

Customer Retention Case Study Report

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Acknowledgement

It is my pleasure to present this report. Working on this project was an incredible experience that has given me good information and knowledge regarding the data analysis process.

All the required information and dataset are provided by **Flip Robo Technologies** (Bangalore) that helped me to complete the project.

I want to thank my SME **Mohd Kashif** for giving the dataset to perform the complete case study process.



Introduction

Problem Statement:

Customer satisfaction has emerged as one of the most important factors that guarantee the success of online store; it has been posited as a key stimulant of purchase or repurchase intentions and customer loyalty.

A comprehensive review of the literature, theories and models have been carried out to propose the models for customer activation and customer retention.

Five major factors that contributed to the success of an e-commerce store have been identified as: service quality, system quality, information quality, trust and net benefit.

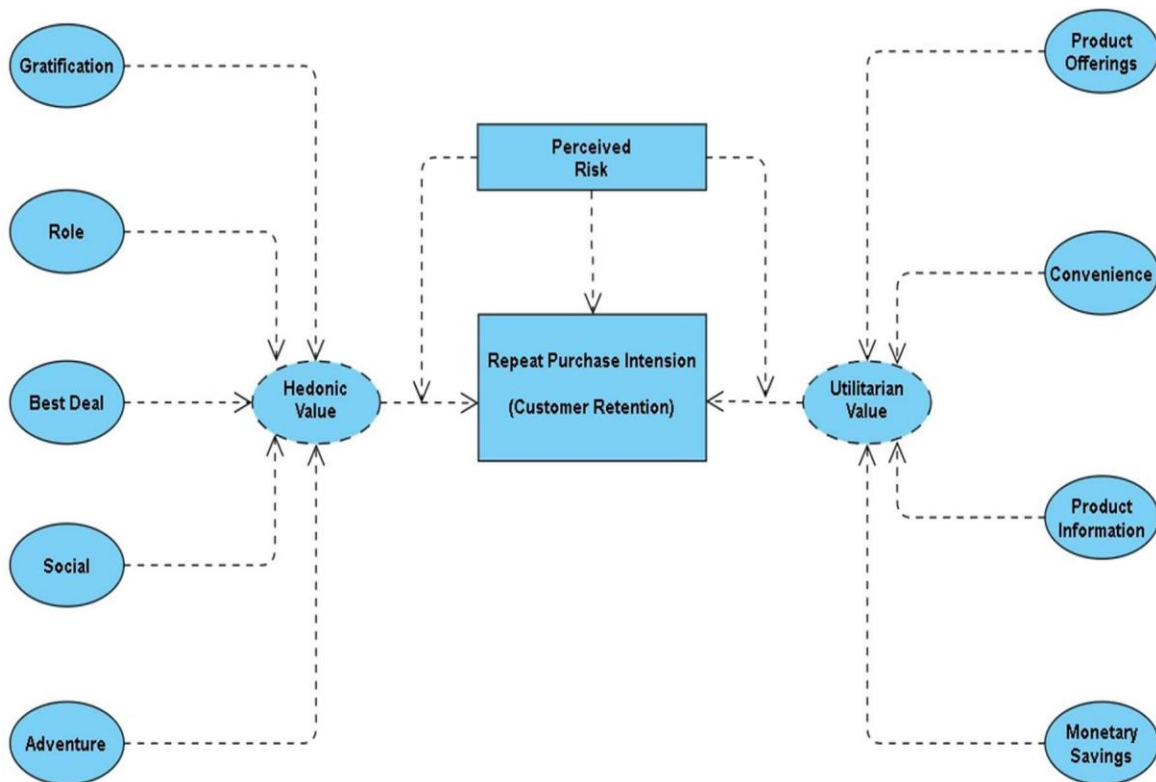
The research furthermore investigated the factors that influence the online customers repeat purchase intention.

The combination of both utilitarian value and hedonistic values are needed to affect the repeat purchase intention (loyalty) positively.

The data is collected from the Indian online shoppers.

Results indicate the e-retail success factors, which are very much critical for customer satisfaction.

Use Case Diagram:



In the above use case diagram, we can see that the Repeat Purchase Intention basically our Customer Retention strategy relies on Hedonic value and Utilitarian value. Also, we see that there are perceived risks affecting the purchase and re purchase intentions of our customers. The Hedonic value has 5 major parts such as gratification, role, best deal, social aspect and adventure feeling criterions. Where as in Utilitarian value we have product offerings, convenience, product information and monetary savings.

Motivation for the Problem Undertaken

Our main objective of doing this project is to analyze whether the users are shopping products from e-commerce websites. How did they give feedbacks to these websites on the basis of several positive and negative factors and also the details of the users on basis of factors like age, gender, city etc.

Benefits of Customer Retention:

1. Retention is cheaper than acquisition

- While the old adage about "it costs five times as much to acquire a new customer" may not be accurate in every case, the basic principle is spot on: it's more cost-effective to keep someone in the fold than to bring in new customers.
- Even still, if it's data you want, there has been plenty of research into acquisition vs retention, and every one of them has come back with the economics favoring retention as the more economically viable focus.
- One caveat though: retention is cheaper than acquisition, but it isn't necessarily easier.

2. Loyal customers are more profitable

- Not only is loyalty cheaper, it has better returns. According to research, engaged consumers buy 90% more frequently, spend 60% more per transaction and are five times more likely to indicate it is the only brand they would purchase in the future.
- On average, they're delivering 23% more revenue and profitability over the average customer.
- While loyal customers are more profitable, don't take their loyalty for granted.
- They'll be more open to price increases, but be cautious not to raise prices simply to see how long they'll stick around.
- Consider the flipside: "Actively disengaged" customers (people who oppose the brand and may be actively spreading that opinion) can cost a brand 13% of its revenue.

3. Your brand will stand out from the crowd

- Put your consumer hat on, and consider how many brands you interact with that actually seem to value your patronage.
- You can probably only think of one or two.
- Most brands focus on acquisition, which makes the retention-centric among us stand out even more.
- People see around 10,000 marketing exposures a day, but only engage with a few of them.
- The ones that earn continual engagement are those with whom they feel an emotional connection with on some level.
- Forget a unique selling proposition; the best brands have a unique retention proposition.

4. You'll earn more word-of-mouth referrals

- Your loyal customers will be your best source of new business.

