for a typical incandescent bulb and 8,000 to 10,000 hours for a comparable CFL. Longer the life of a LED Bulb, then better the return to the consumer over the high initial investment in them.

According to Diekmann, & Franzen (1999) ^[24], a large number of respondent throughout the world have stated that they are very concerned about environmental problems. Today's customers are more aware off the seriousness of environmental degradation, and business that support environmental practices are in the list of desire to purchase eco-friendly product. "Perceived consumer effectiveness" refers to the extent to which individual believe that their actions make a difference in solving a problem. Kim, & Choi (2005) ^[25] argued that individuals acting in consonance of a strong belief that their environmentally conscious behavior will result in a positive outcome and are more likely to support their concern for the environment. Consumers have been found to generally prefer low priced green products and according to Eze (2013) ^[2] they attach

more importance to price as compared to green claims. Higher prices have been reported as a significant barrier to purchasing environmentally sustainable products (Vermeir and Verbeke, 2006; Young et al., 2010) ^[20, 22]. Therefore higher prices should have a negative effect on purchase of LED bulbs. The government of India understood this problem and launched the UJALA YOJANA in 2015 to lower the price of LED BULB by providing subsidized LED Bulb. Convenience in buying and finding green products has been found out to be the most important factor affecting the purchase of green products in many studies. Those studies show that limited availability and difficulties negatively affect such behavior (Joshi & Rahman, 2015) ^[21]. On the other hand, easy availability of the green product positively affected green purchase behaviour. Unwillingness to spend time in searching environmentally sustainable products indicates consumer's desire of easily accessible/available green products (Padel and Foster, 2005) ^[18]. To solve this problem government of India provided LED Bulbs to people through electricity Boards of Indian states and these boards provided to their customers in every electricity bill payment office which is nearby to their house. Thus Indian consumers easily got LED bulbs in nearby their house.

Various studies show that consumers prefer energy-efficient lighting solutions due to rising awareness of environmental concerns and the potential for long-term cost savings. LED bulbs, known for their energy efficiency, have gained much liking among consumers of Indore to reduce their electricity bills while minimizing their carbon footprint (Sinha, 2019; Kumar & Chauhan, 2020) ^[15, 7]. Consumer perception of the brand plays a crucial role in their purchase decisions. Thus in context of low involvement decisions (as in case of LED purchase), a minimum level of brand awareness may be sufficient for the consumers in order to make a purchase decision, even when a well formed attitude does not exist. Thus it may be hypothesized that a well-known brand is likely to be positively related to the intention to buy LED lamps. Orient Electric, being a well-established brand in the electrical appliances sector, enjoys a certain level of trust and reputation among consumers in Indore. Positive brand associations such as reliability, quality, and innovation influence consumers' preferences for Orient Electric LED bulbs. Studies indicate that consumers prioritize LED bulbs known for their durability and long lifespan (Gupta & Saini, 2017). Products perceived to be of higher quality and less prone to malfunction or premature failure are preferred by consumers in Indore, contributing to positive word-of-mouth and repeat purchases. While the initial cost of LED bulbs is higher compared to traditional incandescent or CFL bulbs, consumers are increasingly willing to invest in them due to the potential for long-term cost savings. However, price sensitivity remains a significant factor influencing consumer preferences, particularly in price-conscious markets like Indore. Consumers in Indore prefer brands with a wide distribution network, ensuring convenience and ease of purchase.

Objectives of study

1. To know the psyche of customers about adoption of LED Bulb.
2. To know the effect of promotion strategies of Government of India by UJALA YOJANA and various LED Bulb companies for purchase of LED Bulbs in Indore.

3. To know the preference of customer for purchasing type of LED Bulb.

Hypothesis

H1: Customers had no difference of opinion about adoption of LED Bulbs due to higher prices.

H2: Customers had difference of opinion of Promotion and subsidy offered by Government of India under UJALA Scheme of LED Bulb to make price affordable for customers to purchase LED Bulbs.

H3: Customers had different attitude on purchase decision of LED Bulb due to easily availability of LED bulbs provided by government of India in nearby outlets.

