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Development and validation of consumer confidence level scale

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Abstract
The aim of this study is to develop and validate scales for the consumer confidence level. Consumer Confidence level affects the final consumer purchase behavior. Consumer purchase behavior is a process from information acquisition, formation of purchase intention to purchase decision-making problem. Consumer buying intention is a significant aspect that results into the ultimate buying decision. And in today's information technology era, information is a most vital factor that changes consumers' buying intention and finally makes buying decisions. In this paper Factor Analysis was performed to validates the variables and factors. This technique is usually used to lessen a large number of variables into less factors. The investigation was conducted for testing the reliability of the developed instrument for the following factors *viz*., Gaining Market Information, Decision Making through Social Interaction, Inspiring Knowledge, Personal Decision Making and Market Ally.

Keywords: Consumer confidence, scale development, factor analysis, principal component analysis

Introduction
Consumer Confidence means how capable an individual feels or behave in the market while taking any purchase decision. It evaluates one's capability to fell optimist as a consumer in the market.
Instrument for measuring consumer confidence consists of 31 items. Participants were asked to rate their responses in the five-point scale labeled 1 = extremely disagree, 2 = somewhat disagree, 3 = don't know, 4 = somewhat agree and 5 = extremely agree.
The investigation was conducted using software SPSS 20.0, to determine the validity and reliability of the developed instrument.

Methodology
Development of survey instrument
Research always requires correct data. Besides this, reliable and valid instrument is also needed to generate important data. Development of research instrument especially when the individual perception is important determinant for the study so 31 variables were framed for the investigation purpose.

Final Selection of Item
Factor analysis is used to group 31 selected variables into further sub headings. Cronbach's alpha is used to select final variables of the instrument.

Sampling
For the study, the questionnaire was sent to the respondents through the online mode. Total of 200 respondents send their responses back. Sampling used in this study was convenience sampling.

Analysis Technique
Reliability of Instrument
Many techniques are present to check the reliability of the instrument, however internal consistency method was usually used for the development of the instrument. The value of Cronbach's alpha as reliability coefficient is measured to estimate the internal consistence.

Profile of the respondents
The first part of the questionnaire consists of information of the respondent. This section consists of the information related to their age, education level, occupation and income.

Data Analysis

The Cronbach's alpha value as shown in Table 1 is greater than 0.7 suggests that instrument is having adequate internal consistency. The value of Cronbach's alpha was 0.706, which shows that acceptable reliability for the instrument.

