

1. ANNEX V: Survey Analysis



Survey Report

Aim:

Carrying out an (on-line) quantitative survey study to reveal the current status and a composite view of F/OSS in the target countries, which include countries with a partner in the project.

Factors:

Following factors on F/OSS adoption at public administration is examined.

1. F/OSS product quality. Respondents are asked to scale the importance of F/OSS end product quality in terms of user interface, usability, learnability and effectiveness (Q1).
2. Availability of customer support and qualified experts, and documentation (Q2, Q3).
3. Vendor lock-in due to previously signed contracts (Q6).
4. Importance of ability to anticipate TCO prior to any software provision (Q9).
5. General attitude about F/OSS (Q10, Q11)
6. Financial affordability of employee training to improve their IT skills (Q12).
7. Importance of political decisions on the choice software acquisition (Q14).
8. Loss of productivity of employees on any migration(Q13).
9. Signed contract(Q4)
10. overall experience(Q7).

Questionnaire:

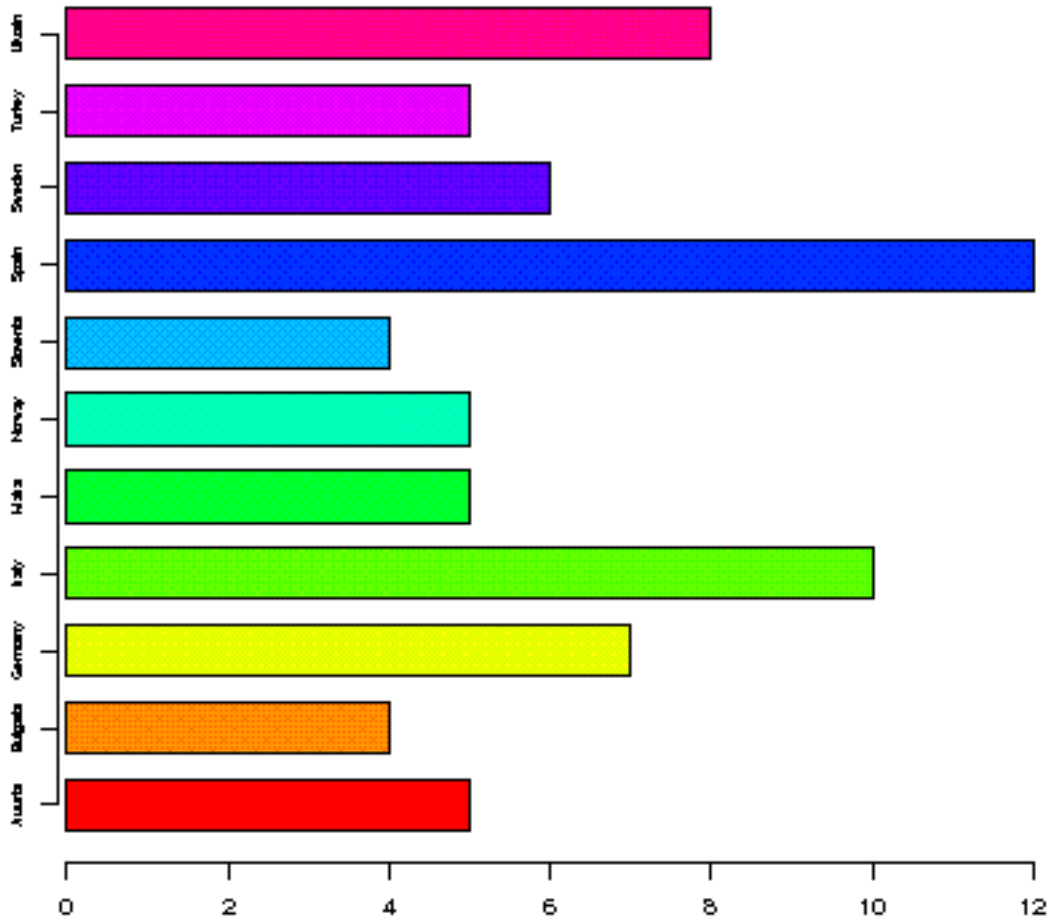


Fig 1: Coverage of Survey

The nature of samples, how it is collected, who are respondents, their role, etc give the nature of sampling emphasize its randomness,...

Why these questions are particularly put forward, how it is developed, previous study, relation,

structure: factual items, categorical items, views, attitudes, experience...

How it is conducted, email, records, check, response rate, valid number of questions.

Distribution of questionnaire by country (bar plot)

Category:

Pie charts.

F/OSS Project Participation:

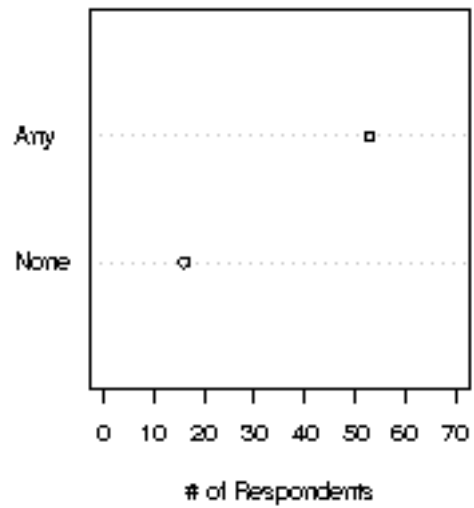
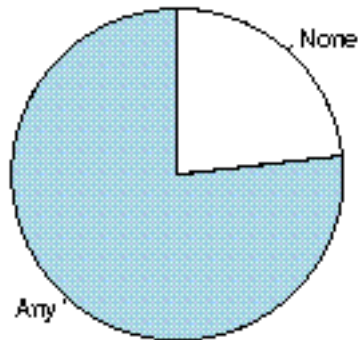
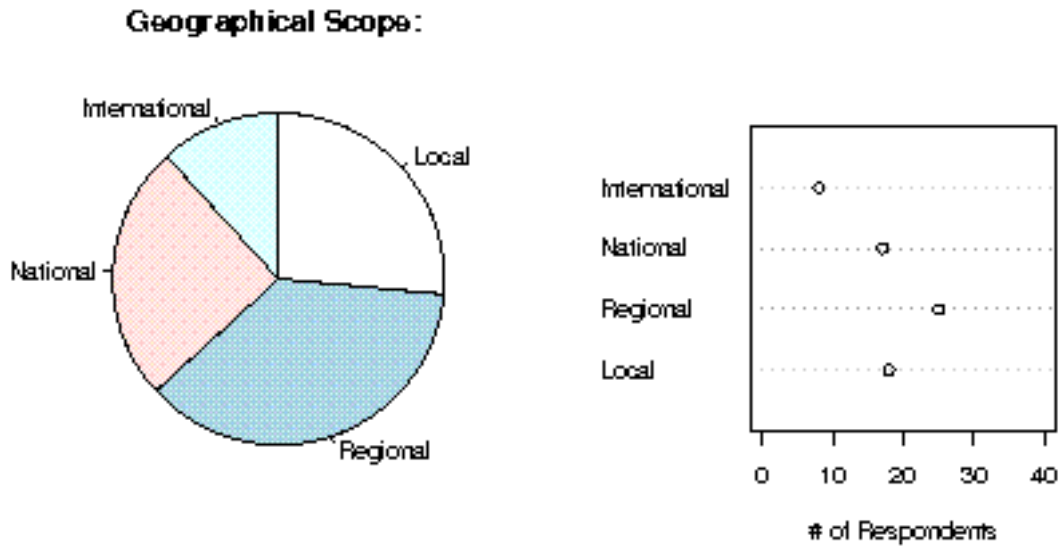
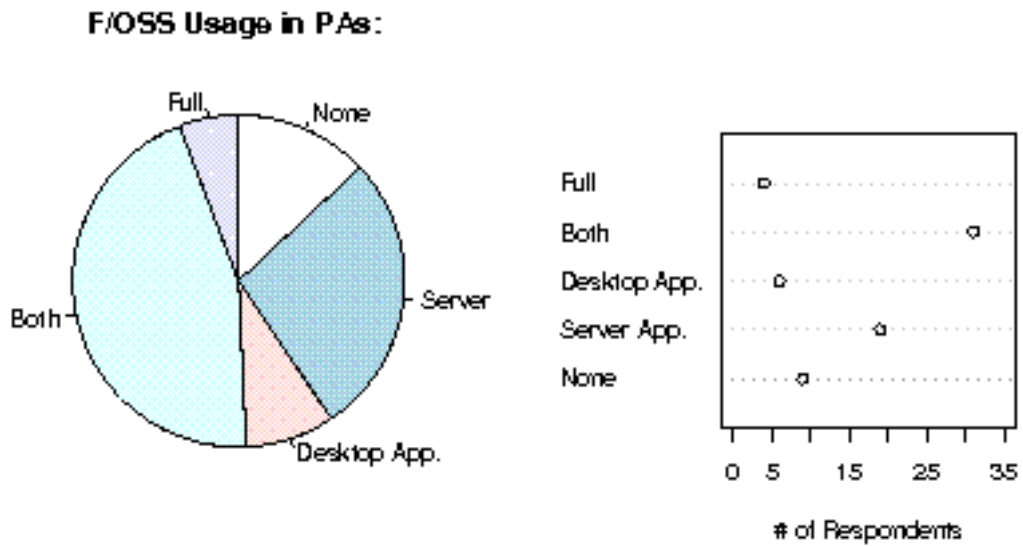


