

An Acceptance Study on Vehicle Scrappage Policy - 2021 Pertaining to Personal Car Owners in Bengaluru

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Abstract

In the Globalization era, pollution from old vehicles is increasing faster. This may lead to changing the vehicle or to curtail vehicle pollution, which may result in the scrapping of old vehicles. To complement and supplement Government of India passed Vehicle Scrappage Policy in FY2021, a pilot study was conducted to know the public awareness of Vehicle Scrappage Policy. An effective policy related to vehicle scrapping cannot be successfully implemented unless large number of people supports policies on Government intervention. This paper aims to explore the public comprehension and acceptability about Vehicle Scrappage Policy after creating awareness in Bengaluru, India. In this study, methods adopted are Pilot study through market survey, statistical analysis and encompasses relevant literature review. After the survey, people have awareness about the Policy but unsure of fringe benefits one can attain from Government. Therefore, creating awareness and advertisement on the Vehicle Scrappage Programs along with benefits both economically and environmentally to the Country are warranted.

Keywords

Vehicle Pollution, Old Vehicles, Scrapping, Vehicle Recycle and Public Awareness.

1. Introduction

The pollution from the vehicle exhaust is one of the main sources for pollution of air. According to CSTEP the pollution causing in Bengaluru may go up to 74% by 2030 (The Hindu, 2022). Old vehicles have further promoted air pollution in the total vehicular pollution by polluting 10-25 times more than that of newer vehicles (IBEF, 2022). For this reason, Government has taken initiative to scrap old vehicles by discouraging people from using old vehicles. To control the pollution from older vehicle, Government follows a principle that the 'polluter must pay'. Thus, the Government has planned to levy green tax for such old vehicles and issued guidelines to states / UTs. Green tax is implemented on the vehicles which pass fitness & emission test after 15 years of registration of vehicles. According to Government of India, the green tax is valid only for 5 years and the Owners are eligible for scrapping their vehicles as well. The implemented green tax shall be around 50% of the road tax which also depends on the State / UT Governments. If public is not interested in renewing their Registration Certificate with such percentage of taxes, the Owners can offer their vehicle for scrapping to the registered scrappers. It is better to scrap the vehicle, as it reduces the pollution. Moreover, the Vehicle Owner obtains repayment from the authorized scrappers along with concession in road tax on buying new vehicles in parallel (MoRTH, 2022).

In order to offset environmental impact, environmentalists had three options that is to introduce electric vehicles; introduce strict rules on emission by bringing (BS6) engines and introduce vehicle scrappage policy paving way for circular production. In particular, an electric car has substantially lower operating costs than a comparable fuel or diesel vehicle. Electric vehicles charge their batteries with electricity rather than utilising fossil fuels such as

gasoline or diesel. Electric vehicles are efficient, and when paired with the cost of power, charging an electric vehicle is less expensive than filling up with gasoline or diesel for the travel needs. Using renewable energy sources can make electric car environmentally friendly. The electricity cost can be reduced further if charging is carried out using renewable energy sources installed at home, such as solar panels. However, India cannot wait till that time because pollution is increasing rapidly and due to covid Indian Automobile industry is seeing less sales, so to tackle these problems India has come up with Vehicle Scrappage policy.

Vehicle Scrappage Policy not only helps to reduce the pollution, but also leverages our country as one of the global manufacturing hub of steel. As of now, India is the second largest producers of steel with approximately 110 million tons (Arora et al. 2018). By implementing Vehicle Scrappage Policy in India, the scrap available can make Government to increase the productivity of steel to 300 million tons by 2030 (IBEF,2022). After scrapping, the secondary sources of materials like Lead, Steel, Aluminium, Zinc, and Nickel along with rubber, glass, fibre, & plastic from the End life vehicle can help and support EV industry with the required materials to manufacture Electric Vehicles. This policy can also benefit in a dimension to stop informal type of dismantling in the country, where only vehicle scrappers who follow standard dismantling procedure can be granted authorization from the Government to start scrapping facility. However, benefits for the individual include:

- While scrapping individual vehicle, the Owner is eligible for 5% revenue on the overall cost of vehicle along with a Vehicle Scrappage Certificate
- 25% rebate on road tax when purchasing the next 4-wheeler
- Waiving off the registration fee on vehicle bought after scrapping old one (MoRTH, 2022)

As the public is not aware of the policy, it is more important for Government to create awareness and facilitate easy procedure of scrapping to public along with the implementing policy.

