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Comparative Evaluation Of Foss And Proprietary-Software Using Survey Of Indian Users

Sushil Kumar,
Research Scholar, I. K. Gujral Punjab Technical University, Jalandhar-Kapurthala Highway, Punjab (India)-144603.
Dr. Sumesh Sood,
Ikgptu Dinanagar Campus - Behrampur Road, Gurdaspur, Punjab (India)-143532.

Abstract

This Case Study Has Been Performed By Conducting A Data Survey Of Software Users Of India. The Data Have Been Collected Using An Online Questionnaire And A Printed Questionnaire. The Questions Have Been Prepared For The Comparison Of Two Categories Of Software, I.E. Proprietary And Foss Based On Features And Qualities Of Software. The Source Of These Features/Qualities And Hence The Questions Is The Policy Document Released By The Government Of India In 2015. The Data On The Comparison Of Two Types Of Software Have Been Collected From More Than 800 Software Users Of India. The Data Has Been Analyzed Using Spss. This Collected Data Have Been Processed By Applying A Vast Variety Of Tests Using Spss.

Foss Research From The Viewpoint Of Indian Users Is The Focus Of This Research Work. Measuring The Satisfaction Level Of These Software Users Is A Key Issue That Must Be Explored On The Basis Of Users' Responses To This Type Of Software(S). The Same Has Been Performed In The Present Work. The Collected Data Has Been Processed Using Spss To Find Out Which Category Of Software I.E. Foss And Proprietary The Users' Response Is Favoring And Why. To Some Factors, The Response Was Found To Be Positive But In Other Factors, It Was Found To Be Negative. The Present Paper Explores The Overall Conclusion From Data Processing.

1. Introduction

The Objective Of This Work Is To Compare Foss And Proprietary – Software By Applying A Vast Variety Of Tests Using Spss On The Data Collected Through Questionnaire Surveys From Indian Users. This Work Will Help The Government Policymakers By Investigating The Responses Of Foss Users.. This Research Work Includes Many Aspects Of Technology Like Human Interaction With Computers Using Proprietary Software Versus Foss, Technology Assessment Of Software Development I.E. Foss And Proprietary - Software, The Social Impact Of Software Development Using Proprietary Versus Foss Development Methodologies, Technology-Enhanced Learning Using Proprietary – Software(S). Versus Foss And Social Shaping Of Technology Using Two Categories Of Software I.E. Foss And Proprietary – Software(S). The Questionnaires In The Form Of Google Forms For Users At Distance And Printed Questionnaire For Local Users Has Played A Good Role To Collect The Users' Response On This Software. Spss Has Been Used To Create A Database Table And Enter Into Its Users' Responses To The Questionnaires. The Questions To Be Asked From The Users Have Been Taken From The [1]. The Overall Results Have Been Obtained By Processing These Responses With Factor Analysis, K Fold Cross-Validation Tests, Cronbach Alpha Tests, Descriptive Frequency Tests And One Sample T-Tests Using Spss (Statistical Package For Social Sciences). The Data Has Been Collected To Compare The Two Types Of Software I.E. 1) Proprietary–Software(S) 2) Foss.

2. Development Of The Questionnaire As A Measurement Tool For Survey

Surveys Can Easily Extract Information From Population Samples [2]. They Are Less Costly, Easily Manageable And To Draw Conclusions From Them Is Easy. Surveys Can Express Attitudes. Scales Are A Method To Specify The Construct [3]. These Scales Try To Measure The Response Of Respondents

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Like Feelings Good Or And Positive Or Negative Feelings Or Reactions Or Responses Of Users On Quality Or Working Of New Software Or A New Category Of Software, As A Result Of Understanding Or Opinion Of The Users Regarding Software Which They Are Using Or Experiencing.
The Steps For The Development Of Scale Have Been Grouped Into 3 Phases:

1) Existence As Well As Importance Of The Construct;
2) Representativeness Cum Appropriateness Of Collection Of Data; And
3) Statistical- Analysis And Statistical -Evidence Of The Construct [4].

Phase 1: Existence And Importance Of The Construct

The First Phase Is Comprised Of Domain(S) Identification Or Specification, Item Development And Evaluation Of Content Validity.

Step1. Domain(S) Identification Or Specification

In This Step Domain Under Study Is Identified And Specified And A New Measure Or Scale Is Constructed. The Domain In The Present Research Is To Perform A Comparison Of Foss With Proprietary –Software(S) Using A Survey Of Indian Users. Numerous Researches Over Such Issues Have Been Conducted Throughout The World But It Has Not Happened In The Context Of India Before. It Is All About The Features And Qualities Of The Two Broad Categories Of The Software(S) I.E. "Proprietary Software(S)" And "Free And Open-Source Software". The Well-Defined Domain, Therefore, Provided The Understanding Of The Observable Fact Under Study And The Process Of Item Generation Became Easier. The Review Of The Relevant Literature Available On University-Provided Research Websites Provided The Base For The Viewpoint Of The New Construct. The New Construct Was Explored And Discussed With It People And Teachers Also. At The Start Of Scale Development, The Relevant Audience From The It Field Was Interviewed. Mccoach Et Al. Have Already Mentioned "The Same Steps In Scale Development; These Are All Based On Thorough Literature Review And Specifying The Purpose Of The Domain Or Construct". A Large Number Of Research Papers And A Ph.D. Thesis On The Related Topic Were Studied Which Is Also Mentioned In The Chapter Of Literature Review. Especially Research Work Of S. K. Saini, At Anna University Chennai And The Framework For Foss Adoption Of 2013 And 2015 Of India Was Referred Which Contains All The Factors On Which Such Comparison Should Be Made. There Was Not An Existing Instrument But There Was A Base For The Instrument In The Form Of The Factors For Comparison. The Dimensions Of The Domain Which Are Factors Of Comparison Have Already Been Mentioned In The Framework For Foss Adoption.