Table 1: Reliability of the Scale

Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	No. of Items
.706	.694	31

Table 2: Item Total Statistics of the Scale

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Squared Multiple Correlation	Cronbach's Alpha if Item Deleted
Have knowledge about various sources for gathering information prior to buy. (Q1)	102.2000	61.432	.682	.	.650
Have knowledge from where I will get required product information. (Q2)	101.9000	59.989	.766	.	.640
Having confidence on my research done prior to any major shopping. (Q3)	102.3500	69.503	.302	.	.693
Have knowledge about what queries to ask while purchasing. (Q4)	101.4500	62.682	.864	.	.644
Have ability to get required information prior to major shopping. (Q5)	102.3000	71.274	.392	.	.687
Have confidence on ability to considering brand worth. (Q6)	101.9500	62.997	.594	.	.660
Can recognize brands that fulfill my expectation. (Q7)	102.1500	59.503	.769	.	.639
Have trust on my decision to consider any brand. (Q8)	101.7000	65.379	.771	.	.657
Have knowledge about correct shop for purchasing. (Q9)	101.8000	64.484	.505	.	.670
Can concentrate on small number of good brands while making decision. (Q10)	103.3000	71.905	.381	.	.689
Usually uncertain regarding my purchase decision. (Q11)	101.2500	85.250	-.472	.	.745
Always feel restless about what to purchase. (Q12)	102.1500	77.397	.037	.	.708
Always be in dilemma regarding correct purchase selection. (Q13)	101.4500	77.103	.037	.	.709
Never found right product for myself. (Q14)	101.5000	73.526	.343	.	.693
Usually, the product I purchase does not satisfy my need. (Q15)	101.7000	76.432	.062	.	.709
Have ability to impress my friends by making good purchase. (Q16)	100.4500	78.682	-.100	.	.714
Usually, people got impressed by the products I purchase. (Q17)	100.5500	79.945	-.198	.	.721
My decorating ability is admired by my neighbor. (Q18)	100.3500	78.239	-.057	.	.712
Have capability to give good gifts. (Q19)	100.4500	79.313	-.179	.	.715
Usually, others compliment me for the products I purchase. (Q20)	100.3500	78.134	-.044	.	.710
Have knowledge about the deals which are usually difficulty to believe that that are right. (Q21)	100.5000	79.421	-.156	.	.719
Easily notice if any hidden condition applied with an offer. (Q22)	102.5000	70.789	.523	.	.682
Easily understand when salesperson starts negotiation strategy. (Q23)	102.4500	71.629	.605	.	.683
Easily grasp when vendor is forcing me to purchase. (Q24)	100.7000	79.905	-.196	.	.720
Easily understand about various offers used for customer to purchase. (Q25)	101.4000	77.621	.018	.	.708
Easily distinguish between reality and unreality in commercial. (Q26)	101.3000	81.484	-.399	.	.724
Scared to inquire regarding meeting the manager of the store. (Q27)	102.3500	74.766	.255	.	.698
Reluctant towards saying if anything is unsatisfactory in the store. (Q28)	103.2500	78.303	-.064	.	.714
Unable to refuse to a salesperson. (Q29)	101.7000	79.484	-.148	.	.722
Feel shy if any issue arises during purchasing. (Q30)	102.0000	80.526	-.186	.	.734
Doubtful towards complaining while purchasing. (Q31)	103.5500	79.313	-.157	.	.717

Factor Analysis: Factor Analysis is a procedure primarily used for data reduction and summarization. It reduces large numbers of items to a smaller number of factors. Principal component analysis is a method to get the least number of factors that are responsible for the covariation observed in the instrument. Those factors that are having eigen value more then one was extracted.

Every variable was standardized and the variables having more loadings on the factors was used to increase the reliability of the instrument. Using the principal component and varimax rotation seven dependent factors as shown in Table 4, were extracted that accounted for 87.323 percentage of total variation in dependent variables in the observed ratings.

Kaiser-Meyer-Olkin (KMO) and Bartlett's Test for Sphericity: Sampling adequacy is generally determined by KMO Statistics. It analyses overall data which is required to form the factors constructed on correlation and partial correlation matrix. The KMO values ranges in between 0 to 1 but in factor analysis, the values should be equal to 0.6 or more. The KMO value for validation of the instrument is 0.9.

Communality

Communality means squared variance which shows total variance measured in observed variables that constructs a factor in an instrument. It generally shows the variance percentage in the variables given jointly by all the factors and also depicted the reliability of the instrument.

In this study the extracted dependent factors explained over 87.32% of the total variance. The values of the extraction communalities as depicted in table 3 were found to be fairly high indicating that variables fit well the factor solution.