Fig 2: F/OSS project participation of respondents



Item by item analysis:

Fig 3: Geographical scope of respondents' activities



- a. summary table of mean, median, standard deviations,
- b. item by item: barplot if lykert scale item + statistical summary
- c. pieplot if yes-no (put percentage info on the pie and do not include within the summary table)

Order: Q1-Q3 (quality, service, etc); Q13, Q12, Q9 (migration, TCO); Q10, Q11(attitudes); Q14(political influence)Q6, Q7; Q4(contract);

Fig. 4: F/OSS usage at public institutes of respondent PAs

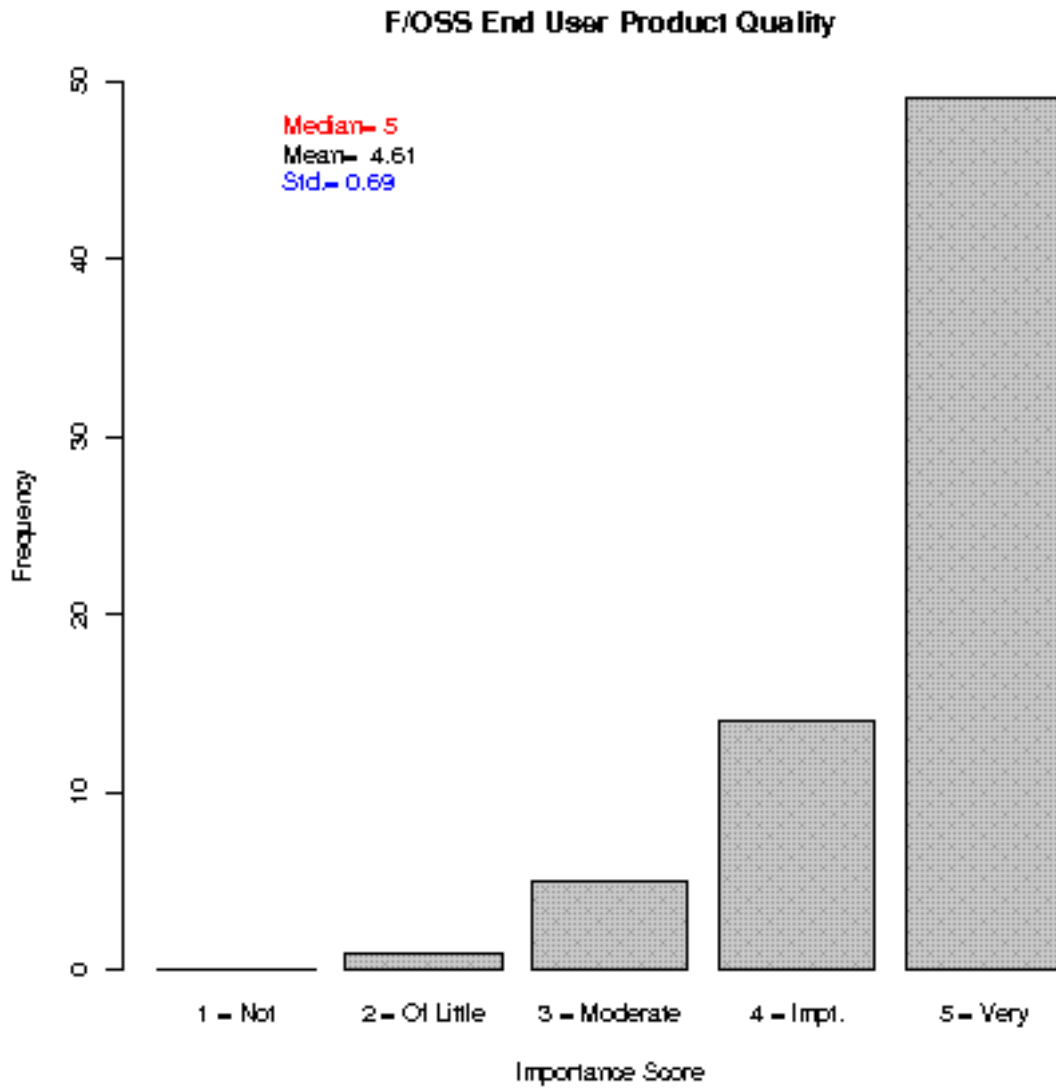


Fig 5: F/OSS end user product quality

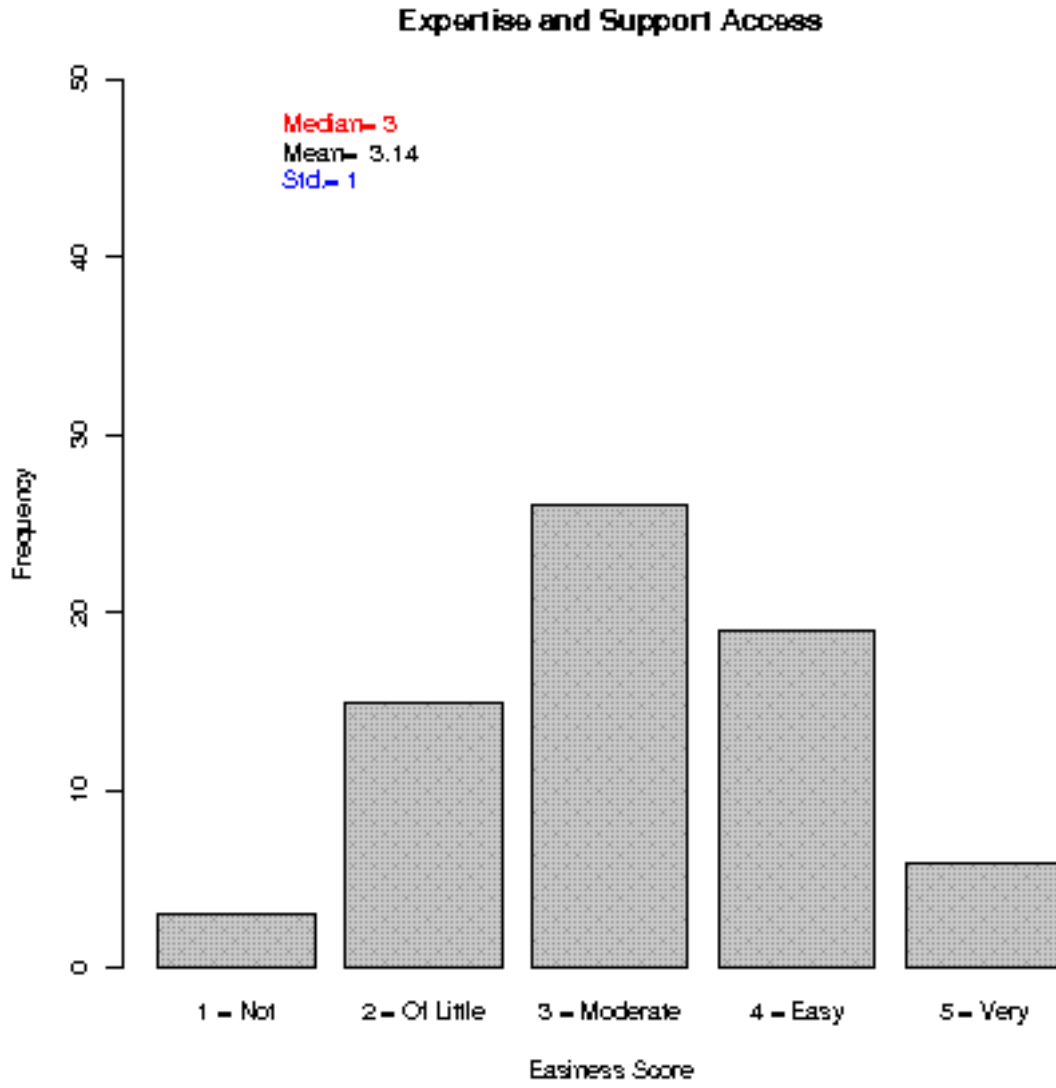


Fig. 6: Customer Support and reachability of experts

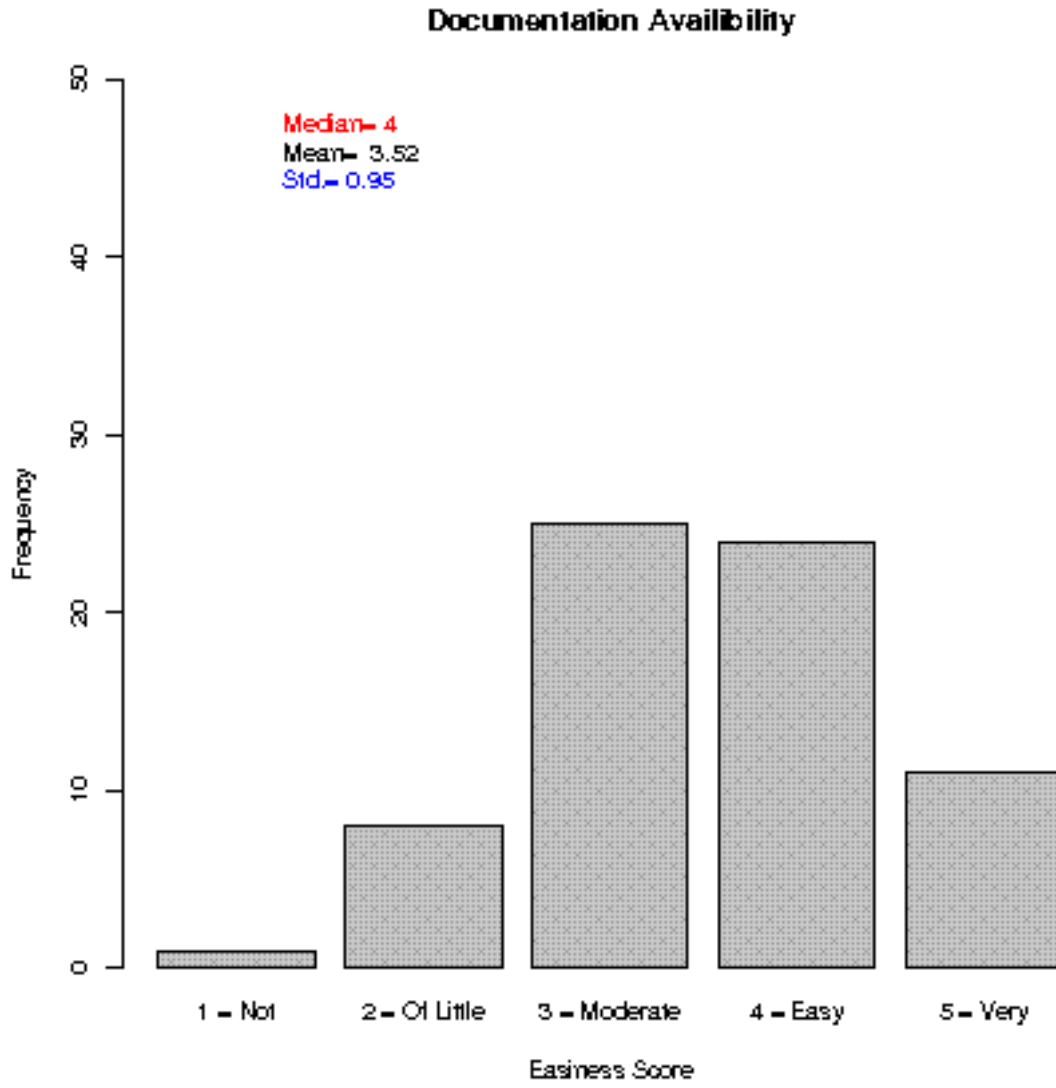


Fig. 7: Availability of F/OSS product documentation.