Step 2: Item Development

In This Step, A Large Pool Of Items Was Developed. Some Additional Items Have Been Generated As A Result Of Interviews Held Previously. According To Nunnally & Bernstein, (1994) Analysis Of Web Pages, And Interviews Of It Experts Helped In The Development Of The Items. Items Are Clear, Simple And Short. Items Are Not Offensive. Variability Has Been Kept In For Respondents In Items. Here Framework Was Already Available Therefore The Domain Has Been Determined From It. Statistical Computation Has Decided On The Dimensions. This Is Called Question- Development Or Generation Of Items. Two Methods To Frame The Correct Questions Are 1) Deductive (Logical Partitioning) And 2) Inductive. Many Of The Items Were Developed On The Basis Of Factors Mentioned In The Framework By Govt. Of India. These Items Are Mentioned In The Online Questionnaire Uploaded On Google Forms.

Step3: Evaluating The Content Validity

As Already Mentioned Vast Study Of Literature Was Performed, Also Explained In The Literature Review Chapter. Interviews Of Experts Like Aashish Dakhane, Software Test Engineer, Kunal Verma, Freelance Java Developer, Milind Oak (A Mathematics Teacher From Maharashtra Who Has Developed

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Foss, And Is A Revolutionary In Foss Adoption In India), Etc. Were Also Conducted. From Many Teachers, And Professionals The Questionnaire Was Discussed And Finalized.

Phase 2: Representativeness Cum Appropriateness Of Data Collection

This Phase Is Comprised Of Questionnaire Development And Evaluation, Pilot Study, As Well As Sampling And Data Collection.

Step 1: Questionnaire Development And Evaluation

Hernandez Et Al (1991) Recommend That In Order To Collect Data, One Must First Select Or Design The Measurement Tool, And This Tool Must Be Validated And Reliable [5]. The Selection Of The Tool Is An Important Decision In Any Research. In The Scientific Methodology There Exist Various Tools For Data Collection, But Due To Recent Methodological Developments, Especially In Statistical Data Analysis, Survey Methodology (Based On Questionnaires) Has Become One Of The Most Common Alternatives In Recent Decades (Meneses & Rodríguez, 2011). Anguita Et Al (2003), States That The Basic Tool Used In Research By The Survey Is The Questionnaire. It Can Be Said That A Questionnaire Is A Standardized Tool To Collect The Required Information From The Studied Sample. To Avoid Confusion, The Difference Between Survey And Questionnaire Is That The Survey Is The Complete Process Of Data Collection; Meanwhile, The Questionnaire Is The Physical Tool With The Questions That The Participants Will Answer. To Design And/Or Adapt A Questionnaire Is Not An Easy Task; It Is Not A Simple Set Of Questions That Can Be Filled By Anyone. Each Approach Of Data Collection Has Advantages And Disadvantages [2]. Data Can Be Collected Manually As Well As With Computer Technology. As Technology Has Been Used, Errors Of Data Entry Have No Place, The Cost Has Been Reduced. Some Of The Data Has Also Been Collected Using Paper And Pen Or Phones. Developing The Questionnaire For The Survey Is A Tedious Process. The Questionnaire Was Developed With Factors Mentioned In The Framework For Foss Adoption By It Department Of Govt. Of India. Most Of The Questions In The Questionnaire Are Closed-Ended. The Questions Comprise The Cost Of Software, User-Friendliness Of Software, Freedom To Use Software, Piracy Of Software, Data Security Of Software, Trail Ability Of Software, Ease To Modify And Improve Software. The Responses Of Users On A Printed Questionnaire And Of Google Form Questionnaires Have Been Converted Into Spss (Statistical Package For Social Sciences) Format. In This Process, A Database File Has Been Developed In Spss. All The Variables Have Been Named In The Name Column Then The Questions Of The Questionnaire Have Been Put In The Label Field And Various Choices Of The Answers To Be Chosen By The Respondent Have Been Put In The Value Field, And Each Choice Has Been Given A Value Like Q1: Which Is More Costly? Value=1 Proprietary Software, Values = 2 “Free And Open-Source Software”. All This Is Known As The Variable View. The Second View Is Called The Data View. Here All The Data Values Have Been Entered I.E. 1, 2 And/Or So On. Here 1 Means Yes And 2 Means No. Therefore Both Techniques Have Been Used In Current Research Work. There Are Also Suggestions Like Sample Size Is Independent Of The Count Of Survey Items [6]. According To Comrey And Lee's Suggestion Sample Sizes Grades For Scale, Development Is Poor For One Hundred, Fair For Two Hundred, Good For Three Hundred, Very Good For Five Hundred, Excellent For One Thousand. This Survey Was Conducted From November 2015 To April 2018 From Different States Of India.

Step 2: Pilot Study

First Preliminary Study Should Be Performed Just On The Small Size Of The Target Population So That Newly Prepared Questionnaires May Be Tested And Any Changes, If Required In The Questionnaires, May Be Performed So That A Large Target Population May Get The Corrected Questionnaires. The Same Has Been Carried Out By Google Forms Online Questionnaire And Printed Questionnaires To Get The Response Of Nearly 200 Respondents.)

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Step 3: Sampling Cum Data Collection

According To Pedhazur & Pedhazur Schmelkin, (1991), In This Process Aim Is To Get A Representative Portion Which May Represent The Whole And Valid Conclusions. Therefore Undergoing The Sampling Process Carefully Is Important. According To Devellis, (2003), "There Is No Established Rule About The Size Of The Sample. Still, Two Main Recommendations Should Be Followed. First, The Sample Of Subjects Should Be Large And Second, As The Number Of Items Increases, The Number Of Respondents Should Increase Too". In This Step, Google Form Named "Questionnaire For Comparison Of Proprietary Software With Foss In The Context Of India" (From The Viewpoint Of Indian Users) Was Developed. The Same Questionnaire Was Also Taken In Printed Form To Distribute Among Users Of Both Types Of Software(S). A Request Over E-Mail Was Sent To One Thousand (1000) Participants In Different Organizations Like Software Organizations, Educational Organizations. To Increase The Number Of Responses, A Printed Questionnaire Was Sent To Probable Participants Who Had No Access To An Online Questionnaire. In Total, Nearly 2000 Invitations Were Sent For This Survey. Responses From More Than 800 Participants Were Received. The Response Rate Was Good. The Respondents Of The Online Google Form Of The Questionnaire Were Selected From The Mailing Lists Of Ph.D. Scholars, Email Ids Of Participants Of Computer Conferences, Professors Of Computers, School Teachers Of Computer, Students Mostly Of Computer Branches. Spic India (The Society For Promotion Of It In Chandigarh) Dept. From It Park Chandigarh Provided A List Of Teachers Who Has Experience With Bharat Operating System Solution In Computer Laboratories Of Schools Provided By Cdac Mohali. The Author Traveled So Many Computer Institutes To Get The Printed Questionnaires Filled By Computer Staff And The Students. The Author Has Also Joined The Whatsapp Group Of Boss Users Of All Over India Named "Bharat Operating System" And Got Filled Some Online Questionnaires From Them. The Author Is Also A Member Of Https://Groups.Google.Com/Forum/#!Forum/Boss-Support. Here One Can Easily Consult Regarding Any Query.