Table 3: Communalities of Scale

	Initial	Extraction
Have knowledge about various sources for gathering information prior to buy. (Q1)	1.000	.824
Have knowledge from where I will get required product information. (Q2)	1.000	.900
Having confidence on my research done prior to any major shopping. (Q3)	1.000	.851
Have knowledge about what queries to ask while purchasing. (Q4)	1.000	.906
Have ability to get required information prior to major shopping. (Q5)	1.000	.790
Have confidence on ability to considering brand worth. (Q6)	1.000	.917
Can recognize brands that fulfill my expectation. (Q7)	1.000	.948
Have trust on my decision to consider any brand. (Q8)	1.000	.832
Have knowledge about correct shop for purchasing. (Q9)	1.000	.789
Can concentrate on small number of good brands while making decision. (Q10)	1.000	.942
Usually uncertain regarding my purchase decision. (Q11)	1.000	.930
Always feel restless about what to purchase. (Q12)	1.000	.895
Always be in dilemma regarding correct purchase selection. (Q13)	1.000	.876
Never found right product for myself. (Q14)	1.000	.765
Usually, the product I purchase does not satisfy my need. (Q15)	1.000	.905
Have ability to impress my friends by making good purchase. (Q16)	1.000	.961
Usually, people got impressed by the products I purchase. (Q17)	1.000	.954
My decorating ability is admired by my neighbor. (Q18)	1.000	.815
Have capability to give good gifts. (Q19)	1.000	.905
Usually, others compliment me for the products I purchase. (Q20)	1.000	.946
Have knowledge about the deals which are usually difficulty to believe that that are right. (Q21)	1.000	.983
Easily notice if any hidden condition applied with an offer. (Q22)	1.000	.862
Easily understand when salesperson starts negotiation strategy. (Q23)	1.000	.896
Easily grasp when vendor is forcing me to purchase. (Q24)	1.000	.786
Easily understand about various offers used for customer to purchase. (Q25)	1.000	.815
Easily distinguish between reality and unreality in commercial. (Q26)	1.000	.911
Scared to inquire regarding meeting the manager of the store. (Q27)	1.000	.855
Reluctant towards saying if anything is unsatisfactory in the store. (Q28)	1.000	.938
Unable to refuse to a salesperson. (Q29)	1.000	.750
Feel shy if any issue arises during purchasing. (Q30)	1.000	.923
Doubtful towards complaining while purchasing. (Q31)	1.000	.698
Extraction Method: Principal Component Analysis.		

Table 4: 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 %
1	9.681	31.231	31.231	9.681	31.231	31.231	7.029	22.673	22.673
2	4.214	13.595	44.826	4.214	13.595	44.826	5.484	17.689	40.362
3	3.969	12.802	57.628	3.969	12.802	57.628	4.301	13.875	54.237
4	3.434	11.077	68.705	3.434	11.077	68.705	3.686	11.890	66.127
5	2.647	8.540	77.245	2.647	8.540	77.245	3.274	10.560	76.687
6	1.936	6.246	83.492	1.936	6.246	83.492	1.951	6.292	82.980
7	1.188	3.831	87.323	1.188	3.831	87.323	1.346	4.343	87.323
8	.815	2.630	89.953						
9	.731	2.357	92.310						
10	.635	2.049	94.359						
11	.446	1.439	95.798						
12	.389	1.254	97.052						
13	.343	1.106	98.159						
14	.261	.842	99.001						
15	.149	.480	99.480						
16	.126	.406	99.886						
17	.026	.084	99.970						
18	.009	.030	100.000						
19	8.697E-016	2.805E-015	100.000						
20	6.106E-016	1.970E-015	100.000						
21	4.474E-016	1.443E-015	100.000						
22	3.616E-016	1.166E-015	100.000						
23	2.515E-016	8.112E-016	100.000						
24	2.130E-016	6.870E-016	100.000						
25	8.891E-017	2.868E-016	100.000						
26	7.976E-017	2.573E-016	100.000						
27	-8.563E-017	-2.762E-016	100.000						
28	-1.527E-016	-4.924E-016	100.000						
29	-2.398E-016	-7.736E-016	100.000						
30	-4.159E-016	-1.342E-015	100.000						
31	-6.076E-016	-1.960E-015	100.000						
Extraction Method: Principal Component Analysis.									