1.1 Objectives

Vehicle Scrappage policy launched by Government of India is a programme to replace old vehicles. The objective of Government is to phase out old vehicles, induce air quality by reducing pollution from vehicles, creating job opportunities and boost up demand for automobile sales. The Objectives of the Pilot Study include:

1. To assess the viability of implementing the policy through focus group discussions
2. To carry out survey on public comprehension on Vehicle Scrappage Policy
3. To create awareness about the benefits and easy procedure of scrapping policy in the public
4. To analyse the consumer perception after creating awareness about the policy

2. Literature Review

Arora et al. (2018) realized that End-of-Life Vehicles (ELV) to be the one among major sources of secondary metals like lead, steel, aluminium, zinc and nickel along with rubber, glass, fibre and plastic. So, the author examined and designed an executive model with a stakeholder engagement structure for enhancing the sustainability of ELV management in India using the framework of shared responsibility. It was found that effective resource recovery and recycling from ELV does not guarantee that the resources will be recycled again. Mohan and Amit (2020) studied a market with a small number of homogeneous informal dismantlers and a single formal dismantler. The authors developed to record the response effects of competition in the ELV recycling merchandise, where a rise in the price of ELV reduces dismantler profitability, affecting future ELV price increases and causing informal dismantlers to leave. As a result, changes in dismantling amounts and scrap supplies occur, which causes scrap prices to fluctuate. From their analysis, environmentally sound recycling can be achieved by building formal dismantling operations with high capacity, vertical integration of car manufacturers, and ELV management systems matched with suitable legal frameworks.

Zhang et al. (2020) developed an evolutionary game model by studying the rivalry between the illicit and the authorized recycling sectors of ELVs. The authors tried to understand the Government's different policies impact on the revenue from recycling ELVs. In the evolutionary games model, a numerical simulation approach was employed to assess and validate the influence of Government policies. The findings lead to the conclusion that raising the evolutionary stable state is almost impossible when the Government imposes penalties exclusively on ELVs recycling. Sharma and Pandey (2020) have stressed about the need of recovering resources from end-of-life passenger vehicles recovery of resources from end-of-life passenger's cars. For this purpose, the authors developed a conceptual framework representing process flow and the reciprocity between the numerous stakeholders involved in

the informal sector. The results from the conceptual framework were used to evaluate the possibility to reuse and recover useable materials from ELVs which are being processed by our country in the informal sector.

Adamo et al. (2020) tried to understand the correlation between the European ELV flows and two variables i.e., Population and Gross Domestic Product through linear regression model. Both produced and recycled ELVs are expected to generate a total of 9.3 and 8.3 million tons in 2030, respectively as per the author findings. Al-Quradaghi et al. (2021) focuses to lay out a mathematical programming model for sustainable ELV vehicle processing and recycling. The model maximizes the network's overall profit and determines the material flows between businesses. Furthermore, the model determines which facility should be used for network flow. Kasim et al. (2021) realized that unless there is a support from Government and various groups of people, the policies related to End-of-Life Vehicles cannot be successful. The authors adopted methods that consisted of primary data analysis by conducting a survey among stakeholders and related literature review. Their study concluded that ELV recyclability in Malaysia is still restricted, and certain major technological and economic constraints must be removed as soon as possible. Based on the discussions and deliberations on the above context, this study discovered that suggested policies must function in parallel with stakeholder approval and awareness among public stakeholders.

From the reviewed papers, it was found that good ELV resource recovery and recycling does not ensure that the resources will be recycled again. Hence, ecologically sound recycling may be accomplished through the development of formal dismantling operations with high capacity, vertical integration of automobile manufacturers, and ELV management systems matched with appropriate regulatory frameworks in a professional way in India. The findings lead to the conclusion that raising the evolutionary stable state is nearly impossible when the Government impose penalties solely on ELV recycling. Therefore, there should be support from the Government and various Stake Holders in order to make the proposed Vehicle Scrappage Policy a success. This study gives an insight about public comprehension about Vehicle Scrappage Policy.