- Despite all the efforts into online and mobile marketing and social media, people are still most strongly influenced by referrals from friends and family.
- Millennials in particular will spread the word of a brand's exploits: 90% share their brand preferences online.

5. Engaged Customers Provide More Feedback

- Feedback is critical to the success of any business.
- Customers who provide feedbacks are often willing to give brands the benefit of the doubt.
- They're telling you how to earn their business repeatedly. As research has shown, people who have complained and seen their issue resolved are 84% less likely to decrease their spend.
- Need help dealing with the customers who are providing nasty feedback?

6. Customers will explore your brand

- That's a nice way of saying you'll be able to sell them more stuff.
- Once a brand has proven itself with one product or service, customers are six times more likely to say they would try a new product or service from the brand as soon as it becomes available.
- That's not just valuable for sales, but these folks can be utilized to help with #5 above as beta testers - a critical element in product development.

7. Loyal Customers are more forgiving

- An Accenture study states over \$1.6 trillion is lost each year due to customers bailing after a poor service experience.
- We've gone so far as to claim that it's the top reason people will ditch a brand.
- But customers who consider themselves loyal will let some misdeeds slide - just don't let it happen too often.

8. Customers will welcome your marketing

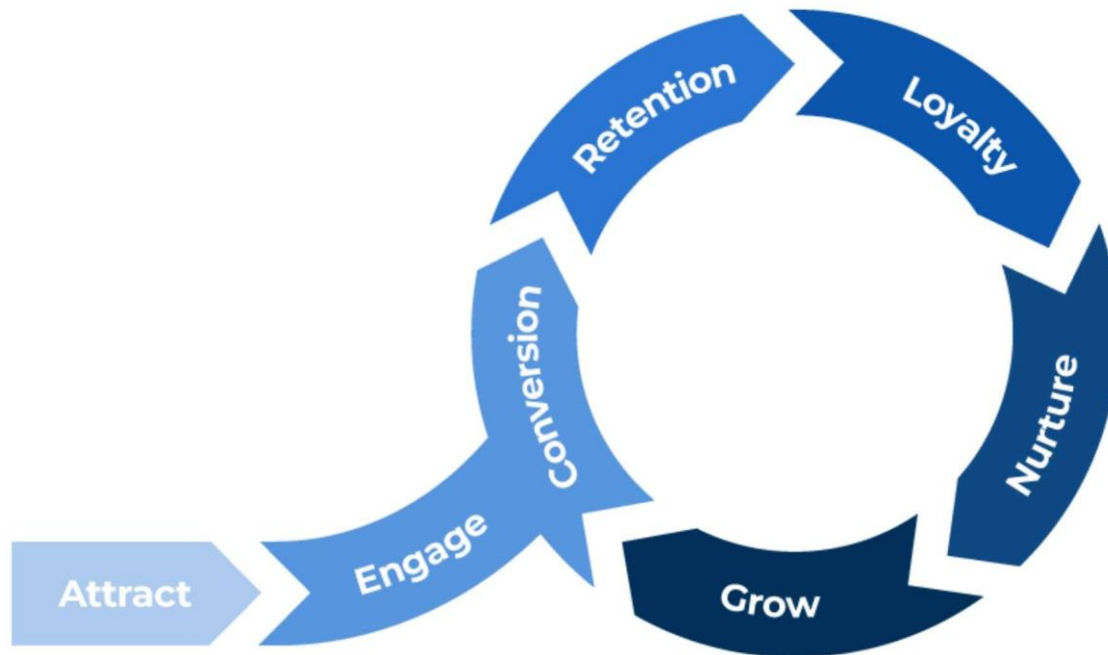
- No one likes being marketed to.
- Except for loyal customers!
- Those folks are four times more likely to say they "appreciate when this brand reaches out to me" and seven times more likely to "always respond to this brand's promotional offers."

9. You earn wiggle room to try new things

- Loyalty is fickle, so too many changes could chase people away.
- But once you've established a core base of proven customers, your brand can expand its boundaries.
- Maybe it's new messaging or a new product line, or even a new logo. The bottom line is as long as you maintain the basic premises that keep people in your corner; they'll stick with you through thin and thin.

- In fact, some of them will be excited to see what you can do.
- Existing customers are 50% more likely to try new products, according to a study.

Client Lifecycle Stages



Lifetime revenue is the end goal, not just today's revenue.

Need for Customer Retention:

Keeping current customers happy is generally more cost-effective than acquiring first-time customers. According to the Harvard Business Review, acquiring a new customer can be five to 25 times more expensive than holding on to an existing one.

Companies don't need to spend big on marketing, advertising, or sales outreach. It is easier to turn existing customers into repeating ones, since they already trust your brand from previous purchases. New customers, however, often require more convincing when it comes to that initial sale.

Customer loyalty won't just give companies repeat business. Loyal customers are more likely to give free recommendations to their colleagues, friends, and family. Creating that cycle of retained customers and buzz marketing is one way a company can cultivate customer loyalty for long-term success.

Improving customer retention means improving the customer experience. In fact, 77 percent of customers surveyed in a 2021 Customer Experience Trend Report being more loyal to a company that offers a good customer experience if they have an issue. 72 percent are willing to spend more from a company that offers good customer experiences. And 50 percent say that customer experience is more important to them now compared to a year ago.



Since the cost of getting a new customer is an estimated five to ten times more than keeping an old one, nurturing loyal customers is a powerful strategy that helps businesses grow.


```

import pandas as pd
import numpy as np
import seaborn as sns
import warnings
warnings.filterwarnings('ignore')
!pip install klib
df=pd.read_excel('codedsheet.xlsx')

```

```
df
df.head()
df.tail()
```

In [6]:

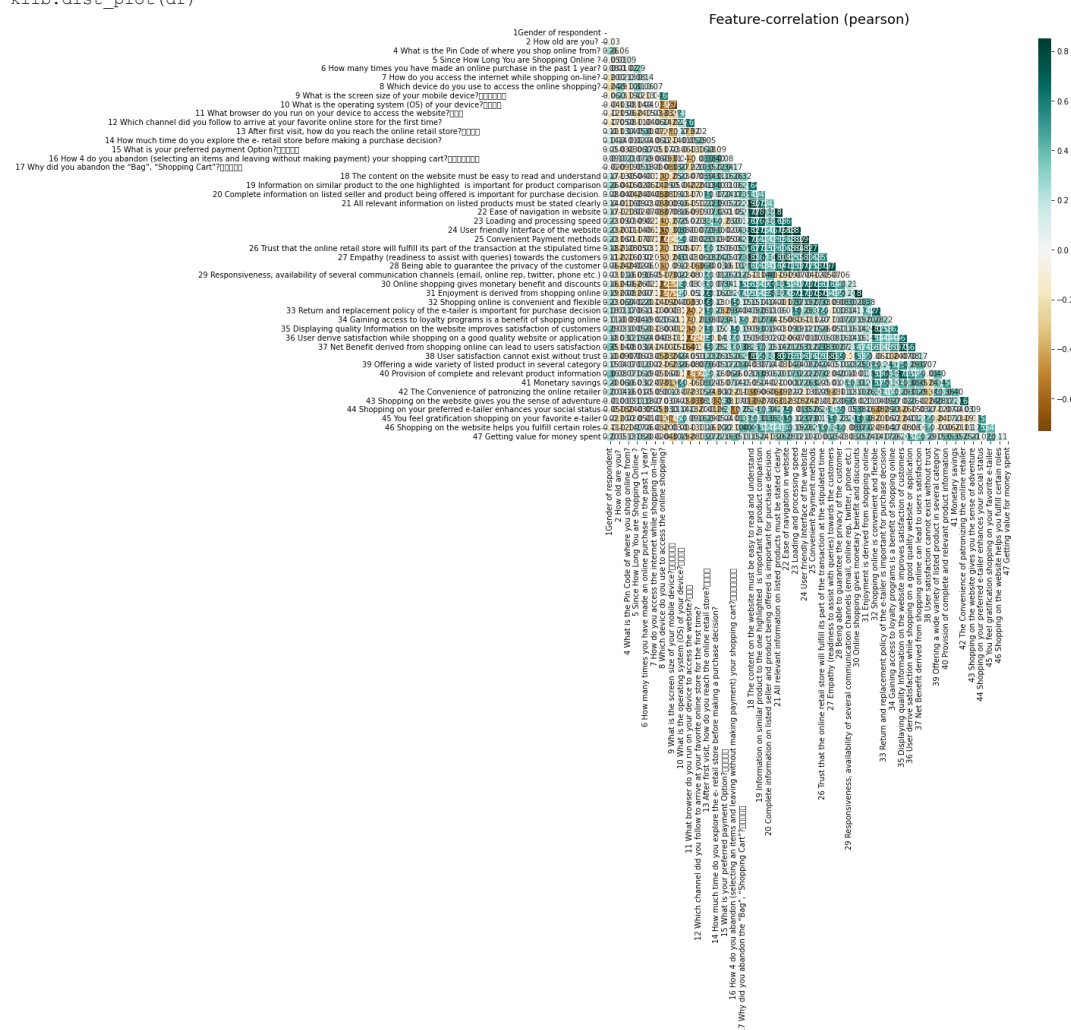
```
import klib
```

In [13]:

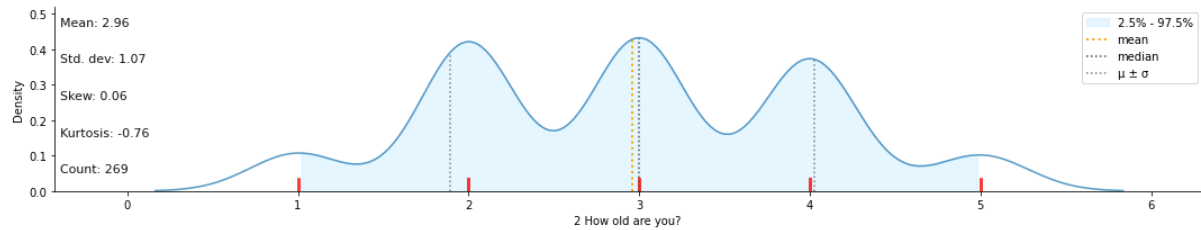
```
klib.corr_mat(df)
klib.corr_plot(df)
```

Out[14]:

```
klib.dist_plot(df)
klib.dist_plot(df)
```



```
_klib.dist_plot(df)
```



```
df.info()
```

```
<class 'pandas.core.frame.DataFrame'>
```

```
RangeIndex: 269 entries, 0 to 268
```

```
Data columns (total 71 columns):
```

```
#    Column
```

```
Non-Null Count  Dtype
```

```
---  -
```

```
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```