Eigen Value

Total variance described by every factor is represented by Eigen Value. If any factor is having less eigen value that shows that the variable has less contribution to the factors, variance and may be rejected with other important. In this study before extraction 31 components were identified within the data set. In this study, only first few factors represented more variance and succeeding factors shows little variance. As per the Kaiser rule is to drop all those factors whose eigen value is less then 1.0. All factors extracted have eigen values greater than one as shown in table 5, which forms 7 dependent factors.

Table 5: Eigen Value of Various Factors

Factor	Eigen Value	% of Variance	Cumulative %
1	7.029	22.673	22.673
2	5.484	17.689	40.362
3	4.301	13.875	54.237
4	3.686	11.890	66.127
5	3.274	10.560	76.687
6	1.951	6.292	82.980
7	1.346	4.343	87.323

Scree Plot

The Cattell scree test plot components and variable's eigen value on the X and Y axis respectively. As the graph moves from right to left, the eigen values decreases. This test depicts to reject all the further components which is shown after the drop, especially when the curve takes form of elbow and after that less steep decline usually found. The eigen values on the scree plot is always be shown in descending order. The scree plot as shown in figure 1 represents 7 dependent factors having eigen value greater than one and represented in descending order based on their contribution to total variance.

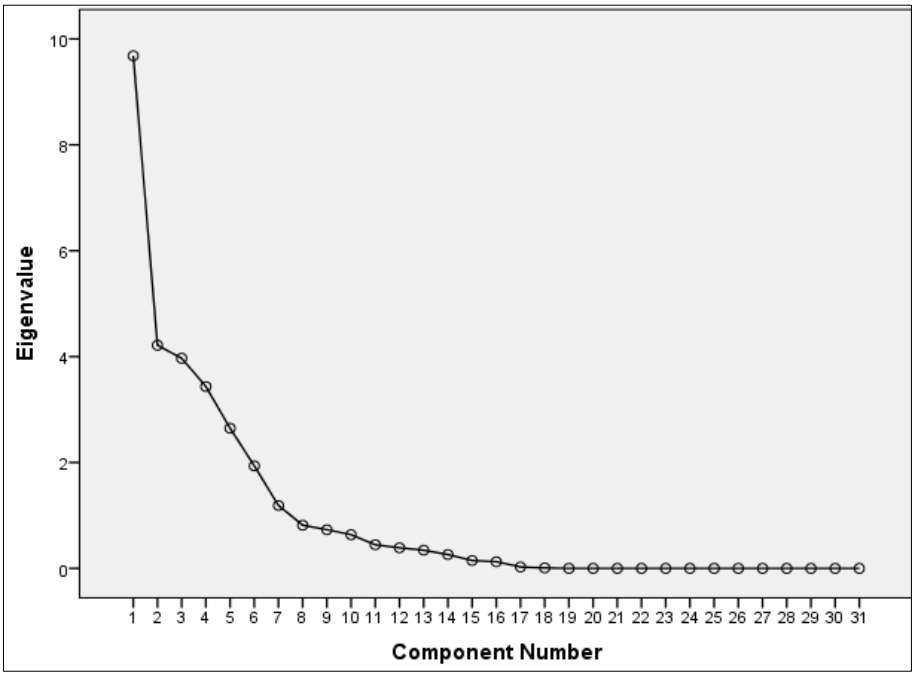

Fig 1: Scree Plot

Factor Rotation

The basic condition of principal component analysis is that maximum variance is observed in the first factor. Usually the first factor have the maximum loading that indicates that variables are important. The factor rotation alters the pattern of the factor loadings, and help in interpretation. Only the variables with factor loading > 0.4 were consider in the analysis.