H4: Customers had difference of attitude on Lowering Electricity Bill by purchase and using of LED Bulb.

H5: Customers had difference of opinion on purchasing subsidized LED Bulb ESSL of government of India than high cost Private brands LED Bulbs.

H6: Customers had difference of opinion on purchase of costly LED Bulbs with longer life than traditional cheaper incandescent Bulbs with shorter life.

H7: Customers had difference of opinion on purchase of costly LED Bulbs due to easily exchange of defective LED Bulbs by Government and Private Companies without any problem from nearby outlets.

H8: Customers have difference of opinion on purchase of private brand LED Bulbs, even after price of these LED Bulbs become affordable after new technology development and large manufacturing by private brands.

Research Methodology

This research is exploratory research.

Sample Design

Sample design is a definite plan of obtaining some items from the whole population, which is Indore city in this case. The sample design used in this study is convenience random sampling.

The total sample size is 104 respondents from Indore (MP), India.

Tools for Data Collection

Primary Data

Primary data is collected using a questionnaire containing

18 questions

Secondary Data

When the data is collected and compiled in a published nature it is called secondary data.

The secondary data is collected from

1. Reference book
2. Journals and Magazines
3. Newspapers
4. Websites

Data Analysis

Reliability Statistics	
Cronbach's Alpha	N of Items
.76	16

Value of Cronbach's Alpha is 0.76; hence data is reliable because value is more than 0.5.

Demographic Analysis

Demographic analysis shows that 58.7% male and 41.3% female respondents purchased LED Bulb in Indore, Madhya Pradesh.

Age group analysis indicates that people below 25 constitute 42.3%, age group 25-45 constitute 31.7%, age group 45-65 constitute 13.5% and age group of above 65 constitute merely 12.5% who purchased LED Bulb in Indore, Madhya Pradesh. Thus majority of respondents constitute young population.

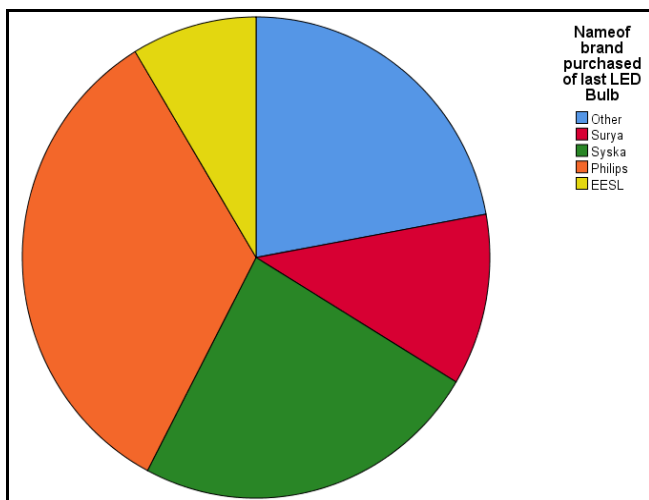
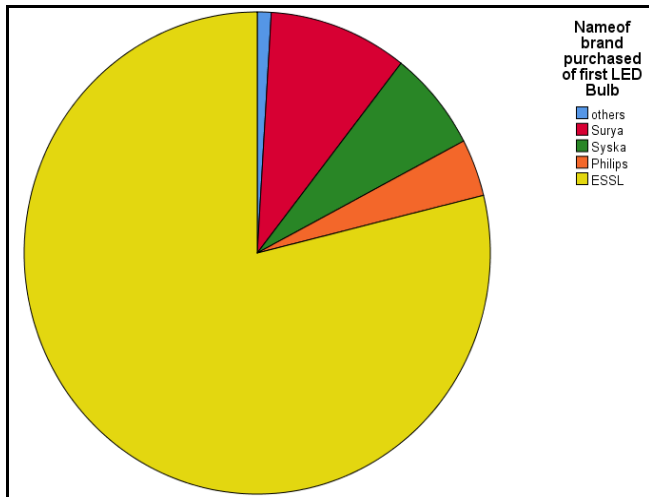
Education qualification analysis of viewers indicate that, 12th and below constitute 18.3%, Graduates constitute 19.2%, Post graduates constitute 34.6% and professionally qualified 27.9% Thus majority of respondents are well qualified and able to understand importance of LED Bulb.