```
0    1gender_of_respondent
269 non-null      int64
1    2_how_old_are_you
269 non-null      int64
2    3_which_city_do_you_shop_online_from
269 non-null      object
3    4_what_is_the_pin_code_of_where_you_shop_online_from
269 non-null      int64
4    5_since_how_long_you_are_shopping_online
269 non-null      int64
5    6_how_many_times_you_have_made_an_online_purchase_in_the_past_1_year
269 non-null      int64
6    7_how_do_you_access_the_internet_while_shopping_on_line
269 non-null      int64
7    8_which_device_do_you_use_to_access_the_online_shopping
269 non-null      int64
8    9_what_is_the_screen_size_of_your_mobile_device
269 non-null      int64
9    10_what_is_the_operating_system_os_of_your_device
269 non-null      int64
10   11_what_browser_do_you_run_on_your_device_to_access_the_website
269 non-null      int64
11
12   12_which_channel_did_you_follow_to_arrive_at_your_favorite_online_store_for
    _the_first_time                269 non-null      int64
12   13_after_first_visit,_how_do_you_reach_the_online_retail_store
269 non-null      int64
13
14   14_how_much_time_do_you_explore_the_e_retail_store_before_making_a_purchase
    _decision                269 non-null      int64
14   15_what_is_your_preferred_payment_option
269 non-null      int64
15
16   16_how_4_do_you_abandon_selecting_an_items_and_leaving_without_making_payme
    nt_your_shopping_cart        269 non-null      int64
16   17_why_did_you_abandon_the_"bag",_"shopping_cart"
269 non-null      int64
17   18_the_content_on_the_website_must_be_easy_to_read_and_understand
269 non-null      int64
18
19   19_information_on_similar_product_to_the_one_highlighted_is_important_for_p
    roduct_comparison            269 non-null      int64
```

19

20_complete_information_on_listed_seller_and_product_being_offered_is_important_for_purchase_decision 269 non-null int64

20 21_all_relevant_information_on_listed_products_must_be_stated_clearly 269 non-null int64

21 22_ease_of_navigation_in_website 269 non-null int64

22 23_loading_and_processing_speed 269 non-null int64

23 24_user_friendly_interface_of_the_website 269 non-null int64

24 25_convenient_payment_methods 269 non-null int64

25

26_trust_that_the_online_retail_store_will_fulfill_its_part_of_the_transaction_at_the_stipulated_time 269 non-null int64

26 27_empathy_readiness_to_assist_with_queries_towards_the_customers 269 non-null int64

27 28_being_able_to_guarantee_the_privacy_of_the_customer 269 non-null int64

28

29_responsiveness,_availability_of_several_communication_channels_email,_online_rep,_twitter,_phone_etc 269 non-null int64

29 30_online_shopping_gives_monetary_benefit_and_discounts 269 non-null int64

30 31_enjoyment_is_derived_from_shopping_online 269 non-null int64

31 32_shopping_online_is_convenient_and_flexible 269 non-null int64

32

33_return_and_replacement_policy_of_the_e_tailer_is_important_for_purchase_decision 269 non-null int64

33 34_gaining_access_to_loyalty_programs_is_a_benefit_of_shopping_online 269 non-null int64

34

35_displaying_quality_information_on_the_website_improves_satisfaction_of_customers 269 non-null int64

35

36_user_derive_satisfaction_while_shopping_on_a_good_quality_website_or_application 269 non-null int64

36

37_net_benefit_derived_from_shopping_online_can_lead_to_users_satisfaction 269 non-null int64

37 38_user_satisfaction_cannot_exist_without_trust 269 non-null int64

38 39_offering_a_wide_variety_of_listed_product_in_several_category 269 non-null int64

39 40_provision_of_complete_and_relevant_product_information 269 non-null int64

40 41_monetary_savings 269 non-null int64

41 42_the_convenience_of_patronizing_the_online_retailer 269 non-null int64

42 43_shopping_on_the_website_gives_you_the_sense_of_adventure 269 non-null int64

43 44_shopping_on_your_preferred_e_tailer_enhances_your_social_status 269 non-null int64

44 45_you_feel_gratification_shopping_on_your_favorite_e_tailer 269 non-null int64

45 46_shopping_on_the_website_helps_you_fulfill_certain_roles 269 non-null int64

```

46 47_getting_value_for_money_spent
269 non-null      int64
47
from_the_following,_tick_any_or_all_of_the_online_retailers_you_have_shopped_from      269 non-null      object
48 easy_to_use_website_or_application
269 non-null      object
49 visual_appealing_web_page_layout
269 non-null      object
50 wild_variety_of_product_on_offer
269 non-null      object
51 complete,_relevant_description_information_of_products
269 non-null      object
52 fast_loading_website_speed_of_website_and_application
269 non-null      object
53 reliability_of_the_website_or_application
269 non-null      object
54 quickness_to_complete_purchase
269 non-null      object
55 availability_of_several_payment_options
269 non-null      object
56 speedy_order_delivery
269 non-null      object
57 privacy_of_customers'_information
269 non-null      object
58 security_of_customer_financial_information
269 non-null      object
59 perceived_trustworthiness
269 non-null      object
60 presence_of_online_assistance_through_multi_channel
269 non-null      object
61 longer_time_to_get_logged_in_promotion,_sales_period
269 non-null      object
62 longer_time_in_displaying_graphics_and_photos_promotion,_sales_period
269 non-null      object
63 late_declaration_of_price_promotion,_sales_period
269 non-null      object
64 longer_page_loading_time_promotion,_sales_period
269 non-null      object
65 limited_mode_of_payment_on_most_products_promotion,_sales_period
269 non-null      object
66 longer_delivery_period
269 non-null      object
67 change_in_website_application_design
269 non-null      object
68 frequent_disruption_when_moving_from_one_page_to_another
269 non-null      object
69 website_is_as_efficient_as_before
269 non-null      object
70 which_of_the_indian_online_retailer_would_you_recommend_to_a_friend
269 non-null      object
dtypes: int64(46), object(25)
memory usage: 149.3+ KB

```

In [20]:

```

klib.data_cleaning(df)
Long column names detected (>25 characters). Consider renaming the
following columns ['3_which_city_do_you_shop_online_from',
'4_what_is_the_pin_code_of_where_you_shop_online_from',
'5_since_how_long_you_are_shopping_online',
'6_how_many_times_you_have_made_an_online_purchase_in_the_past_1_year',
'7_how_do_you_access_the_internet_while_shopping_on_line',

```

'8_which_device_do_you_use_to_access_the_online_shopping',
 '9_what_is_the_screen_size_of_your_mobile_device',
 '10_what_is_the_operating_system_os_of_your_device',
 '11_what_browser_do_you_run_on_your_device_to_access_the_website',
 '12_which_channel_did_you_follow_to_arrive_at_your_favorite_online_store_for_the_first_time',
 '13_after_first_visit_how_do_you_reach_the_online_retail_store',
 '14_how_much_time_do_you_explore_the_e_retail_store_before_making_a_purchase_decision', '15_what_is_your_preferred_payment_option',
 '16_how_4_do_you_abandon_selecting_an_items_and_leaving_without_making_payment_your_shopping_cart',
 '17_why_did_you_abandon_the_"bag",_"shopping_cart"',
 '18_the_content_on_the_website_must_be_easy_to_read_and_understand',
 '19_information_on_similar_product_to_the_one_highlighted_is_important_for_product_comparison',
 '20_complete_information_on_listed_seller_and_product_being_offered_is_important_for_purchase_decision',
 '21_all_relevant_information_on_listed_products_must_be_stated_clearly',
 '22_ease_of_navigation_in_website', '23_loading_and_processing_speed',
 '24_user_friendly_interface_of_the_website',
 '25_convenient_payment_methods',
 '26_trust_that_the_online_retail_store_will_fulfill_its_part_of_the_transaction_at_the_stipulated_time',
 '27_empathy_readiness_to_assist_with_queries_towards_the_customers',
 '28_being_able_to_guarantee_the_privacy_of_the_customer',
 '29_responsiveness_availability_of_several_communication_channels_email_online_rep_twitter_phone_etc',
 '30_online_shopping_gives_monetary_benefit_and_discounts',
 '31_enjoyment_is_derived_from_shopping_online',
 '32_shopping_online_is_convenient_and_flexible',
 '33_return_and_replacement_policy_of_the_e_tailer_is_important_for_purchase_decision',
 '34_gaining_access_to_loyalty_programs_is_a_benefit_of_shopping_online',
 '35_displaying_quality_information_on_the_website_improves_satisfaction_of_customers',
 '36_user_derive_satisfaction_while_shopping_on_a_good_quality_website_or_application',
 '37_net_benefit_derived_from_shopping_online_can_lead_to_users_satisfaction', '38_user_satisfaction_cannot_exist_without_trust',
 '39_offering_a_wide_variety_of_listed_product_in_several_category',
 '40_provision_of_complete_and_relevant_product_information',
 '42_the_convenience_of_patronizing_the_online_retailer',
 '43_shopping_on_the_website_gives_you_the_sense_of_adventure',
 '44_shopping_on_your_preferred_e_tailer_enhances_your_social_status',
 '45_you_feel_gratification_shopping_on_your_favorite_e_tailer',
 '46_shopping_on_the_website_helps_you_fulfill_certain_roles',
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 'complete_relevant_description_information_of_products',
 'fast_loading_website_speed_of_website_and_application',
 'reliability_of_the_website_or_application',
 'quickness_to_complete_purchase',
 'availability_of_several_payment_options',
 'privacy_of_customers_information',
 'security_of_customer_financial_information',
 'presence_of_online_assistance_through_multi_channel',
 'longer_time_to_get_goods_in_promotion_sales_period',
 'longer_time_in_displaying_graphics_and_photos_promotion_sales_period',
 'late_declaration_of_price_promotion_sales_period',