3. Methods

The purpose of this study is to ascertain the public acceptance on Vehicle Scrappage Policy -2021. Before knowing about the public comprehension, awareness about the policy is given to the respondents through Focused group discussion / Pilot study. The outcomes are counted & divided into categorial data, and are analyzed using Chi-Square test to determine their relationships or the interdependence between the variables.

3.1. Pilot Study

A pilot experiment carried out on small scale people to know about public comprehension of vehicle Scrappage Policy and conducting demand analysis provided insight about the acceptance of policy on personal car Owners. The Pilot Survey involves four parts:

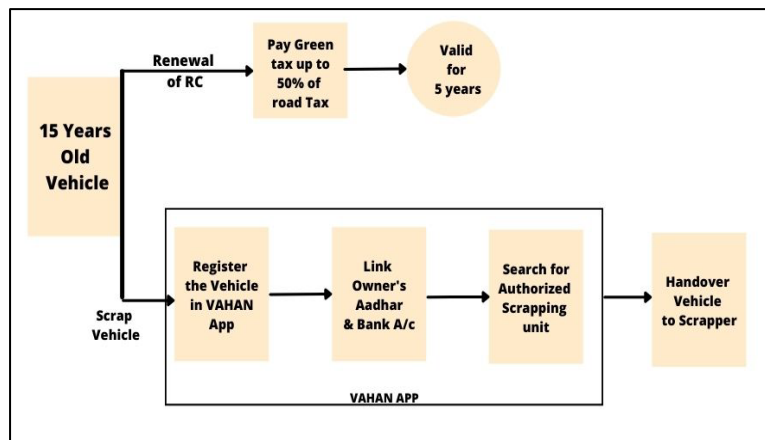


Figure 1. Procedure of scrapping for old vehicle owners

1. In the first section, the survey team collected the personal details of respondents which include their name, age, occupation, mail Id and asking whether the respondents own 4-wheeler vehicles. Only if the respondent owns a vehicle, the survey shall continue

2. In the second section, attributes about their personal vehicles details such as, how many 4 wheelers do they own, how old is that vehicle, whether the status of the vehicle is running or expired, if they are planning to sell their vehicle and awareness about the Vehicle Scrappage Policy are enquired. All these questions are asked to the respondents to know the properties of their vehicle attributes linking to Vehicle Scrapping
3. The third section provides an information insight about the awareness of Vehicle Scrappage Policy, it's benefits and easy procedure of scrapping as shown in the Figure 1 for interested vehicles owners
4. In the final section, Feasibility of Vehicle Scrappage Policy is conducted to know the apprehension of respondents. After creating awareness in the third section, here the questions are asked to know about the public perception about the Policy. It includes whether public is interested in scrapping vehicle or resale. By scrapping old vehicles, it can help in reduction of environmental pollution& how beneficial it is on a scale of 5. The public opinion and their expectation on the Government for proposed policy are explored deeply

3.2. Chi-Square Test

The collected data is analysed using Chi-Square test. This specific technique is used to analyse when the outcomes of interest are discrete. This statistical analysis follows Chi-Square probability distribution with two or more responses with discrete outcome. The test is carried out to find significant relationship between any two nominal or categorical variables. By using JMP software, the chi-square test was conducted by comparing between the frequencies of first and second nominal variable. By virtue of this, the relationship between the independent category (occupation) and the dependent category (awareness) were determined. This variables selection, the features which are highly dependent for our response is considered. The results from JMP software are expressed in contingency Table 2 and the degree of freedom is calculated by formula $(r-1) * (c-1)$ where r, c is number of rows and columns.

4. Data Collection

The study samples are pertaining to Bangalore and responses were collected through online. Though, the investigating team purported to meet participants, due to pandemic and time constraint, the survey was carried out online. Table 1 reports the consolidated data collected from public comprehension.