Phase 3: Analyzing Statistically And Getting Statistical Evidence Of Construct

This Part Comprises Of Steps: Assessment Of Dimensions, Assessment Of Reliability, And Validity.

Step 1: Assessment Of Dimensions

According To Netemeyer Et Al., (2003), Dimensions Represents Items' Homogeneity. It Is Equal To The Number Of Common Factors That Account For The Correlation Among Items. According To Haynes Et. Al., Specifying Dimensions Of The New Construct Is Important. An Item Can Have One Or More Dimensions, Either The Item Has One Factor Or Many I.E. Multidimensional. Dimensionality Is Predicted Using Factor Analysis. It Is Executed In The Initial Stage Of Scale Development. In Factor Analysis, The Loadings Of Items On Factors Are Examined [7]. According To Clark & Watson,(1995), Items With A High Value Of Loading Should Be Retained. According To Hair, Et Al., (2010) Factor Loadings Should Be Statistically Significant And Standardized Loadings Should Be Above 0.50 [8]. The K-M-O Sampling- Adequacy Measure Represents The Proportion Of Variance In The Variables That Are Generated By The Factors. The Values Nearer 1.0 Represent That Factor Analysis Will Be Usable With Given Data. When Value < 0.5; The Factor-Analysis Will Not Be Of Any Use. [9] Kaiser Put The Following Values On The Results <.5 Unacceptable.,.5 - .59 Miserable, .6 - .69 Mediocre.,.7 - .79 Middling ,.8 - .89 Meritorious, .90 - 1 Marvelous". Therefore >0.7 Is Enough [10].

Step: 2. Assessment Of Reliability, And Validity

Value Of Cronbach's-Alpha The Coefficient For Testing Reliability Computed Equal To 0.6. It Is Within The Acceptable Range From 0.6 To 0.7 For Reliability [11]. Reliability Is Used For Confirmation Of The Questionnaires-Validation. For Reliability Of Questionnaires- Consistency; The Values Of Cronbach-Alpha-Coefficient More Than 0.7 Are Considered Good. A Questionnaire Is A Self-Administered Tool. This Scale Includes Items On Positive And Negative Experiences Related To Feedback And Consists Of

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Questions 1 To 17 To Select One Option Out Of Two I.E. Proprietary Software(S) Or Foss. These Questions Contain The Quality Of Software And The Respondent Has To Answer Whether That Mentioned Quality Is Good In Proprietary Software Or The Foss. Questions 18 And 19 Were Not Considered Of Importance For Further Exploration. Q 20 Has 9 Parts Which Are Related To The Problems Faced By Users During Software Use. Q 21 And 22 Were Again Omitted. Question No. 23 Has 14 Parts Which Are Good Factors Of Foss. Q No 24 With 9 Parts Was Related To The Concerns Of Users Regarding The Software. The Q 25 And Q26 Were Also Not Considered Of Different Importance Which Could Bring Some Additional Results, So Were Omitted. Q 27 Was Having Regarding The Sources Of Software With 9 Parts. Q 28 Was Again Related To The Problems Faced By The Users. Q 29 With 9 Parts Was Related To Sources Of Software. Q 30 With Eight Options Was Related To The Problems Faced By Users. Q 31 With 5 Options Was Regarding Sources Of Software Help Available. Q 33 With 5 Parts Was Related To The Problems Of Users. As A Whole, All The Questions Were Divided Into Main 4 Broad Categories 1. General Questions For A Choice Of Respondents: Q. 1 To 17, 2. Good Factors And Concerns Of Users Of The Software: Q 23 And Q 24, 3. Problems Faced By Software Users: Q 20,28,30,33 And 4. Sources And Access To Software To Users: Q 27, 29, 31. Out Of A Total Of 816 Participants, A Total Of Nearly 150 Participants From These Organizations Completed The Online Questionnaire And Nearly 670 Participants Filled Offline Printed Questionnaires.
Kmo Test (For Sampling Adequacy), Factor Analysis (To Get The Most Important/ Contributing Factors Or Parameters), Cronbach-Alpha Coefficient-Test And Cross-Validation Test-Retest For Reliability And Validity, Descriptive Frequency Tests, One-Sample T-Tests (To Analyze The Data Especially Regarding Factors/Parameters Found From Factor Analysis) Has Been Performed For Comparison Of Foss And Proprietary Software(S).
All Are Discussed Here Minutely.

3. Statistical Examination Using Spss 26 From Data Collected Through Questionnaires:
Spss: The Abbreviation Of Spss Is The Statistical Package For Social Science. This Software Runs On Windows. It Is Used To Carry Out An Analysis. This Software Automatically Creates Tables And Graphs. Spss Takes Data From Files Created In Various Types Of Software Packages. It Performs Complex Statistical Analyses. Spss Is Used In The Business World And Analysis Work In Research Problems Of Various Types Of Disciplines. Spss Is A Popular Statistical Package. It Performs Data Manipulation And Analysis With Simple Instructions [12].

As A Whole, All The Questions Of The Questionnaire Were Divided Into Main 4 Broad Categories **1. General Questions For A Choice Of The Respondent, This Includes Items On Positive And Negative Experiences Related To Feedback And Comprise Of Q. 1 To 17. Following Is The Statistical Processing Of Users' Responses To These Questions:**

Table 1: K-M-O And Bartlett-Test[a]

K-M-O Measure Of Sampling Adequacy.		.842
Bartlett-Test Of Sphericity	Approx. Chi-Square	888.195
	Df	120
	Sig.	.000"

(Where Df: Degree Of Freedom)
The Sampling-Adequacy Measure K-M-O And Bartlett-Test Were Used To Examine The Appropriateness Of Factor Analysis.:

As Shown In Table 1; K-M-O.842 > 0.6, It Signifies The Sample Adequacy And The Factor -Analysis Can Be Used.
Let H0 Null Hypothesis Is That There Is No Relationship Between Variables.