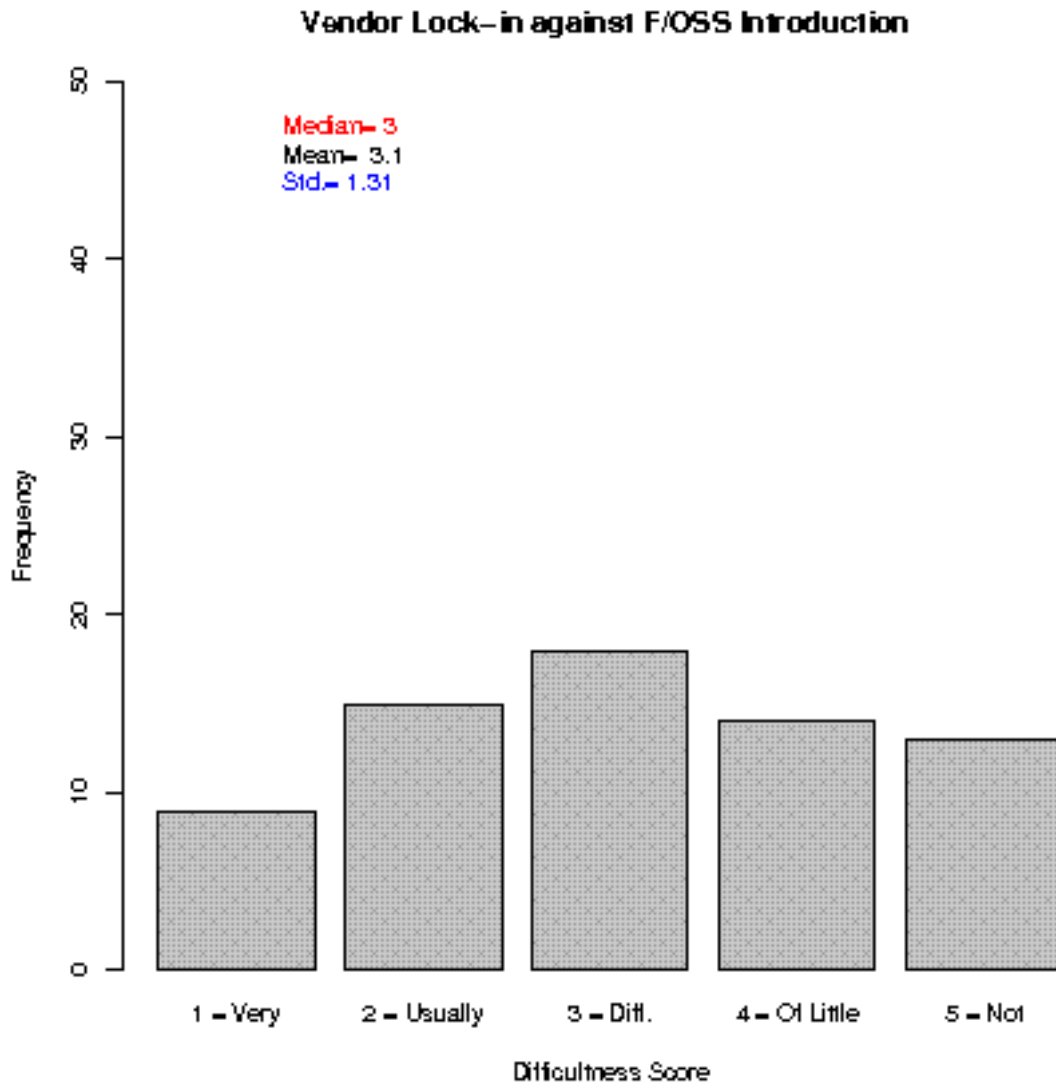


Fig. 8: Vendor lock-in due to previous proprietary contracts.

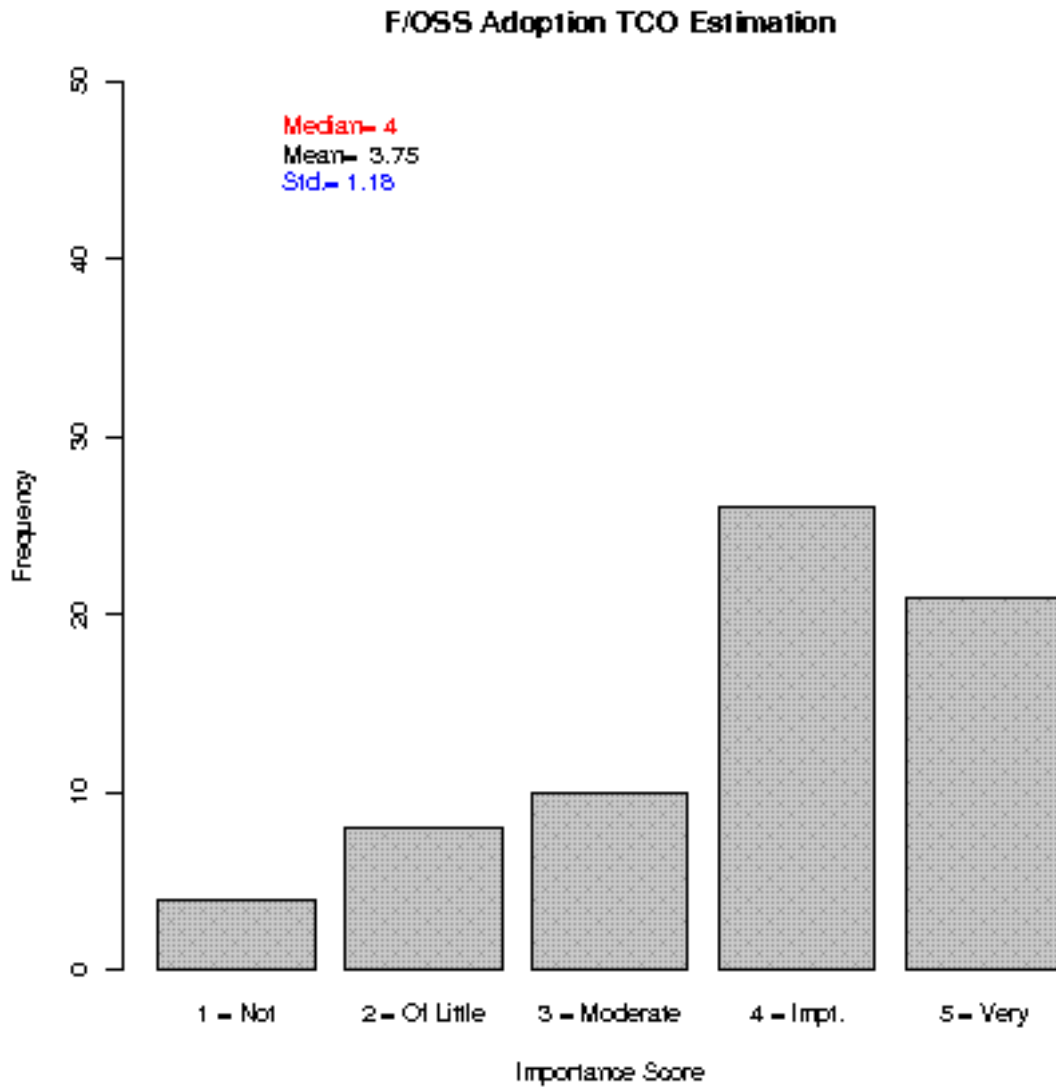


Fig. 9: Importance of ability to estimate TCO before any software procurement process.