Table 1.Consolidated Information on Public Comprehension

Responses		Frequency	Percentage
Do you own 4-wheeler	Yes	85	67.5
	No	41	32.5
How many vehicles do you own	1	56	65.9
	2	21	24.7
	More than 2	8	9.4
Occupation Categorized	Student	31	36.5
	Salaried	33	38.8
	Self employed	21	24.7
Vehicle age	(0-5) years	34	40
	(6-10) years	40	47.1
	more than 10 years	11	12.9
What's the status of the vehicle registration certificate	Running	85	100
	Expired	0	0
Are you planning to sell your car	Yes	18	21.2
	No	67	78.8
Are you aware of Vehicle Scrappage Policy and its benefits	Yes	36	42.4
	No	49	57.6
Do you think, as old vehicle is scrapped, it will help in reduction of environmental pollution	Yes	69	81.2
	No	16	18.8

	1	3	3.5
On a scale of 5, How beneficial is the Vehicle Scrappage Policy to you? (5 being the highest and 1 being the lowest)	2	3	3.5
	3	25	29.4
	4	24	28.2
	5	30	35.3
What do you choose if you want to get rid of old vehicle	Scraping Vehicle	43	50.6
	Resale	42	49.4

In summary, 126 responses were collected and in that those who had (4-wheeler) car is 85. Therefore, 85 responses are considered to run the analysis to know about the acceptance. From the responses, the occupation of respondents is classified into Student, Salaried, and Self-employed for better understanding and easy grouping of occupation category. Professors, Engineers, Government Employees, Managers, Teachers, and Research Scholars are classified under salaried category. Businessmen, Photographers, Entrepreneurs, Farmers, Home makers, Pharmacists, and Hoteliers are classified under Self-employed category. Further, vehicle age is classified into 3 categories. Namely:(0-5) years, (6-10) years, and more than 10 years.

5. Results and Discussions

Findings from pilot study are summarized as follows:

- Majority of the people were not aware. Out of 85 respondents who own 4-wheeler, 57.60 % are not aware of the policy before our market survey
- After knowing about the benefits, 81.20 % are now accepting the policy and are aware about the benefits of the policy related to individuals and environment
- As the policy is still new, the respondents prefer resale of the vehicles rather than to scrap it. This may be due to less availability of Government authorised scrapping units

5.1 Numerical Results

The considered data set is to determine whether the respondents with classified occupation are aware about the Vehicle Scrapping Policy. Now the Chi-square test is performed for 2 variables. Occupation of respondents with the classified group values in terms of Student, Salaried, and Self-employed as the independent category were considered. The awareness from the respondents is arrived based on the response values Yes/No. Here, an attempt to verify the relationship between Occupation and Awareness is conducted.

H0: There is no relationship between occupation and awareness of policy

H1: There is a relationship between occupation and awareness of policy

Table 2 shows Contingency distribution gives the relation between two variables occupation and awareness, one variable in row and other one in column. The degree of freedom here is, $df = (3-1) * (2-1) = 2$.

Table 2. Contingency distribution table

Count Total % Col % Row%	Awareness		Total
	No	Yes	
Salaried	18	15	33
	21.18	17.65	38.82
	36.73	41.67	
	54.55	45.45	
Self employed	13	8	21
	15.29	9.41	24.71
	26.53	22.22	
	61.90	38.10	
Student	18	13	31

	21.18	15.29	36.47
	36.73	36.11	
	58.06	41.94	
Total	49	36	85
	57.65	42.35	

Chi-Square output for occupation and awareness is obtained using JMP as shown in the Table 3. The calculated Pearson Chi-square value is taken as it is the squared difference value between the observed and expected frequencies.

Table 3. Chi-Square Values of Respondents

Test	Chi Square	Prob>Chi-Square
Likelihood	0.289	0.8654
Pearson	0.288	0.8658

For 95% confidence alpha value is 0.05, with degree of freedom value is 2, the Chi-Square value from the standard Chi-Square table is 5.991. Here the calculated Chi-Square value is 0.288, which is less than the standard critical Chi-Square value 5.991. Hence, the Null hypothesis is accepted. Thus, there is no relationship between occupation and awareness of policy. It concludes that awareness of Vehicle Scrappage Policy doesn't depend on occupation of the respondents.

5.2 Graphical Results

The following graph show cases whether people own vehicle or not.