```
'longer_page_loading_time_promotion,_sales_period',
'limited_mode_of_payment_on_most_products_promotion,_sales_period',
'change_in_website_application_design',
'frequent_disruption_when_moving_from_one_page_to_another',
'website_is_as_efficient_as_before',
'which_of_the_indian_online_retailer_would_you_recommend_to_a_friend'].
Shape of cleaned data: (139, 71) - Remaining NAs: 0
```

Dropped rows: 130

of which 130 duplicates. (Rows (first 150 shown): [72, 94, 95, 97, 99, 100, 101, 108, 109, 110, 111, 113, 114, 115, 118, 119, 120, 121, 122, 123, 124, 125, 126, 127, 128, 129, 130, 131, 132, 133, 134, 135, 136, 137, 138, 139, 140, 141, 142, 143, 144, 145, 146, 147, 148, 152, 153, 155, 162, 163, 169, 170, 171, 174, 175, 177, 180, 181, 182, 183, 192, 199, 200, 201, 202, 203, 204, 205, 206, 207, 208, 209, 210, 211, 212, 213, 214, 215, 216, 217, 218, 219, 220, 221, 222, 223, 224, 225, 226, 227, 228, 229, 230, 231, 232, 233, 234, 235, 236, 237, 238, 239, 240, 241, 243, 244, 245, 246, 247, 248, 249, 250, 251, 252, 253, 254, 255, 256, 257, 258, 259, 260, 261, 262, 263, 264, 265, 266, 267, 268])

Dropped columns: 0

of which 0 single valued. Columns: []

Dropped missing values: 0

Reduced memory by at least: 0.12 MB (-80.0%)

klib.clean_column_names(df)

klib.convert_datatypes(df)

Out[22]:

1 g e n d e r o f r e s p o n d e n t	2 _h o _d _r e s p o n d e n t	3 _wh ich _is _d _u _sh _o _n li _fr _o _m	4_w hat _is _the _pin _co _de _of _u _sh _o _n li _fr _o _m	5_s inc e_ ho _lon _g_ yo _u_ are _s ho _ppi ng _o nli ne	6_ho w_m any_t imes_ you_ have_ made_ _an_ onlin e_pur chase_ _in_t he_p ast_1 _year	7_h ow_ do_ you_ _ess_ the_ inte _rnet _wh ile_s hop ping_ on_ _lin e	8_w hich _de_ vice_ _do_ _yo _u_ _a cces _s_th e_o nlin e_sh oppi ng	9_ wh at_i s_t he_ scr een_ _siz _e_o _f_y our_ _m obil e_d evi ce	10_ wh at_i s_t he_ ope rati ng_ syst em_ _os _of _yo ur_ dev ice	lon ger_ _ti me_ _to_ _get_ _logg _ed_i n_p rom otio n_s ales _pe riod	longe r_tim e_in_ displ _gra _phics _and_ _pho tos_p romo tion, _sale _s_per iod	late_ _de cla rati on_ of_ pri ce_ pro mo tio n_ sale _s_p eri od	lon ger_ _pa ge_ loa din _g_t _ti _me _pr om otio n_ sale _s_p eri od	limit _ed_ _mod _e_of_ _pay _ment _on_ _most _pro ducts_ _pro moti on_s_ ales_ _perio d	1 o n g e r _d _r _d _el _i _v _e _y _p _e _ri o d	ch an ge_ _i _n_ _we _bsi _te _a _pp lic ati on_ _d _esi gn	freq uent_ _dis _rupt _ion_ _n_m _g_fr _om_ one_ _page _to_ _anot her	w eb sit e_ _is _a _s_ _ef fic ie nt _a _s_ _be fo re	whic h_of _the _india _n_on _line_ _retail _er_w ould _you_ _reco mme nd_ _t_o_a _friend	
0	0	3	De lhi	110 009	5	4	4	3	5	1	Am azo n.in	Amaz on.in	Flip kart .co m	Flip kart .co m	Ama zon.i n	Pa ya tm .co m	Fl ip ka rt .co m	Ama zon.i n	A m az on .in	Flipk art.co m
1	1	2	De lhi	110 030	5	5	2	1	2	3	Am azo n.in, Flip kart .co m	Mynt ra.co m	sna pde al.c om	Sna pde al.c om	Snap deal. com	S na p de e al .c o m	A ma zo n.i n	Myn tra.c om	A m az on .in , Fl ip ka rt. co m	Ama zon.i n, Mynt ra.co m

[illegible]

1 ge nd er o f r e s p o n d e n t	2 _h o w o d u	3_ wh ich _ci ty _d yo u sh op _o nli ne _fr om	4_w hat _is the _pin _co de of _whe re _sh op _onli ne_f rom	5_s inc e_ ho w_ lon g_ yo u_ are _s ho ppi ng _o nli ne	6_ho w_m any_t imes_ you_ have_ _an_ onlin e_pur chase _in_t he_p ast_1 _year	7_h ow_ do_ you_ _acc _do the_ inte rnet _wh ile_s hop ping _on _lin e	8_w hich _de vice _do _yo u_ se_t o_a cces s_th e_o nlin e_sh oppin g	9_ wh at_i s_t he_ scr een_ _siz e_o f_y our_ m obil e_d evi ce	10_ wh at_i s_t he_ ope rati ng_ syst em_ _os _of _yo ur_ dev ice	lon ger _ti me_ to_ get_ logg ed_i n_p rom otio n_s ales _pe riod	longe r_tim e_in_ displ aying_ _gra phics _and_ _pho tos_p romo tion, _sale _s_per iod	late_ de cla rati on_ of_ pri ce_ pro mo tio n_ sale _s_p eri od	lon ger_ pa ge_ loa din g_ ti me_ _pr om otio n_ sale _s_p eri od	limit ed_ mod e_of_ pay ment _on_ most_ _pro ducts_ _pro moti on_s ales_ _per iod	1 o n g e r _d el i v e r y _p e ri od	ch an ge_ _i n_ we bsi te_ _a pp lic ati on_ _d esi gn	frequ ent_ _dis rupt ion_ _whe n_m ovin g_fr om_ one_ page_ _to_ anot her	w eb sit e_ _is _a s_ ef fic ie nt_ _a s_ be fo re	whic h_of _the_ india n_on line_ retail er_w ould_ _you_ _reco mme nd_t o_a_f riend		
0	0	3	De lhi	110 009	5	4	4	3	5	1	.	Am azo n.in	Amaz on.in	Flip kart .co m	Flip kart .co m	Ama zon.i n	P a y t m . co m	Fli pk art .co m	Ama zon.i n	A m az on .in	Flipk art.co m
1	1	2	De lhi	110 030	5	5	2	1	2	3	.	Am azo n.in, Flip kart .co m	Mynt ra.co m	sna pde al.c om	Sna pde al.c om	Snap deal. com	S n a p d e al . co m	A ma zo n.i n	Myn tra.c om	A m az on .in , Fl ip ka rt. co m	Ama zon.i n, Mynt ra.co m
2	1	2	Gr eat er No ida	201 308	4	5	3	1	4	2	.	My ntra .co m	Mynt ra.co m	My ntra .co m	My ntra .co m	Ama zon.i n	P a y t m . co m	Pa yt m. co m	Payt m.co m	A m az on .in	Ama zon.i n, Payt m.co m, Mynt ra.co m
3	0	2	Ka rna l	132 001	4	1	3	1	4	3	.	Sna pde al.c om	Mynt ra.co m, Snap deal.c om	My ntra .co m	Pay tm. co m	Payt m.co m	P a y t m . co m	A ma zo n.i n, Fli pk art .co m	Ama zon.i n, Fl ip ka rt. co m	A m az on .in , Fl ip ka rt. co m, Pa yt m. co m	Ama zon.i n, Flipk art.co m
4	1	2	Ba ng alo re	530 068	3	2	2	1	2	3	.	Flip kart .co m, Payt m.c om	Payt m.co m	Pay tm. co m	Pay tm. co m	Snap deal. com	P a y t m . co m	A ma zo n.i n	Snap deal. com	Pa yt m. co m	Ama zon.i n, Mynt ra.co m
...
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1 g e n d e r o f r e s p o n d e n t	2 _h o w _o _d _l _a _r _y _o _u	3_ wh _ci _ty _d _o _u _sh _o _nli _fr _o _m	4_w hat _is _the _pin _co _de _of _whe _re _you _sh _op _nli _fr _o _m	5_s inc e_ ho _w_ lon _g_ yo _u_ are _s ho _ppi _ng _o nli ne	6_ho w_m any_t imes_ you_ have_ _an_ onlin e_pur chase_ _in_t he_p ast_1 _year	7_h ow_ do_ you_ _acc_ _ess_ _the_ _inte _rnet _wh _ile_s _hop _ping _on_ _lin e	8_w hich _de _vice _do_ _yo _u_ _se_ _t_ _o_a _cces _s_th _e_o _nlin e_sh _oppi _ng	9_ wh _at_i _s_ _t_ _he_ _scr _een _siz _e_o _f_y _our_ _m _obil _e_d _evi _ce	10_ wh _at_i _s_ _t_ _he_ _ope _rati _ng_ _syst _em_ _os_ _of_ _yo _ur_ _dev _ice	lon ger_ _ti _me_ _to_ _get_ _logg _ed_i _n_p _rom _otio _n_s _ales _pe _riod	longe r_tim e_in_ _displ _aying_ _gra _phics_ _and_ _pho _tos_p _romo _tion, _sale _s_per _iod	late_ _de _cla _rati _on_ _of_ _pri _ce_ _pro _mo _tio _n_ _sale _s_p _eri _od	lon ger_ _pa _ge_ _loa _din _g_ _ti _me_ _pr _om _otio _n_ _sale _s_p _erio _d	limit _ed_ _mod _e_of_ _pay _ment _on_ _most _pro _ducts _pro _moti _on_s _ales_ _perio _d	1 o n g e r _ _d _el _i _v _e _r _y _ _p _e _r _e _o _d	ch an ge_ _i _n_ _we _bsi _te_ _a _pp _lic _ati _on_ _d _esi _gn	frequ ent_ _dis _rupt _ion_ _whe _n_m _ovin _g_fr _om_ _one_ _page _to_ _anot _her	w eb sit e_ _is _a _s_ _ef _fic _ie _nt_ _a _s_ _be _fo _re	whic h_of _the_ _india _n_on _line_ _retail _er_w _ould _you_ _reco _mme _nd_t _o_a_f _riend		
2 6 4	1	2	So lan	173 212	2	1	3	1	4	2	.	Am azo n.in	Amaz on.in	Am azo n.in	Am azo n.in	Ama zon.i n	A ma zo n.i n	Ama zon.i n	A ma zo n.in	Ama zon.i n	
2 6 5	1	3	Gh azi ab ad	201 008	2	4	3	1	5	2	.	Flip kart .co m	Flipk art.co m	Flip kart .co m	Flip kart .co m	Flipk art.co m	Fli pk art .co m	Fli pk art .co m	Flip kart .co m	Fl ip ka rt.co m	Flipk art.co m
2 6 6	1	4	Ba ng alo re	560 010	3	1	3	2	5	1	.	Am azo n.in	Snap deal.c om	Am azo n.in	Sna pde al.c om	Snap deal. com	S n a p d e a l .c o m	Sn ap de al. co m	Snap deal. com	A m az on. in	Ama zon.i n