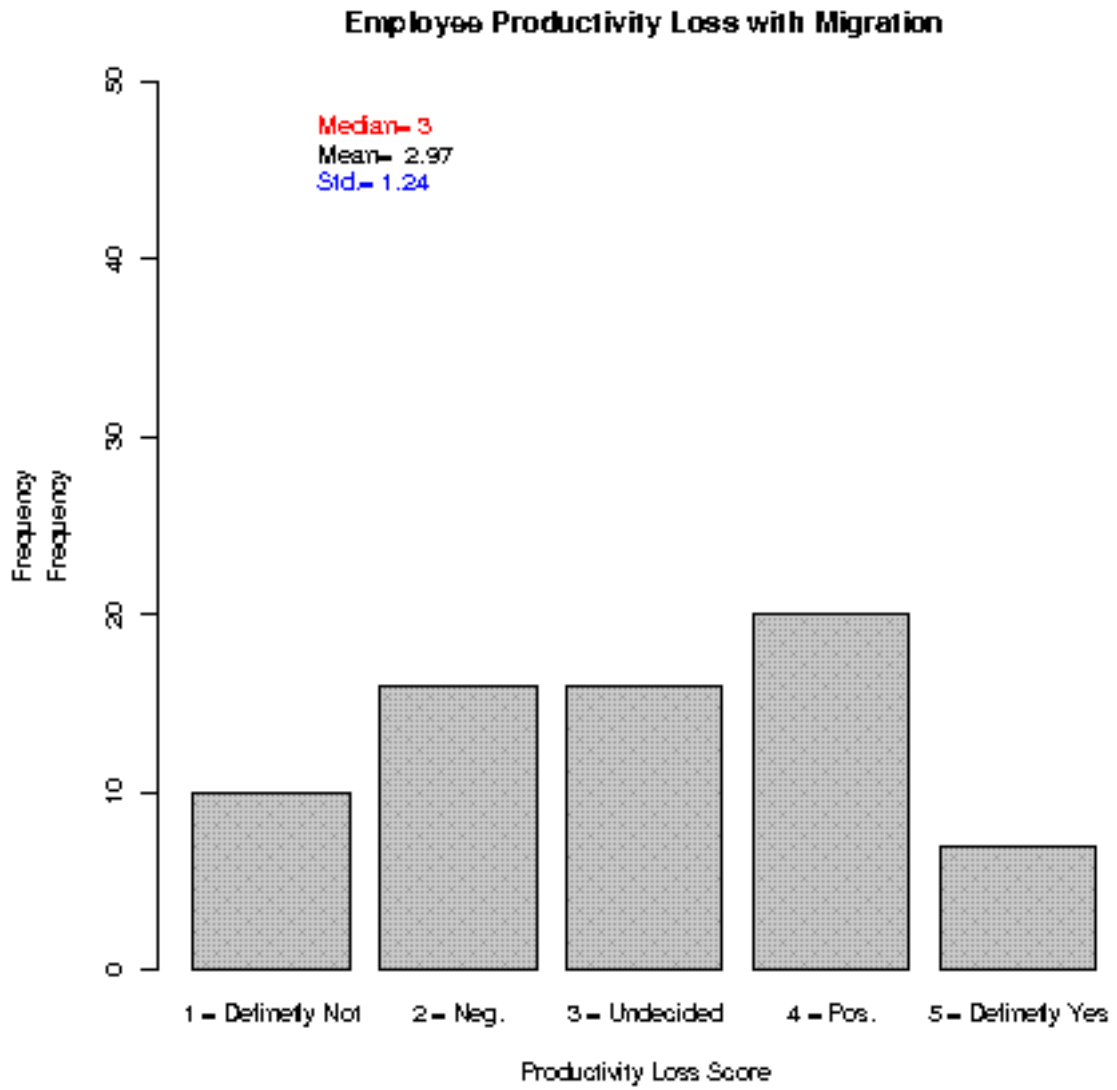


Fig.10: Migration cost in terms of employee productivity

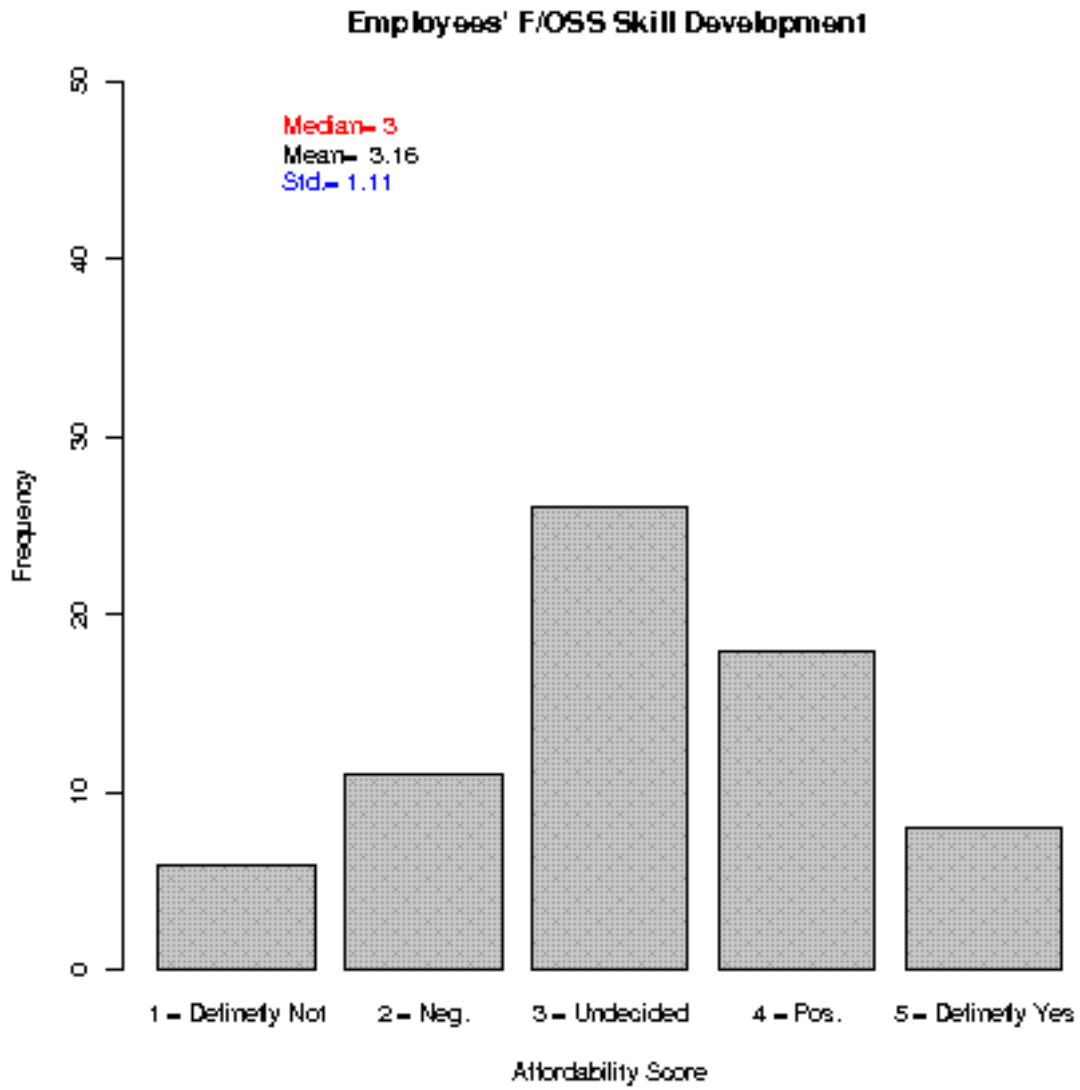


Fig.11: Financial ability to train employees'