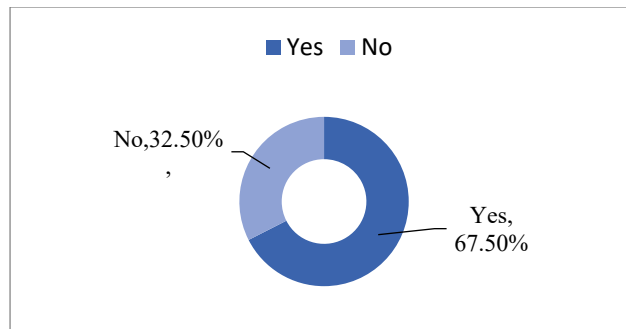


Figure 2. vehicle (4-wheeler) owned by people

From Figure 2, it can be concluded that out of 126 responses, 67.5% respondents own the vehicle, and this helps to conduct further research on the condition of vehicle and whether people are willing to scrap their vehicle instead of resale.

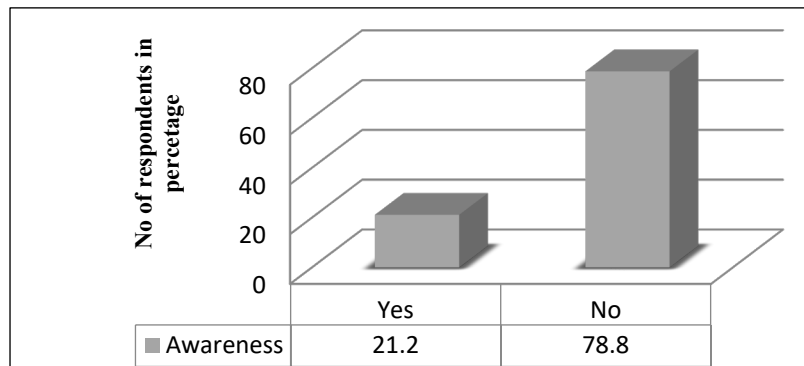


Figure 3. People’s Knowledge on Scrappage Policy

Figure 3 provide insights on people’s knowledge on Vehicle Scrappage Policy. It can be seen that majority were not having the knowledge about Vehicle Scrappage Policy. Out of 85 respondents only 21.2 % were aware and 78.8% were not aware about the Policy. This concludes that awareness about the policy should be created among the public.

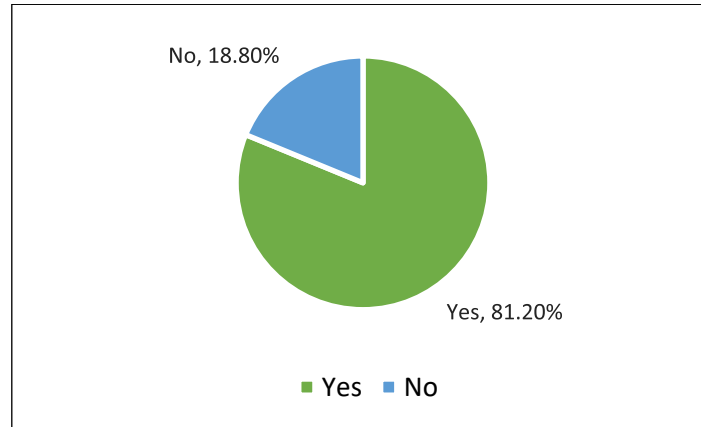


Figure 4. Policy Impact on Environment

Figure 4 reveal that 81.2% are aware of the policy and the vehicle scrapping helps in reducing carbon footprints which can be the USP to market Vehicle Scrappage Policy.