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The Alternative Hypothesis (H1) That There May Be A Statistically Significant Inter-Relationship Between Variables.
'Bartlett- Test Of Sphericity-Sig'=.000<0.05 Therefore Null Hypothesis H0 That There Is No Relationship Between Variables Is Rejected And The Alternative Hypothesis (H1) That There May Be The Statistically Significant Inter-Relationship Between Variables Is Accepted. (Whenever 'Bartlett-Test Of Sphericity-Sig'<0.05, In Addition To 'Kmo' Value >.6; Factor Analysis Is Considered Useful And Appropriate).
Therefore Factor Analysis Is Considered Appropriate For Data Analysis In This Case And It Was Conducted And Following Are Tables And Plot As A Result:

Table-2:Total –Variance- Explained[a]

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	6.605	41.283	41.283	6.605	41.283	41.283	3.264	20.401	20.401
2	1.331	8.317	49.600	1.331	8.317	49.600	3.100	19.373	39.774
3	1.263	7.897	57.497	1.263	7.897	57.497	2.074	12.963	52.737
4	1.137	7.104	64.601	1.137	7.104	64.601	1.898	11.864	64.601
5	.910	5.690	70.290						
6	.763	4.771	75.062						
7	.699	4.371	79.433						
8	.632	3.949	83.382						
9	.518	3.234	86.617						
10	.467	2.920	89.537						
11	.410	2.563	92.100						
12	.362	2.262	94.362						
13	.293	1.829	96.191						
14	.241	1.508	97.699						
15	.198	1.240	98.939						
16	.170	1.061	100.000						

The Rotation- Sums Of The Squared-Loading (Last Column Of Table 2) Represent The Distribution Of The Variance After The Varimax -Rotation Using Kaiser -Normalisation. The Varimax- Rotation Tries To Maximize The Variance Of Each Factor.

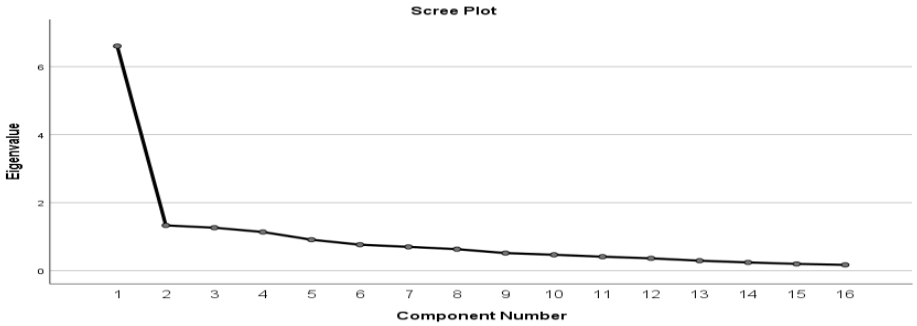

Figure 1: Scree Plot

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Table 3: Rotated- Component- Matrix[a,B]				
	Component			
	1	2	3	4
Which Category Of Software(S) Provide Us Better Local Capacity Building Opportunities	.724			
Which Software(S) Are More Secure.	.722			
Which Software Provide Us The Method To Minimize Piracy.	.682			
What Can Save Nation/Company Foreign Currency?	.661			
Which Software Provide Technological Compatibility Based On Standards.	.595			
Which Category Of Software(S) Provide Us Full Freedom To Use And Reuse		.768		
Which Software(S) Have Better Availability Of Device Drivers?		.699		
Which Software(S) Possess More Trial Ability.		.638		
Which Software(S) Provide More Good Economic Opportunity For The Local Industry.		.625		
Which Software(S) Provide Freedom To Modify And Improve.		.610		
Which Is More Costly		-.509		
Which Software(S) Have A Better Proprietary Lock-In?			.774	
Which Software(S) Are Technologically More Complex.			.674	
Which Category Of Software(S) Makes More Use Of The Reuse Of Software(S).				.825
Which Software(S) Have The Availability Of Software Stack?				.567
Which Software(S) Provide More Source Code Level Security Without Mistrust Code.				.525
It Is Very Easy To See That In Table 3: Rotated Component Matrix All The Factor Loading Values Are Greater Than 0.5, Which Are Desired.				

The Following Part Covers The Responses Of Questions Related To Good Factors And Concerns Of Users Of The Software(S), Q23 And Q24 Of The Questionnaire.

Table 4: K-M-O And Bartlett-Test[a]		
K-M-O Measure Of Sampling Adequacy.		.961
Bartlett- Test Of Sphericity	Approx. Chi-Square	5522.385
	Df	253
	Sig.	.000

As Shown In Table 4; K-M-O = .961 > 0.6, It Signifies That Sample Is Adequate

'Bartlett -Test Of Sphericity- Sig.'=.000<0.05 It Means Factor -Analysis Is Useful And Appropriate For This Data.

Therefore Factor Analysis Was Conducted And Following Are Tables And Plot As A Result:

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Table – 5:Total–Variance-Explained[a]									
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	11.187	48.640	48.640	11.187	48.640	48.640	11.187	48.637	48.637
2	1.754	7.625	56.265	1.754	7.625	56.265	1.754	7.628	56.265
3	.912	3.965	60.230						
4	.844	3.669	63.899						
5	.801	3.482	67.381						
6	.659	2.864	70.245						
7	.620	2.696	72.941						
8	.605	2.632	75.573						
9	.595	2.589	78.162						
10	.541	2.353	80.515						
11	.499	2.170	82.685						
12	.453	1.970	84.655						
13	.428	1.862	86.517						
14	.424	1.845	88.362						
15	.377	1.637	90.000						
16	.364	1.583	91.582						
17	.346	1.506	93.088						
18	.328	1.426	94.515						
19	.304	1.320	95.835						
20	.282	1.227	97.062						
21	.243	1.055	98.117						
22	.225	.979	99.096						
23	.208	.904	100.000						

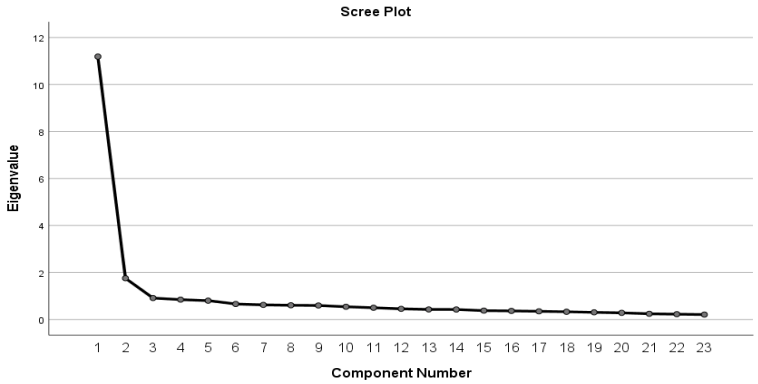

Figure 2: Scree Plot

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As Shown In Table 5: Total–Variance-Explained[a] And Figure 2: Scree-Plot; Two Factors Have Initial Eigen Value >1 (Which Is Desired),.