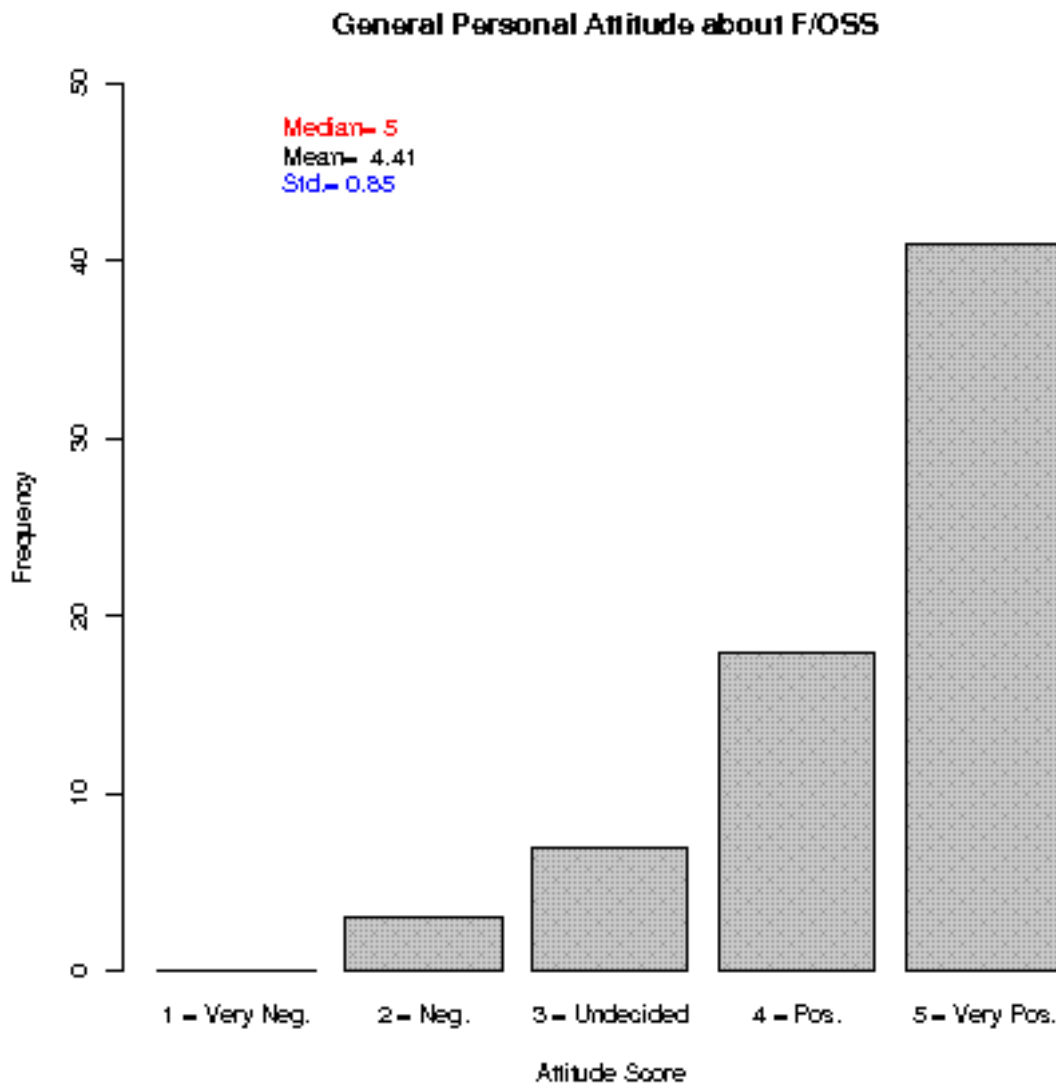


Fig. 12: Personal Attitude

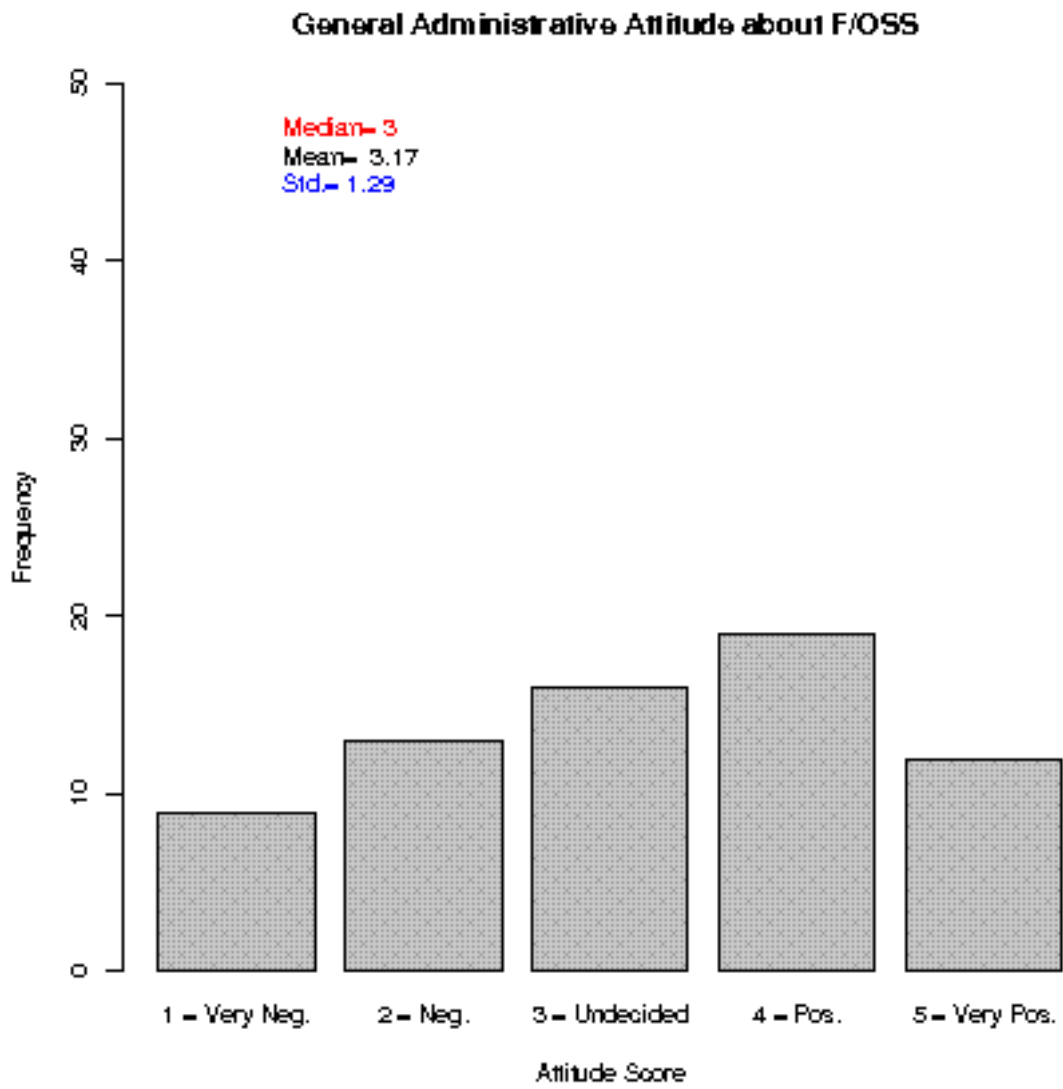


Fig 13: Administrative Attitude

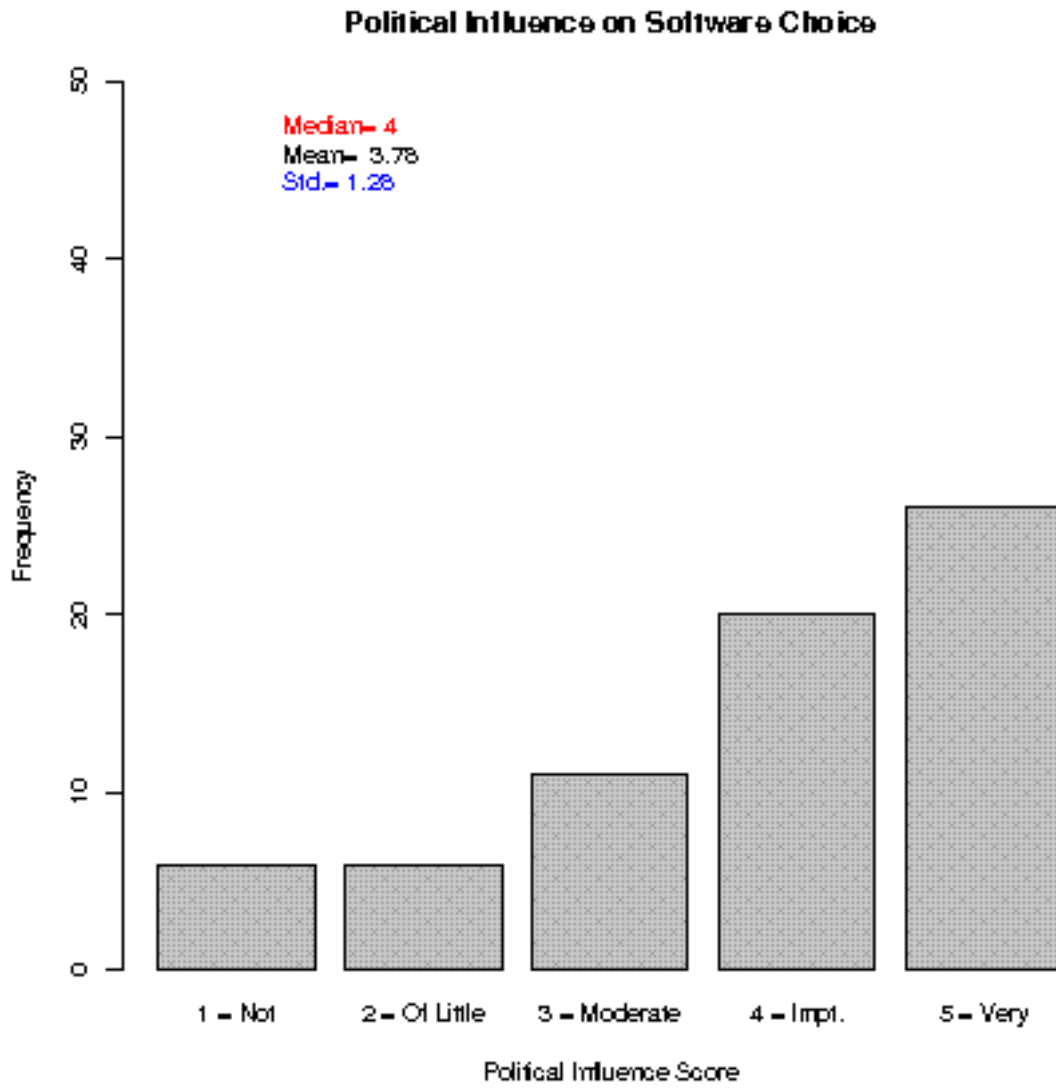


Fig. 14: Political Influence

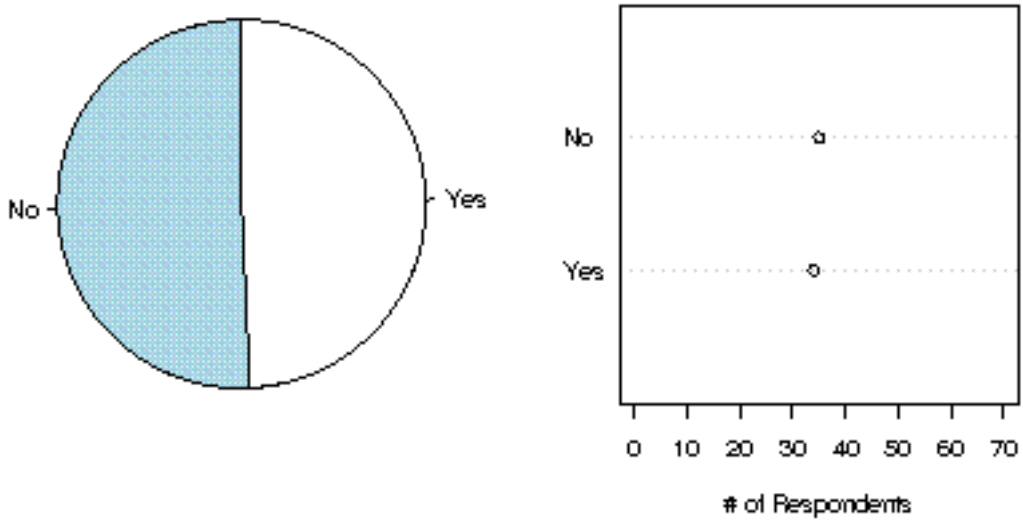
Course of Inferential Analysis:

Research Question:

A. Survey

The questionnaire includes questions some of which focus on the opinions of Public administrators other aims to collect some factual information regarding

Any Contract on F/OSS Provision:



F/OSS adoption within public bodies. The survey questions are given by Appendix 1.

Fig 15: F/OSS Contracts

A prior knowledge on F/OSS experience of administrators is not factor in selection of respondents for the interviews.