2 6 7	1	1	So lan	173 229	3	1	2	1	4	2	.	Am azo n.in	Amaz on.in, Mynt ra.co m, Snap deal.c om	Am azo n.in	Am azo n.in, Sna pde al.c om	Ama zon.i n	A m a z o n . i n	A ma zo n.i n	Myn tra.c om, Snap deal. com	M yn tra .c o m, Sn ap de al. co m	Ama zon.i n
2 6 8	1	4	Gh azi ab ad	201 009	3	4	3	1	4	2	.	Am azo n.in	Amaz on.in	Am azo n.in	Am azo n.in	Ama zon.i n	A m a z o n . i n	A ma zo n.i n	Ama zon.i n	A m az on. in	Ama zon.i n

klib.mv_col_handling(df)

Out[24]:

1	g	2	3	4	5	6	7	8	9	10		lon	longe	late	lon	limit	1	ch	freq	w	whic
e	n	h	wh	hat	inc	ho	ow	hich	wh	wh		ger	r_tim	_de	ger	ed	o	an	uent	eb	h_of
d	o	o	_ci	_is_	e_	w_m	do_	_de	at_i	at_i		_ti	e_in	cla	_pa	_mod	n	ge	_dis	sit_e	_the
e	r	w	_ty	the	w_	any_t	_acc	_do	he_	s_t		me_	_displ	on_	ge_	e_of_	r	n_	rupt	is_	_india
_	_	_	_d	_co	lon	you_	_ess_	_yo	_scr	he_		to_	_gra	of_	loa	_pay	_d	we	ion_	_a	_on
f	l	o	de_	pin	g_	have_	the_	u_u	een	siz	.	logg	_and	pri	din	ment	i	bsi	wh_	s_	_retail
_	_	_	u_	of_	yo_	made	inte	se_t	_o_a	_e_o	.	ed_i	_pho	ce_	_me	_on_	el	n_	n_m	ef	_ould
r	_	_	sh	re_	u_	_an_	_rnet	_cces	_f_y	_syst	.	n_p	_pho	pro	_pr	_most	i	te_	ovin	fic	_er_w
e	a	_	op	you_	are	e_pur	_wh	s_th	_o_m	_os	.	rom	_tos_p	mo	_om	_pro	v	_a	g_fr	ie	_you
s	r	_	_o	_sh	_s	_chase	ile_s	_hop	_obil	_of		otio	n_	tio	n_	_pro	e	pp	om_	nt_	_reco
p	e	n	li	op_	ppi	_in_t	ping	e_o	_m	_yo		n_s	romo	n_	om	_moti	r	lic	one_	_a	_mme
n	_	y	_fr	onli	_o	he_p	_on	_sh	_ed	_ur_		ales	_sale	sale	sale	on_s	y	ati	page	_s_	_nd_t
e	n	o	o	ne_f	nli	_ast_1	_lin	_oppi	_evi	_dev		_pe	s_p	s_p	s_p	ales_	_p	_to_	_to_	_be	_o_a_f
t		u	m	rom	ne	_year	e	ng	ce	ice		riod	iod	eri	erio	perio	e	esi	anot	for	_friend
0	0	3	De	110	5	4	4	3	5	1	.	Am	Amaz	Flip	Flip	Ama	P	Fli	Ama	A	Flipk
			lhi	009							.	azo	on.in	kart	kart	zon.i	a	pk	zon.i	m	art.co
											.	n.in		.co	.co	n	y	art	n	az	m
											.			.com	.com	n	t	.com	.in	.in	m
1	1	2	De	110	5	5	2	1	2	3	.	Am	Mynt	sna	Sna	Snap	S	A	Myn	A	Ama
			lhi	030							.	azo	ra.co	pde	pde	deal	n	ma	tra.co	Fl	zon.i
											.	n.in,	m	al.c	al.c	com	a	zo	ip	n,	Mynt
											.	Flip	.com	om	om	com	p	n.i	ka	Mynt	ra.co
											.	kart				com	d	n	rt.co	m	m
											.	.com					o		com		
2	1	2	Gr	201	4	5	3	1	4	2	.	My	Mynt	My	My	Ama	P	Pa	Payt	A	Ama
			eat	308							.	ntra	ra.co	ntra	ntra	zon.i	a	yt	m.co	m	zon.i
			No								.	.co	m	.co	.co	n	m	co	m	on	Payt
			ida								.	m		m	m	com	m	m	.in	.in	m.co
											.										m,
											.										Mynt
											.										ra.co
											.										m
3	0	2	Ka	132	4	1	3	1	4	3	.	Sna	Mynt	My	Payt	Payt	P	A	Ama	A	Ama
			rma	001							.	pde	ra.co	ntra	tm.	m.co	a	ma	zon.i	Fl	zon.i
			l								.	al.c	m,	.co	.co	m	y	zo	n,	ip	n,
											.	om	Snap	m	m	com	t	n.i	ka	ka	Flipk
											.		deal.c	com	com		m	n,	rt.co	rt.co	art.co
											.		om					Flip	com,	com,	m
											.							kart	Pa	Pa	
											.							art	yt	yt	
											.							.com	m.co	m.co	
											.								m,	m,	
											.								com	com	
4	1	2	Ba	530	3	2	2	1	2	3	.	Flip	Payt	Pay	Pay	Snap	P	A	Snap	Pa	Ama
			ng	068							.	kart	m.co	tm.	tm.	deal	a	zo	deal	yt	zon.i
			alo								.	.co	m	co	com	com	y	n.i	com	m.co	n,
			re								.	m,		com	com	com	t	n	com	com	Mynt
											.	Payt								ra.co	m
											.	m.c	om								
											.	om									