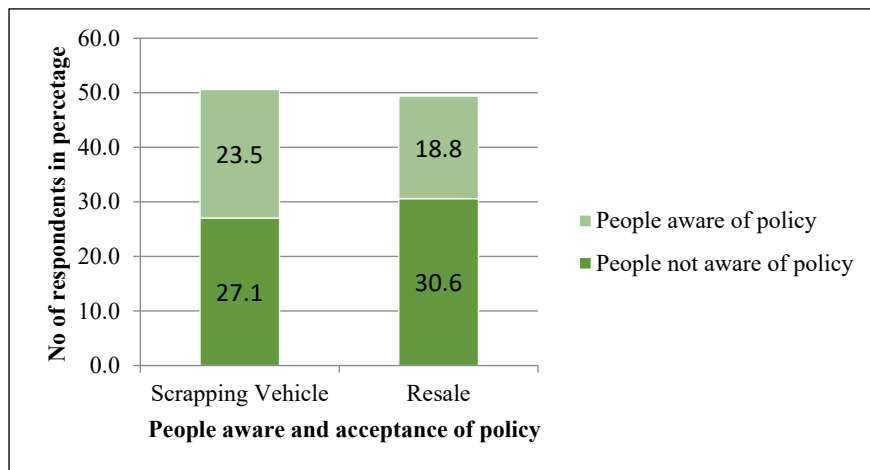


Figure 5. People awareness and acceptance of policy

Figure 5 shows that 50.60 % people have believed that Scrapping Vehicle is an effective way of replacing old vehicle and 49.40 % opted for resale. Out of 85 respondents, 42.40% of respondents were aware of policy and 57.60% were not aware of policy. After knowing about the policy, 27.10% of the respondents who were not aware of policy accepted the policy by choosing scrapping vehicle, and 18.80% of respondents who were aware of the policy did not accept the policy, as these respondents opted resale. Based on Figure 6, it may be deduced that many respondents are uninterested in selling and are aware of the policy. This indicates that consumers have lately purchased automobiles and that the policy acceptance can be known in the near future. As the scrappage policy being new, there are no significant units available to scrap vehicle based on the expected demand.

Figure 6 reports knowledge on acceptance of policy by customer segmentation. It shows that majority of students and salaried have decided to resell rather than to abandon their four-wheeler. On the other hand, Self-employed have chosen to scrap vehicle rather than reselling it.

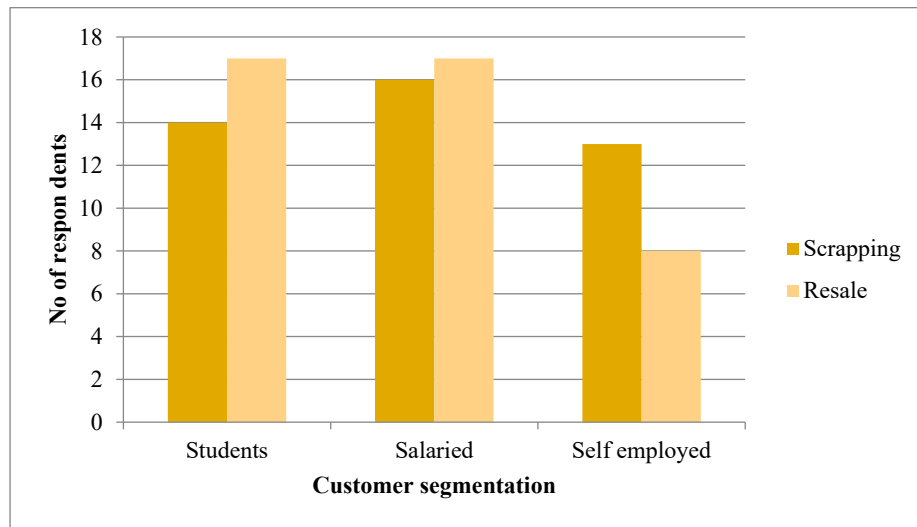


Figure 6. Customer Segmentation about Acceptance of Policy

6. Conclusion and Recommendations

The data clearly indicates that, out of 126 responses only 67.50 % respondents own vehicle. Majority of respondents were not having knowledge about the Vehicle Scrapping Policy. Market survey made people to get insight about the awareness. As a result, 81.20 % accepted that scrapping old vehicles will reduce environmental pollution. But 50.60 % believed that Scrapping Vehicle is an effective way of replacing old vehicle and 49.40 % opted for resale.

From the study, it can be concluded that even though people appreciate the policy, the respondents are still unsure because the policy is new and people are not satisfied with the benefits announced by the Government. Further, the respondents are keen to observe the acceptance of policy in near future, until then people shall choose reselling their car instead of scrapping. This shows that the Government has to create awareness, advertise and stress the vehicle scrapping programs to leverage the benefits from the policy considering environment.

From our market survey, people received awareness about the Vehicle Scrapping Policy and now they are expecting more from the Government. Instead of 25% rebate on the road tax, the Government should increase the tax rebate since; an individual will pay more than 25% in terms of taxes ranging from GST to road tax, cess, and toll gates etc. Strict laws on emission of vehicles should be imposed so that people will scrap their old vehicle to hinder tax. The automobile industry should use best-in-class technologies for scrapping old vehicles, where it can increase the availability of good raw materials which can be recycled and used for future propose. Government should advertise more about the scrapping areas to make aware for public.

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