Table-6: Rotated-Component-Matrix[a,B]		
	Component	
	1	**2**
What Is Your Concern Regarding Foss Licensing Policies Of Big Software Companies 7. Are You In Favor Of Foss Adoption Rules	.832	
Factors Which Are Good In Foss For Adoption Are 11. Better Interoperability With Other Products Due To Open Standards	.818	
Factors Which Are Good In Foss For Adoption Are 10. Less Reliance On The Particular Vendor	.817	
Factors Which Are Good In Foss For Adoption Are 9. Better Performance With Bug Fixes And Support	.814	
Factors Which Are Good In Foss For Adoption Are 8. Lower Hardware Costs For Foss	.804	
Factors That Are Good In Foss For Adoption Are 13. Oss Applications May Be Already Integrated Into Oss Server	.801	
Factors Which Are Good In Foss For Adoption Are 12. Savings Of Installation, Integration, And Customization Cost Of The Company	.789	
What Is Your Concern Regarding Foss Licensing Policies Of Big Software Companies 6. Are You Aware Of Rules For Foss Adoption	.776	
Factors Which Are Good In Foss For Adoption Are 7. Better Functionality	.754	
What Is Your Concern Regarding Foss Licensing Policies Of Big Software Companies 8. Is Foss Adoption Good In Today's Competitive Sw Market	.747	
Factors Which Are Good In Foss For Adoption Are 4. Better Price To Performance Ratio	.743	
Factors Which Are Good In Foss For Adoption Are 6. Better Protection Against Unauthorized Access	.733	
Factors That Are Good Foss For Adoption Are 2. Foss Maintenance Is Less Costly Than Proprietary Sw	.703	
What Is Your Concern Regarding Foss Licensing Policies Of Big Software Companies 2. Interoperability	.695	
What Is Your Concern Regarding Foss Licensing Policies Of Big Software Companies 5. Skilled Personnel In Foss	.692	
Factors Which Are Good In Foss For Adoption Are 5. Better Stability	.690	
What Is Your Concern Regarding Foss Licensing Policies Of Big Software Companies 3. Maintenance And Support For Troubleshooting	.673	
What Is Your Concern Regarding Foss Licensing Policies Of Big Software Companies 4. Modification In Source Code	.651	
Factors That Are Good In Foss For Adoption Are 1. Easy To Find Foss For Specific Requirement	.622	
What Is Your Concern Regarding Foss Licensing Policies Of Big Software Companies 1. Complex And Costly	.536	
Factors That Are Good In Foss For Adoption Are 3. Foss Is Superior In Quality Than Proprietary- Software	.532	
What Is Your Concern Regarding Foss Licensing Policies Of Big Software Companies 9. None		.928
Factors Which Are Good In Foss For Adoption Are 14. None		.924

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It Is Very Easy To See That In Table 6: All The Factor Loading Values Are Greater Than 0.5, Which Are Desired.

Table-7: Descriptive-Statistics For Which Category Of Software(S) Provide Us Better Local Capacity Building Opportunities

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Proprietary Software	287	35.2	35.2	35.2
	Foss	528	64.7	64.8	100.0
	Total	815	99.9	100.0	
Missing	System	1	.1		
Total		816	100.0		

Table-8: One-Sample–Statistics

	N	Mean	Std. Deviation	Std. Error Mean
Which Category Of Software(S) Provide Us Better Local Capacity Building Opportunities	815	1.65	.478	.017

Table-9: One-Sample-Test

	Test Value = 408					
	T	Df	Sig. (2-Tailed)	Mean Difference	95% Confidence Interval Of The Difference	
					Lower	Upper
Which Category Of Software(S) Provide Us Better Local Capacity Building Opportunities	-24272.497	814	.000	-406.352	-406.39	-406.32

Analysis Of Statistical Output Tables:

Assume H0: Null Hypothesis Is That Users Believe That The Software Of The Two Categories Provides Equal Local Capacity Building Opportunities Or There Is No Difference Between The Local Capacity Building Opportunities Provided By Two Categories Of Software.

H1: Alternative Hypothesis: Local Capacity-Building Opportunities Provided By Two Categories Of Software Are Different. It Means That One Category Of Software(S) Provides More Local Capacity-Building Opportunities Than The Other.

Table7 Displays Descriptive Statistics Providing Insight Into The Pattern Of Data. It Is Easy To See That The Mean Of The Number Of Users Who Believe That Proprietary Software(S) Provides Local Capacity

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Building Opportunities Is 287 And The Number Of Users Who Believe That Foss Provides Local Capacity Building Opportunities Is 528. The Figures Clearly Show That A Large Number Of Users Feel That Foss Provides More Local Capacity Building Opportunities Than Proprietary Software(S).

One-Sample-T-Test:

Table 8 (N: Users = 815) And Table 9 Shows Output From One-Sample-T-Test. The T Value = 24272.497. This Big Value Proves That The Results Are Not A Matter Of Chance. Here T Value Is Large. It Means Results Have Not Come By Chance.

Df-Degree Of Freedom: This Value In This Case Is 814, Which Is Close To The Total Number Of Participants (816). Missing Entries Are Only 2 It Means Out Of 816, Only 2 Users Are Not Aware Of Local Capacity Building Opportunities Of Two Types Of Software.