Marital status analysis indicates that single constitute 33.7% and married constitute 66.3%. It means married people purchased more LED Bulbs as married life require more Bulb for their family members.

Occupation analyses of respondents indicate that students constitute 22.1%, Private employees constitute 28.8%, Government employees constitute 10.6%, Self Employed 27.9% and Retired constitute 10.6%. Private employees and self-employed constitute majority of LED Bulbs purchasers as these two classes also constitute majority of the population's occupations in Indore, Madhya Pradesh.

Income analysis of respondents indicate that income 10,000 or below constitute 20.2%, 20,000 or below constitute 31.7%, 40,000 or below constitute 24% and above 40,000 constitute 24%. Thus majority of LED Bulbs purchasers are in income from 20,000 to 40,000.

Name	Purchased from 2014 to 2019		Purchased from 2022 to 2024	
	No	Percent	No	Percent
ESSEL	82	78.8	9	8.7
Surya	10	9.6	12	11.5
Syska	7	6.7	25	24
Philips	4	3.8	35	33.7
Others	1	1	23	22.1
Total	104	100	104	100



Test of Hypothesis

H1: Customers had no difference of opinion about adoption of LED Bulbs due to higher prices.

$T(103) = 64.39, p= 00$

The value of $p < 0.5$ which means there is significance difference in mean value. It means the null hypothesis is rejected and customers are not ready to purchase LED Bulb due to higher price of LED bulbs.

H2: Customers had difference of opinion of Promotion and subsidy offered by Government of India under UJALA Scheme of LED Bulb to make price affordable for customers to purchase LED Bulbs.

$T(103) = 68.04, p=00$

The value of $p < 0.5$ which means there is significance difference in mean value. It means the null hypothesis is rejected and customers are influenced by discounts on LED Bulbs given by government and liked to purchase low price LED Bulb from government outlets.

H3: Customers had different attitude on purchase decision of LED Bulb due to easily availability of LED bulbs provided by government of India in nearby outlets.

$T(103) = 35.34, p= 00$

The value of $p < 0.5$ which means there is significance

difference in mean value. It means the null hypothesis is rejected and customers were influenced by easily availability of LED Bulbs provided by government in nearby outlets for purchase.

H4: Customers had difference of attitude on Lowering Electricity Bill by purchase and using of LED Bulb.

$T(103) = 65.99, p= 00$

The value of $p < 0.5$ which means there is significance difference in mean value. It means the null hypothesis is rejected and customers were influenced by adopting LED Bulbs to decrease their Electricity Bills.

H5: Customers had difference of opinion on purchasing subsidized LED Bulb ESSL of government of India than high cost Private brands LED Bulbs.

$T(103) = 29.94, p= 00$

The value of $p < 0.5$ which means there is significance difference in mean value. It means the null hypothesis is rejected and customers were influenced by adopting subsidized LED Bulbs ESSL of government of India than costly private brands.

H6: Customers had difference of opinion on purchase of costly LED Bulbs with longer life than traditional cheaper incandescent Bulbs with shorter life.

$T(103) = 59.30, p=0.00$

The value of $p < 0.5$ which means there is significance difference in mean value. It means the null hypothesis is rejected and customers were ready to purchase costly bulb with longer life than cheaper traditional bulbs with uncertain life.

H7: Customers had difference of opinion on purchase of costly LED Bulbs due to easily exchange of defective LED Bulbs by Government and Private Companies without any problem from nearby outlets.

$T(103) = 70.63, p=0.00$

The value of $p < 0.5$ which means there is significance difference in mean value. It means the null hypothesis is rejected and customers were influenced by easily exchange of defective costly LED Bulbs. This makes confidence of customers for adopting new technology LED Bulbs with higher price.