Table 6: Rotated Component Matrix

	Component						
	1	**2**	**3**	**4**	**5**	**6**	**7**
Can recognize brands that fulfill my expectation. (Q7)	.941						
Have knowledge about what queries to ask while purchasing. (Q4)	.905						
Have trust on my decision to consider any brand. (Q8)	.889						
Have knowledge about various sources for gathering information prior to buy. (Q1)	.841						
Easily understand when salesperson starts negotiation strategy (Q23)	.777	-.402					
Have confidence on ability to considering brand worth. (Q6)	.772	-.306		-.320			
Have knowledge from where I will get required product information. (Q2)	.753		.376		-.369		
Have knowledge about correct shop for purchasing. (Q9)	.573		.537				
Have ability to get required information prior to major shopping. (Q5)	.564				-.432		
Have knowledge about the deals which are usually difficulty to believe that that are right. (Q21)		.968					
Usually, people got impressed by the products I purchase. (Q17)		.951					
Have ability to impress my friends by making good purchase. (Q16)		.929					
Have capability to give good gifts. (Q19)		.855					
Usually, others compliment me for the products I purchase. (Q20)		.700		.639			
Easily understand about various offers used for customer to purchase. (Q25)			.830				
Never found right product for myself. (Q14)			.777				
Having confidence on my research done prior to any major shopping. (Q3)			.732	.313	-.347		
Usually uncertain regarding my purchase decision. (Q11)	-.329		.707		-.438		
Unable to refuse to a salesperson. (Q29)			.681	.326	.301		
Reluctant towards saying if anything is unsatisfactory in the store. (Q28)				.934			
Always feel restless about what to purchase. (Q12)				.903			
My decorating ability is admired by my neighbor. (Q18)		.463		.728			
Can concentrate on small number of good brands while making decision. (Q10)	.376		.325		.791		
Scared to inquire regarding meeting the manager of the store. (Q27)					.741	.443	
Easily distinguish between reality and unreality in commercial. Usually, the product I purchase does not satisfy my need. (Q26)					.648	-.358	-.420
(Q15)	.316	-.595			.603		
Easily grasp when vendor is forcing me to purchase. (Q24)			.417	.453	.496		
Always be in dilemma regarding correct purchase selection. (Q13)						.869	
Doubtful towards complaining while purchasing. (Q31)		-.319	.431			.577	
Feel Shy if any issue arises during purchasing. (Q30)			.467				.669
Easily notice if any hidden condition applied with an offer. (Q22)	.585						.633
Extraction Method: Principal Component Analysis. Rotation Method: Varimax with Kaiser Normalization.							

Naming the factors

Naming the factors requires knowledge of theory because sometimes dissimilar attributes can correlate strongly for unknown reasons The factor is represented by the variables having loading > 0.4 should broadly signify the variables contents within the factor. A common theme representation by different items was assessed for all the factors to get more insight about the respective factor. Table 7 shows the factor number and names assigned to the extracted factors and item contents of respective factor.

Table 7: Nomenclature of the Factors

Factors	Name of factor	Variables in the factor
1	Gaining Market Information	Can recognize brands that fulfill my expectation.
		Have knowledge about what queries to ask while purchasing.
		Have trust on my decision to consider any brand.
		Have knowledge about various sources for gathering information prior to buy.
		Easily understand when salesperson starts negotiation strategy.
		Having confidence on my research done prior to any major shopping.
		Have knowledge from where I will get required product information.
		Have knowledge about correct shop for purchasing.
		Have ability to get required information prior to major shopping.
2	Decision Making through Social Interaction	Have knowledge about the deals which are usually difficulty to believe that that are right.
		Usually, people got impressed by the products I purchase.
		Have ability to impress my friends by making good purchase.
		Have capability to give good gifts.
		Usually, others compliment me for the products I purchase.
3	Inspiring Knowledge	Easily understand about various offers used for customer to purchase.
		Never found right product for myself.
		Have confidence on ability to considering brand worth.
		Usually uncertain regarding my purchase decision.
		Unable to refuse to a salesperson.
4	Personal Decision Making	Reluctant towards saying if anything is unsatisfactory in the store.
		Always feel restless about what to purchase.
		My decorating ability is admired by my neighbor.
5	Market Ally	Can concentrate on small number of good brands while making decision.
		Scared to inquire regarding meeting the manager of the store.
		Easily distinguish between reality and unreality in commercial.
		Usually, the product I purchase does not satisfy my need.
		Easily grasp when vendor is forcing me to purchase.
6	Personal Stochastic Behavior	Always be in dilemma regarding correct purchase selection.
		Doubtful towards complaining while purchasing.
7	Purchasing Inhibition	Feel shy if any issue arises during purchasing.
		Easily notice if any hidden condition applied with an offer.