Sig. (2-Tailed) : This Significance-Level Or P-Value = .000 < .05, This Value Is Low, Very Less Than .05 It Represents That The Null-Hypothesis That Two Types Of Software(S) Provide Equal Local Capacity Building Opportunities Is Automatically Rejected And The Alternative- Hypothesis Is Proved. The Users Have The Opinion That Local Capacity Building Opportunities Of One Software Category Are More Than That Of The Other. This Is More For The Foss Category Than Proprietary-Software(S), As Is Clearly Visible From Descriptive-Frequency-Table.

Table -10: Descriptive- Statistics For Which Software(S) Are More Secure.

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Proprietary Software	434	53.2	53.6	53.6
	Foss	376	46.1	46.4	100.0
	Total	810	99.3	100.0	
Missing	-99	5	.6		
	System	1	.1		
	Total	6	.7		
Total		816	100.0		

Table-11:One-Sample –Statistics

	N	Mean	Std. Deviation	Std. Error Mean
Which Software(S) Are More Secure.	810	1.46	.499	.018

Table 12:One-Sample –Test

	Test Value = 408					
	T	Df	Sig. (2-Tailed)	Mean Difference	95% Confidence Interval Of The Difference	
					Lower	Upper
Which Software(S) Are More Secure.	-23185.651	809	.000	-406.536	-406.57	-406.50

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Analysis Of Statistical Output Tables:

Assume H0: The Null Hypothesis Is That Users Believe That The Software Of The Two Categories Is Equally Secure Or There Is No Difference Between The Security Provided By Two Categories Of Software(S).

H1: Alternative Hypothesis: Two Categories Of Software Are Not Equally Secure. It Means One Category Of Software(S) Is More Secure Than The Other.

Table 10 Displays Descriptive Statistics Providing Insight Into The Pattern Of Data. It Is Easy To See That The Number Of Users Who Believe That Proprietary Software Is More Secure Is 434 And The Number Of Users Who Believe That Foss Is More Secure Is 376. The Figures Clearly Show That A Large Number Of Users Feel That Proprietary Software(S) Are More Secure Than Foss.

One-Sample -T-Test: Table 11 (N: Users = 810) And Table 12 Shows Output From One-Sample- T-Test. The T Value = 23185.651. This Big Value Proves That The Results Are Not A Matter Of Chance. Here T Value Is Large. It Means Results Have Not Come By Chance.

Df-Degree Of Freedom: This Value In This Case Is 810, Which Is Close To The Total Number Of Participants (816). Missing Entries Are Only 6 It Means Out Of 816, Only 6 Users Are Not Aware Regarding Which Of Two Types Of Software Is More Secure.

Sig. (2- Tailed): This Significance-Level Or P-Value = .000 < .05, This Value Is Low, Very Less Than .05. It Represents That The Null -Hypothesis That Two Types Of Software Are Equally Secure Is Automatically Rejected And The Alternative-Hypothesis Is Proved. A Significantly More Number Of Users Have The Opinion That Proprietary Software(S) Are More Secure Than Foss, As Is Clearly Visible From Descriptive Frequency Table.

Table 13: Descriptive-Statistics For Which Software(S) Provide Us The Method To Minimize Piracy.

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Proprietary Software	402	49.3	49.8	49.8
	Foss	405	49.6	50.2	100.0
	Total	807	98.9	100.0	
Missing	-99	6	.7		
	System	3	.4		
	Total	9	1.1		
Total		816	100.0		

Table 14: One-Sample-Statistics

	N	Mean	Std. Deviation	Std. Error Mean
Which Software Provide Us The Method To Minimize Piracy.	807	1.50	.500	.018

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Table 15: One-Sample-Test						
	Test Value = 408					
	T	Df	Sig. (2-Tailed)	Mean Difference	95% Confidence Interval Of The Difference	
					Lower	Upper
Which Software(S) Provide Us The Method To Minimize The Piracy.	-23081.237	806	.000	-406.498	-406.53	-406.46

Analysis Of Statistical Output Tables:

Assume H0: Null Hypothesis Is That Users Believe That The Software Of The Two Categories Provides Us The Method To Minimize Piracy Equally Or There Is No Difference Between Providing Us The Method To Minimize Piracy By Two Categories Of Software(S).

H1: Alternative Hypothesis: Two Categories Of Software Are Not Providing Us The Method To Minimize Piracy. It Means One Category Of Software(S) Is More Secure Than The Other.

Table 13 Displays Descriptive Statistics Providing Insight Into The Pattern Of Data. It Is Easy To See That The Number Of Users Who Believe That Proprietary Software(S) Provides Us The Method To Minimize The Piracy Is 402 And The Number Of Users Who Believe That Foss Provides Us The Method To Minimize Is 405. The Figures Clearly Show That More Number Of Users Feel That Foss Provides Us The Method To Minimize Piracy Than Proprietary Software.

One-Sample T-Test: Table 14 (N: Users = 807) And Table 15 Shows Output From "One Sample T-Test". The T Value = 23081.237. This Big Value Proves That The Results Are Not A Matter Of Chance. Here T Value Is Large. It Means Results Have Not Come By Chance.

Df-Degree Of Freedom: This Value In This Case Is 807, Which Is Close To The Total Number Of Participants (816). Missing Entries Are Only 9 It Means Out Of 816, Only 9 Users Are Not Aware Regarding Which Of Two Types Of Software Provide Us The Method To Minimize Piracy

Sig. (2 -Tailed): This Significance-Level Or P-Value = .000 < .05, This Value Is Low, Very Less Than .05. It Represents That The Null-Hypothesis That Two Types Of Software Are Equally Secure Is Automatically Rejected And The Alternative -Hypothesis Is Proved. The Number Of Users Who Have The Opinion That Foss Provide Us The Method To Minimize Piracy Is More Than That Of Proprietary Software(S), As Is Clearly Visible From The Descriptive Frequency Table.