H8: Customers have difference of opinion on purchase of private brand LED Bulbs, even after price of these LED Bulbs become affordable after new technology development and large manufacturing by private brands

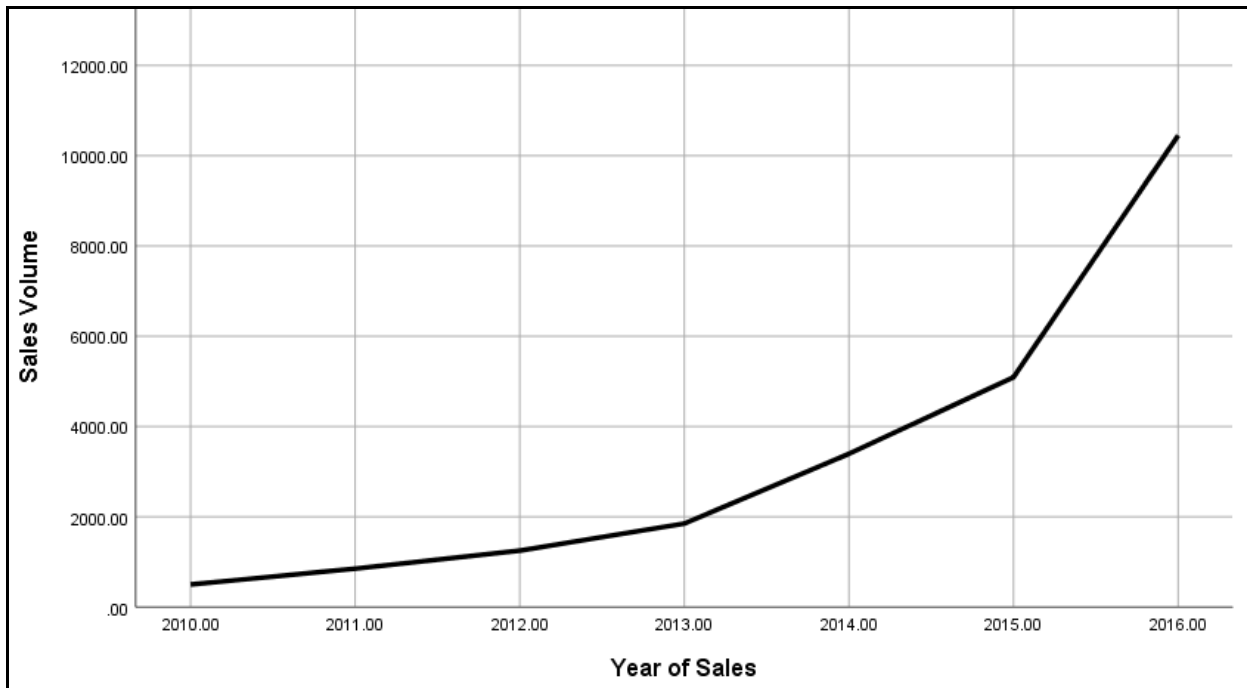
$T(103) = 56.48, p=0.00$

The value of $p < 0.5$ which means there is significance difference in mean value. It means the null hypothesis is rejected and customers are now purchasing both government and private affordable brands because price of LED Bulbs is