Internal Consistency Analysis

Internal consistency reliability depicts the overall reliability of the instrument in which various variables are added to calculate total score. In an instrument, every variable represents some aspect of the model and the variables are constantly showing their features. Internal consistency emphasizes on reliability of the variable that construct a scale Cronbach's alpha measures the average of all probable split-half coefficient that may be result of splitting the instrument in varied form. The Cronbach's alpha values ranges from 0 to 1, and if it's value is nore then 0.6 then it shows reliability of the internal consistency.

Table 8: Reliability of the Summated Scale

S. No.	Scale	No. of Item	Cronbach's Alpha
1	Gaining Market Information	9	.933
2	Decision Making through Social Interaction	5	.957
3	Inspiring Knowledge	5	.936
4	Personal Decision Making	3	.858
5	Market Ally	5	.841
6	Personal Stochastic Behavior	2	.385
7	Purchasing Inhibition	2	.084

The alpha values for first five factor as shown in table 8, ranges from 0.933 to 0.841 which indicates good internal consistency. As factor 6 and 7 is having less than 0.7 alpha value, these factors were dropped for further study.

Validity

Validity of the instrument shows the range of difference in the observed instrument score that depicts the real variance in the variables on the characteristics for which they are measured rather than any other random or systematic error. Perfect validity shows error conducted during measurement was none. Various kind of validity are namely Content Validity; Criterion related validity and Construct validity.

Content Validity

Content validity is more of qualitative evaluation which represents the overall content of the instrument. The investigator scrutinizes all the variables of the instrument so

that it satisfactorily covers the whole arena of the construct. An instrument can be incomplete if it left any important dimension. Since the selection of measurement variables was based on scale already developed so the instrument has content validity.

Construct Validity

Construct validity shows about the features that instrument is measuring. The investigator tries to find the possible solutions of all the questions related to the theory given by the scientist about how the instrument works and what are the end results of the instrument. Therefore, for construct validity, theory and principles are required to assess as well as compare the scale with other scale. So, each factor was assessed by individual principal component analysis. Only when each factor assesses as a valid construct, then its variables may from a single factor. The percentage variance explained by each factor indicates that the scale contained in the instrument has construct validity.

Table 9: Construct Validity of the Final Scale

S. No.	Factor	KMO	% of variance	Eigen Value	Nos. of factor extracted
1	Factor 1	0.719	69.316	6.238	1
2	Factor 2	0.723	86.964	4.348	1
3	Factor 3	0.716	59.024	2.951	1
4	Factor 4	0.712	79.044	2.371	1
5	Factor 5	0.695	37.044	1.881	1
6	Factor 6	0.500	62.000	1.240	1
7	Factor 7	0.500	52.396	1.048	1

KMO statistics was found significant for factors 1 to 5 as depicted in table 9, which shows the sample adequacy was there to perform factor analysis. But KMO statistics was found insignificant for the factor 6 and 7. Barlett's Test of sphericity shows that the collected sample that is highly significant and it indicated that the collected data is suitable for factor analysis for factors 1 to 5.

Conclusion

The investigation was performed for testing the reliability of the developed instrument. It was observed that only factors 1 to 5 was found significant. So, the factor 6 and 7 were deleted which includes Q 13, 31, 27 and 30. Besides, the instrument was found valid and as a result Cronbach's alpha improve to 0.733 after removing unnecessary items.

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