1 g e n d e r - o - r e s p o n d e n t	2 - h o w o o l d a r e y o u	3_ wh ich _ci ty _d yo u sh op _o nli ne _fr om	4_w hat _is the _pin _co de _of _whe re _you _sh op _onli ne _f rom	5_s inc e_ ho w_ lon g_ yo u_ are _s ho ppi ng _o nli ne	6_ho w_m any_t imes_ you_ have_ made_ _an_ onlin e_ pur chase _in_t he_p ast_1 _year	7_h ow_ do_ you_ _acc ess_ the_ inte rnet_ _wh ile_s hop ping _on _lin e	8_w hich _de vice_ _do _yo u_ se_t o_a cces s_th e_o nlin e_sh oppi ng	9_ wh at_i s_t he_ scr een_ _siz e_o f_y our_ _m obil e_d evi ce	10_ wh at_i s_t he_ ope rati ng_ syst em_ _os _of _yo ur_ dev ice	lon ger _ti me_ to_ get_ logg ed_i n_p rom otio n_s ales _pe riod	longe r_tim e_in_ displ aying_ _gra phics _and_ _pho tos_p romo tion, _sale s_per iod	late_ _de cla rati on_ of_ pri ce_ pro mo tio n_ sale s_p eri od	lon ger_ _pa ge_ loa din g_ ti me_ _pr om otio n_ sale s_p eri od	limit ed_ mod e_of_ pay ment _on_ most_ _pro ducts_ _pro moti on_s ales_ perio d	1 o n g e r _ d el i v e r y _ p e ri od	ch an ge_ _i n_ we bsi te_ _a pp licati on_ _d esi gn	frequ ent_ _dis rupt ion_ _whe n_m ovin g_fr om_ one_ page_ _to_ anot her	w eb sit e_ _is _a s_ ef fic ie nt_ _a s_ be fore	whic h_of _the_ _india n_on line_ retail er_w ould_ _you_ _reco mme nd_t o_a_f riend		
.	
2 6 4	1	2	So lan	173 212	2	1	3	1	4	2	.	Am azo n.in	Amaz on.in	Am azo n.in	Am azo n.in	Ama zon.i n	A m a z o n .i n	A ma zo n.i n	Ama zon.i n	A m a z o n .in	Ama zon.i n
2 6 5	1	3	Gh azi ab ad	201 008	2	4	3	1	5	2	.	Flip kart .co m	Flipk art.co m	Flip kart .co m	Flip kart .co m	Flipk art.co m	Fli p k a r t .c o m	Fli pk art .co m	Flip kart .com	Fl ip ka rt .co m	Flipk art.co m
2 6 6	1	4	Ba ng alo re	560 010	3	1	3	2	5	1	.	Am azo n.in	Snap deal.c om	Am azo n.in	Sna pde al.c om	Snap deal. com	S n a p d e a l .c o m	Sn ap de al. co m	Snap deal. com	A m a z o n .in	Ama zon.i n
2 6 7	1	1	So lan	173 229	3	1	2	1	4	2	.	Am azo n.in	Amaz on.in, Mynt ra.co m, Snap deal.c om	Am azo n.in	Am azo n.in, Sna pde al.c om	Ama zon.i n	A m a z o n .i n	A ma zo n.i n	Myn tra.c om, Snap deal. com	M yn tra .c o m, Sn ap de al. co m	Ama zon.i n
2 6 8	1	4	Gh azi ab ad	201 009	3	4	3	1	4	2	.	Am azo n.in	Amaz on.in	Am azo n.in	Am azo n.in	Ama zon.i n	A m a z o n .i n	A ma zo n.i n	Ama zon.i n	A m a z o n .in	Ama zon.i n

klib.pool_duplicate_subsets(df)

Out[25]:

pooled_vars	
0	0
1	1
2	2
3	3
4	4
...	...
264	103
265	106
266	178
267	8
268	105

269 rows × 1 columns

In [28]:

df

Out[28]:

1	2	3	4_w	5_s	6_ho	7_h	8_w	9_	10_	lon	longe	late	lon	limit	1	o	ch	freq	w	whic	
g		wh	hat	inc	6_ho	ow_	hich	wh	wh	ger	r_tim	_de	ger	ed_	n	n	an	uent	eb	h_of	
n	-	ich	_is_	e_	w_m	do_	_de	at_i	at_i	me_	e_in_	cla_	_pa	mod	e	g	ge	_dis	sit	_the_	
e	o	_ci	the_	ho	any_t	you	vice	s_t	s_t	ti	e_in_	on_	ge_	e_of_	r	-	_i	rupt	e_	india	
r	w	ty	pin	w_	imes_	_acc	_do	he_	he_	to_	displ	of_	loa	pay	d	n_	we	ion_	is	_a	
-	-	_d	_co	lon	you_	ess_	_yo	een	ope	get_	_gra	of_	din	ment	el	i	bsi	wh_	_s_	retail	
o	l	yo	de_	g_	have_	the_	u_u	scr	rati	logg	_phics	pri	g_ti	_on_	v	-	_a	n_m	ef	er_w	
f	d	u_	of_	u_	_an_	inte	se_t	_siz	ng_	ed_i	_and	ce_	me	most	e	pp	ovin	g_fr	ie	_you	
-	-	sh	re_	are	onlin	_wh	o_a	e_o	syst	n_p	_pho	pro	_pr	_pro	r	y	ati	om_	_a	ould	
r	-	op	you	_s	e_pur	ile_s	s_th	our	_os	rom	tos_p	mo	om	ducts	y	-	pp	one_	nt	_reco	
s	a	_o	_sh	ho	chase	hop	e_o	_m	_of	otio	romo	n_	otio	_pro	o	p	lic	g_	_a	_you	
p	e	nli	op_	ppl	_in_t	ping	nlin	obil	_yo	n_s	tion,	n_	n_	moti	-	-	ati	one_	_a	mme	
o	-	ne	op_	ng	he_p	ping	e_sh	e_d	ur_	ales	_sale	sale	sale	on_s	o	e	on	_to_	s_	nd_t	
n	y	_fr	onli	ng	ast_1	_on	e_sh	evi	dev	_pe	s_sale	s_p	s_p	ales_	p	-	_d	page	be	o_a_f	
d	o	_o	ne_f	o	_year	_lin	oppi	ng	ce	riod	_per	erio	erio	perio	e	esi	anot	her	fo	riend	
e	u	m	rom	ne		e	ng				iod	od	d	d	ri	o	gn	re			
n															d						
t																					
0	0	3	De	110	5	4	4	3	5	1	.	Am	Am	Flip	Flip	Ama	P	Fli	Ama	A	Flipk
			lhi	009							.	azo	on.in	kart	kart	zon.i	a	pk	zon.i	m	art.co
											.	n.in		.co	.co	n	y	art	n	az	m
											.			m	m		t	.co		.in	
											.						o				

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