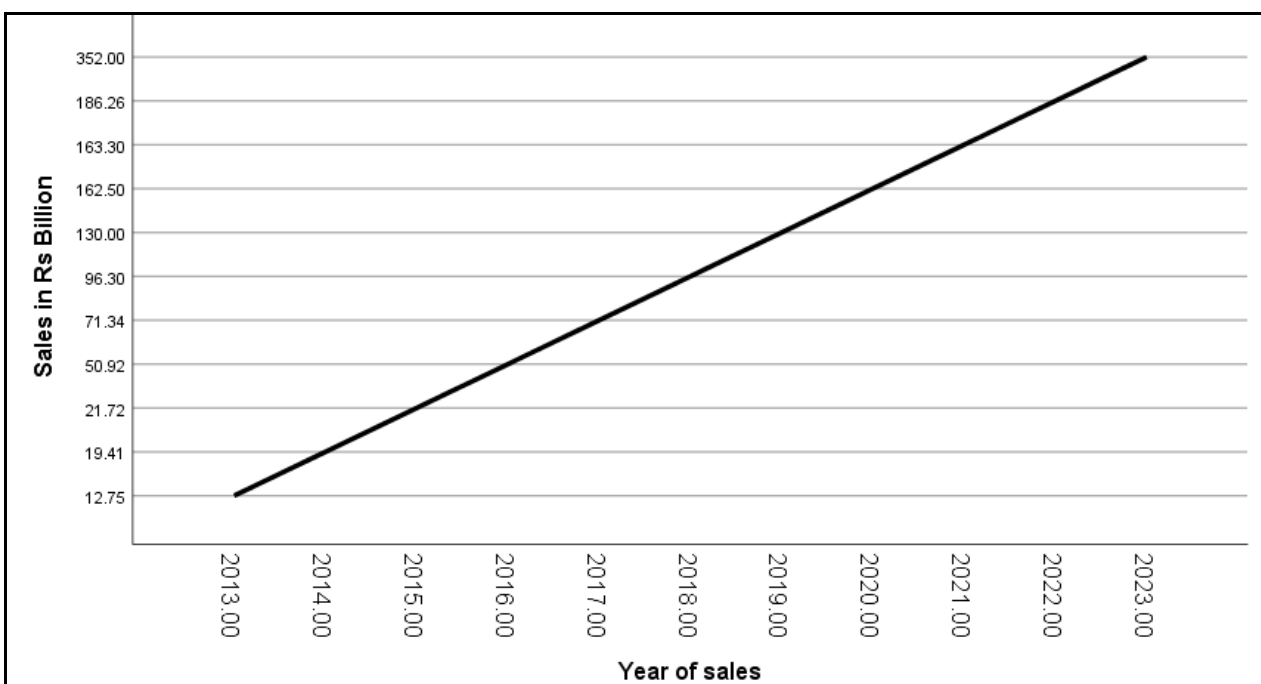
affordable irrespective of government or private.

Findings

1. Customers were not ready to purchase LED Bulb due to higher price of LED bulbs in the beginning.
2. Customers are influenced by discounts on LED Bulbs when given by government and liked to purchase low price LED Bulb from government outlets.
3. Customers are influenced by easily availability of LED Bulbs provided by government in nearby outlets for purchase.
4. Customers are influenced by adopting LED Bulbs to decrease their Electricity Bills.
5. Customers are influenced by adopting subsidized LED Bulbs ESSL of government of India than costly private brands.
6. Customers are ready to purchase costly bulb with longer life than cheaper traditional bulbs with uncertain life.
7. Customers are influenced by easily exchange of defective costly LED Bulbs. This makes confidence of customers for adopting new technology LED Bulbs with higher price.
8. Customers are now purchasing both government and private affordable brands because prices of LED Bulbs is affordable irrespective of government or private.



Simple Line of Sales Volume by Year of Sales



Simple Line of Sales in Rs Billion by Year of sales

Conclusion

The research provides insight of consumers of Indore city for the actual preferences of buying behaviour and satisfaction levels of consumers regarding LED bulbs compared to other competing bulbs in the local market. Given the growing awareness of energy efficiency, longevity, and durability, as well as the importance of new LED bulb technology's reputation and warranty coverage, it's likely that LED Bulbs are experiencing a positive reception among consumers in Indore city.

The policy of government of India for adopting new technology of LED Bulbs played important role to help people of India and particularly Indore city for adopting new technology which was costly but efficient and eco-friendly and cost effective in long term for people. In the beginning the prices of LED Bulbs is much higher and availability for them is not easy. The government policy of UJALA provided subsidized LED Bulbs to customer at affordable price and also guaranteed exchange of defective Bulbs, nearby their house by government outlets encouraged common consumers to purchase them without any fear of losses. With the growing market of LED Bulbs private brands also started large scale of manufacturing and brought down the prices of LED Bulbs from Rs. 500-600 in 2014-15 to below Rs. 100 in 2019-20. They also extended guarantee of exchange of defective LED Bulbs and easily availability in their nearby outlets helped customer to purchase their LED Bulbs. Thus the efforts of government of India and private companies greatly helped people of India to adopt new LED Bulb technology within a decade.

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