Table 16: Descriptive- Statistics For What Can Save Nation/Company Foreign Currency.					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Proprietary Software	324	39.7	40.0	40.0
	Foss	486	59.6	60.0	100.0
	Total	810	99.3	100.0	
Missing	-99	1	.1		
	System	5	.6		
	Total	6	.7		
Total		816	100.0		

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Table 17:One-Sample -Statistics				
	N	**Mean**	**Std. Deviation**	**Std. Error Mean**
What Can Save Nation/Company Foreign Currency.	810	1.60	.490	.017

Table 18: One-Sample-Test						
	Test Value = 408					
	T	**Df**	**Sig. (2-Tailed)**	**Mean Difference**	**95% Confidence Interval Of The Difference**	
					Lower	**Upper**
What Can Save Nation/Company Foreign Currency.	-23595.128	809	.000	-406.400	-406.43	-406.37

Analysis Of Statistical Output Tables

Assume H0: Null Hypothesis Is That Users Believe That The Software Of The Two Categories Can Save Nation/Company Foreign Currency Equally Or There Is No Difference Between Saving Nation/Company Foreign Currency By Two Categories Of Software(S).

H1: Alternative Hypothesis: Two Categories Of Software Can Save Nation/Company Foreign Currency Equally. It Means One Category Of Software(S) Can Save Nation/Company Foreign Currency More Than The Other.

Table 16 Displays Descriptive Statistics Providing Insight Into The Pattern Of Data. It Is Easy To See That The Number Of Users Who Believe That Proprietary Software(S) Can Save Nation/Company Foreign Currency Is 324 And The Number Of Users Who Believe That Foss Can Save Nation/Company Foreign Currency Is 486. The Figures Clearly Show That Significantly More Number Of Users Feel That Foss Can Save Nation/Company Foreign Currency Than Proprietary Software.

One-Sample- T-Test:

Table 17 (N: Users = 810) And Table 18 Shows Output From One Sample- T-Test. The T Value = 23595.128. This Big Value Proves That The Results Are Not A Matter Of Chance. Here T Value Is Large. It Means Results Have Not Come By Chance.

Df-Degree Of Freedom: This Value In This Case Is 810, Which Is Close To The Total Number Of Participants (816). Missing Entries Are Only 6 It Means Out Of 816, Only 6 Users Are Not Aware Of Which Of Two Types Of Software Provide Us The Method To Minimize Piracy.

Sig. (2 -Tailed): This Significance Level Or P-Value = .000 < .05, This Value Is Low, Very Less Than .05. It Represents That The Null- Hypothesis That Two Types Of Software Are Equally Secure Is Automatically Rejected And The Alternative- Hypothesis Is Proved. A Significantly More Number Of Users Have The Opinion That Foss Foss Can Save Nation/Company Foreign Currency Than Proprietary Software, As Is Clearly Visible From The Descriptive Frequency Table.

Table 19: What Are Your Concerns About Foss Licensing Policies Of Big Software Companies 7. Are You In Favor Of Foss Adoption Rules				
	Frequency	**Percent**	**Valid Percent**	**Cumulative Percent**

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Valid	Yes	197	24.1	25.0	25.0
	No	591	72.4	75.0	100.0
	Total	788	96.6	100.0	
Missing	-99	26	3.2		
	System	2	.2		
	Total	28	3.4		
Total		816	100.0		

Table 20: One-Sample-Statistics

	N	Mean	Std. Deviation	Std. Error Mean
What Have Been Your Greatest Concerns About Foss Licensing Policies Of Big Software Companies 7. Are You In Favor Of Foss Adoption Rules	788	1.75	.433	.015

	Test Value = 408					
	T	Df	Sig. (2-Tailed)	Mean Difference	95% Confidence Interval Of The Difference	
					Lower	Upper
What Have Been Your Greatest Concerns About Foss Licensing Policies Of Big Software Companies 7. Are You In Favor Of Foss Adoption Rules	-26319.650	787	.000	-406.250	-406.28	-406.22

Analysis Of Statistical Output Tables

Assume H0: The Null Hypothesis Is That Users Are In Favor Of Foss Adoption Rules.

H1: Alternative Hypothesis: Alternative Hypothesis Is That Users Are Not In Favor Of Foss Adoption Rules.

Table 19 Displays Descriptive Statistics Providing Insight Into The Pattern Of Data. It Is Easy To See That The Number Of Users Who Are In Favor Of Foss Adoption Rules Is 197 And The Number Of Users Who Are Not In Favor Of Foss Adoption Rules Is 591.

One-Sample -T-Test:

Table 20 (N: Users = 788) And Table 21 Shows Output From One -Sample T-Test. The T Value = 26319.650. This Big Value Proves That The Results Are Not A Matter Of Chance. Our T Value Is Large. It Means Results Have Not Come By Chance.

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Df-Degree Of Freedom: This Value In This Case Is 788, Which Is Close To The Total Number Of Participants (816). Missing Entries Are Only 28 It Means Out Of 816, Only 28 Users Are Not Aware Foss Adoption Rules

Sig. (2 -Tailed): This Significance –Level Or P-Value = .000 < .05, This Value Is Low, Very Less Than .05. It Represents That The Null- Hypothesis That Two Types Of Software Are Equally Secure Is Automatically Rejected And The Alternative -Hypothesis Is Proved. The Significantly More Number Of Users Are Not In Favor Of Foss Adoption Rules, As Is Clearly Visible From Descriptive -Frequency -Table. It Means Users Do Not Want To Get Foss Adoption Imposed On Them By Govt. They Will Adopt Foss On Their Own Will. It Can Also Be Concluded That Out Of 788 Users 197 Are In Favor Of Foss Adoption Rules As They Found It Good And Other Users I.E. 591 Assume Other Factors In Place Of Factor 7 As Better Than This Factor Of Foss Adoption Rules.

Table 22: Descriptive -Statistics For Factors Which Are Good In Foss For Adoption Are 11. Better Interoperability With Other Products Due To Open Standards

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Yes	197	24.1	25.0	25.0
	No	590	72.3	75.0	100.0
	Total	787	96.4	100.0	
Missing	-99	24	2.9		
	System	5	.6		
	Total	29	3.6		
Total		816	100.0		

Table 23:One-Sample-Statistics

	N	Mean	Std. Deviation	Std. Error Mean
Factors Which Are Good In Foss For Adoption Are 11. Better Interoperability With Other Products Due To Open Standards	787	1.75	.433	.015

Table 24: One-Sample-Test

	Test Value = 408					
	T	Df	Sig. (2-Tailed)	Mean Difference	95% Confidence Interval Of The Difference	
					Lower	Upper

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Factors Which Are Good In Foss For Adoption Are 11. Better Interoperability With Other Products Due To Open Standards	-26291.817	786	.000	-406.250	-406.28	-406.22

Analysis Of Statistical Output Tables

Assume H0: The Null Hypothesis Is That Users Have The Opinion That Foss Have Better Interoperability With Other Products.
H1: Alternative Hypothesis: Alternative Hypothesis Is That Users Have The Opinion That Foss Do Not Have Better Interoperability With Other Products.
Table 22 Displays Descriptive- Statistics Providing Insight Into The Pattern Of Data. It Is Easy To See That The Number Of Users Who Believe That Foss Have Better Interoperability With Other Products Is 197 And The Number Of Users Who Believe That Foss Do Not Have Better Interoperability With Other Products Is 590. The Figures Clearly Show That Significantly More Number Of Users Feel That Foss Do Not Have Better Interoperability With Other Products

One-Sample -T-Test:
Table 23 (N: Users = 787) And Table 24 Shows Output From One- Sample T-Test. The T Value = 26291.817. This Big Value Proves That The Results Are Not A Matter Of Chance. Our T Value Is Large. It Means Results Have Not Come By Chance.
Df-Degree Of Freedom: This Value In This Case Is 787, Which Is Close To The Total Number Of Participants (816). Missing Entries Are Only 29 It Means Out Of 816, Only 29 Users Are Not Aware Regarding Interoperability With Other Products.

Sig. (2- Tailed): This Significance-Level Or P-Value = .000 < .05, This Value Is Low, Very Less Than .05. It Represents That The Null -Hypothesis That Foss Have Better Interoperability With Others Is Automatically Rejected And The Alternative- Hypothesis Is Proved. A Significantly More Number Of Users Have The Opinion That Foss Do Not Have Better Interoperability With Other Products, As Is Clearly Visible From The Descriptive -Frequency Table.
It Can Also Be Concluded That Out Of 787 Users 187 Believe That Foss Have Better Interoperability With Other Products And Other Users I.E. 591 Assume Other Factors In Place Of Factor 11 As Better Than This Factor Of Interoperability With Other Products.

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Table 25: Descriptive-Statistics For Factors Which Are Good For Foss Adoption Are 10. Less Reliance On The Particular Vendor

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Yes	184	22.5	23.323.3	23.3
	No	606	74.3	100.076.7	100.0
	Total	790	96.8	100.0	
Missing	-99	24	2.9		
	System	2	.2		
	Total	26	3.2		
Total		816	100.0		

Table 26: One-Sample-Statistics

	N	Mean	Std. Deviation	Std. Error Mean
Factors Which Are Good In Foss For Adoption Are 10. Less Reliance On The Particular Vendor	790	1.77	.423	.015

Table 27: One-Sample-Test

	Test Value = 408					
	T	Df	Sig. (2-Tailed)	Mean Difference	95% Confidence Interval Of The Difference	
					Lower	Upper
Factors Which Are Good In Foss For Adoption Are 10. Less Reliance On The Particular Vendor	-26995.755	789	.000	-406.233	-406.26	-406.20

Analysis Of Statistical Output Tables

Assume H0: The Null Hypothesis Is That Users Have The Opinion That Foss Have Less Reliance On A Particular Vendor.

H1: Alternative Hypothesis: Alternative Hypothesis Is That Users Have The Opinion That Foss Do Not Have Less Reliance On A Particular Vendor.

Table 25 Displays Descriptive Statistics Providing Insight Into The Pattern Of Data. It Is Easy To See That The Number Of Users Who Believe That Foss Have Less Reliance On A Particular Vendor Is 184 And The Number Of Users Who Believe That Foss Do Not Have Less Reliance On A Particular Vendor Is 606. The Figures Clearly Show That Significantly More Number Of Users Feel That Foss Do Not Have Less Reliance On A Particular Vendor.

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One-Sample T-Test: Table 26 (N: Users = 790) And Table 27 Shows Output From One Sample T-Test. The T Value = 26995.755. This Big Value Proves That The Results Are Not A Matter Of Chance. Our T Value Is Large. It Means Results Have Not Come By Chance.
Df-Degree Of Freedom: This Value In This Case Is 789, Which Is Close To The Total Number Of Participants (816). Missing Entries Are Only 26 It Means Out Of 816, Only 26 Users Are Not Aware Regarding Reliance On A Particular Vendor. Actually, It Seems That Most Of The Users Are Not Well Aware Of This Feature Of Foss.
Sig. (2-Tailed): This Significance-Level Or P-Value = .000 < .05, This Value Is Low, Very Less Than.05. It Represents That The Null-Hypothesis That Foss Have Less Reliance On A Particular Vendor Is Automatically Rejected And The Alternative–Hypothesis Proved. The Significantly More Number Of Users Have The Opinion That Foss Do Not Have Less Reliance On A Particular Vendor., As Is Clearly Visible From The Descriptive Frequency Table.
It Can Also Be Concluded That Out Of 789 Users 184 Believe That Foss Have Less Reliance On The Particular Vendor And Other Users I.E. 606 Assume Other Factors In Place Of Factor 10 Are Better Than This Factor Of Less Reliance On The Particular Vendor.

4. Conclusions Drawn From Analysis Of Statistical Output Tables

1. A Significant Number Of Users Have The Opinion That Foss Can Save Nation/Company Foreign Currency In Comparison To Proprietary Software(S). This Means That If Foss Is Adopted In India. Then Much Of Indian Currency Will Be Saved Which Can Be Utilized In Various Development Projects For The Welfare Of The Public. Our Country Remains In Financial Crunch And Finances Saved By Adopting Foss Can Be Much Helpful In Such A Scenario.
2. The Security Of Foss Should Be Increased By The Development Communities So That Users May Realize The Same.
3. A Large Number Of Users Have The Opinion That Is Foss Provide Us The Method To Minimize Piracy More Than That From Proprietary Software(S).
4. The Significantly More Number Of Users Are Not In Favor Of Foss Adoption Rules. It Means Users Do Not Want To Get Foss Adoption Imposed On Them By Govt. They Will Adopt Foss On Their Own Will.
5. More Number Of Users Have The Opinion That Foss Do Not Have Better Interoperability With Other Products.
6. A Significantly More Number Of Users Have The Opinion That Foss Do Not Have Less Reliance On A Particular Vendor. It Can Also Be Concluded That More Users Assume Other Factors Good For Foss Adoption In Place Of This Factor Of Less Reliance On The Particular Vendor.

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