Responses to a set of attitude statements are generally categorized from a) 'strongly agree' to 'strongly disagree': Q13 b) 'not important' to 'very

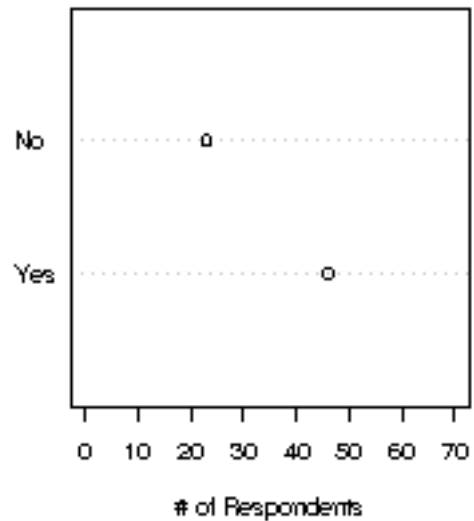
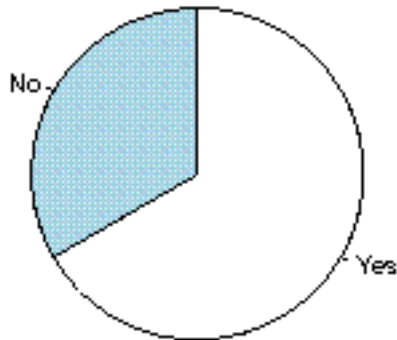
important'Q1, c) 'not easy' to 'very easy': Q2, Q3 or 'very difficult' to 'not difficult'
Q6 d) 'not important' to 'very important' Q9, Q14 d) 'very negative' to positive'
Q10, Q11

These categories has been ordered from 0 to 4 using the five-point Likert Scale. However during the analyses each point is numerically shifted to the conventional range, that is from 1 to 5. Since we have treated responses as ordinal data such a manipulation is valid. Considering the fact that Likert scaling is a bipolar scaling method, measuring either positive and negative response to the statements given on the questionnaire, our design of 0 to 4 scaling might have served as a pseudo forced choice method where the effect of middle option of "Neither agree nor disagree" has been diminished.

Facts: Yes/No: Contract Q4, Bad experience reported Q7; Classification:
Geographic scope, Type of products, Participation Level.

Fig 16: Overall F/OSS adoption experience

Any F/OSS Bad Experience at PAs



Analyses:

- a) Description (Facts) 1) contract-experience relation Q4-Q7
- 2) Type of products and contract relation

b) Pie charts of Q18,17,16

c)

Based on the observed facts and opinions we want to discuss the mutual relationship between F/OSS adoption, its awareness and opinions of administrators on F/OSS. Thus we have looked into relationship... bla bal... The R2 and t-distribution of given sample indicates that statistically The conclusions we derive hereby are NOT tentative answers to that particular relationship but it

indicates that the relationship found in that sample can be expected to also exist in whole European F/OSS adoption attitudes.

--Correlation in between bad experiance with introduction of F/OSS and TCO

-- Use box plots for individual items

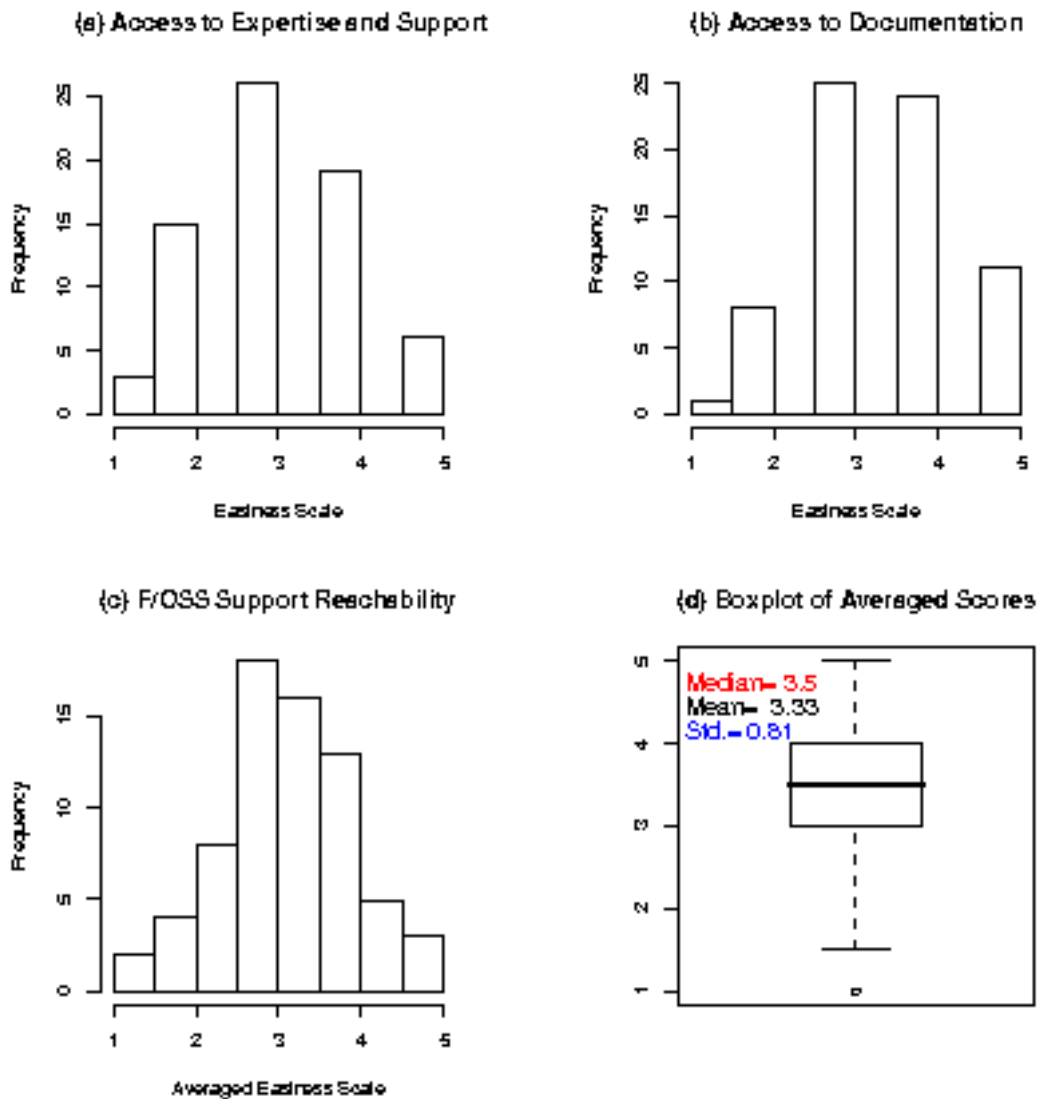


Fig 17: F/OSS Support Reachability

-- Spearman's rho statistic is used to estimate a rank-based measure of association. We see that there is some correlation between the two rankings but the correlation is far from perfect.

-- We have applied Chi-square test to check whether there is a relationship between having or not having signed a contract and general administrative attitude towards F/OSS adoption. The test $p = 0.03$ suggests that there is a statistically significant relationship. We have also estimated the strength of that relationship by the statistical measure Cramer's phi.

In other words, we checked what portion of the total attitude in the sample data can be explained by having signed a F/OSS contract. For Table 1, $r^2 = 0.154$, so approximately 15% of the total F/OSS attitude is explained/predicted by having signed or not signed F/OSS contract.

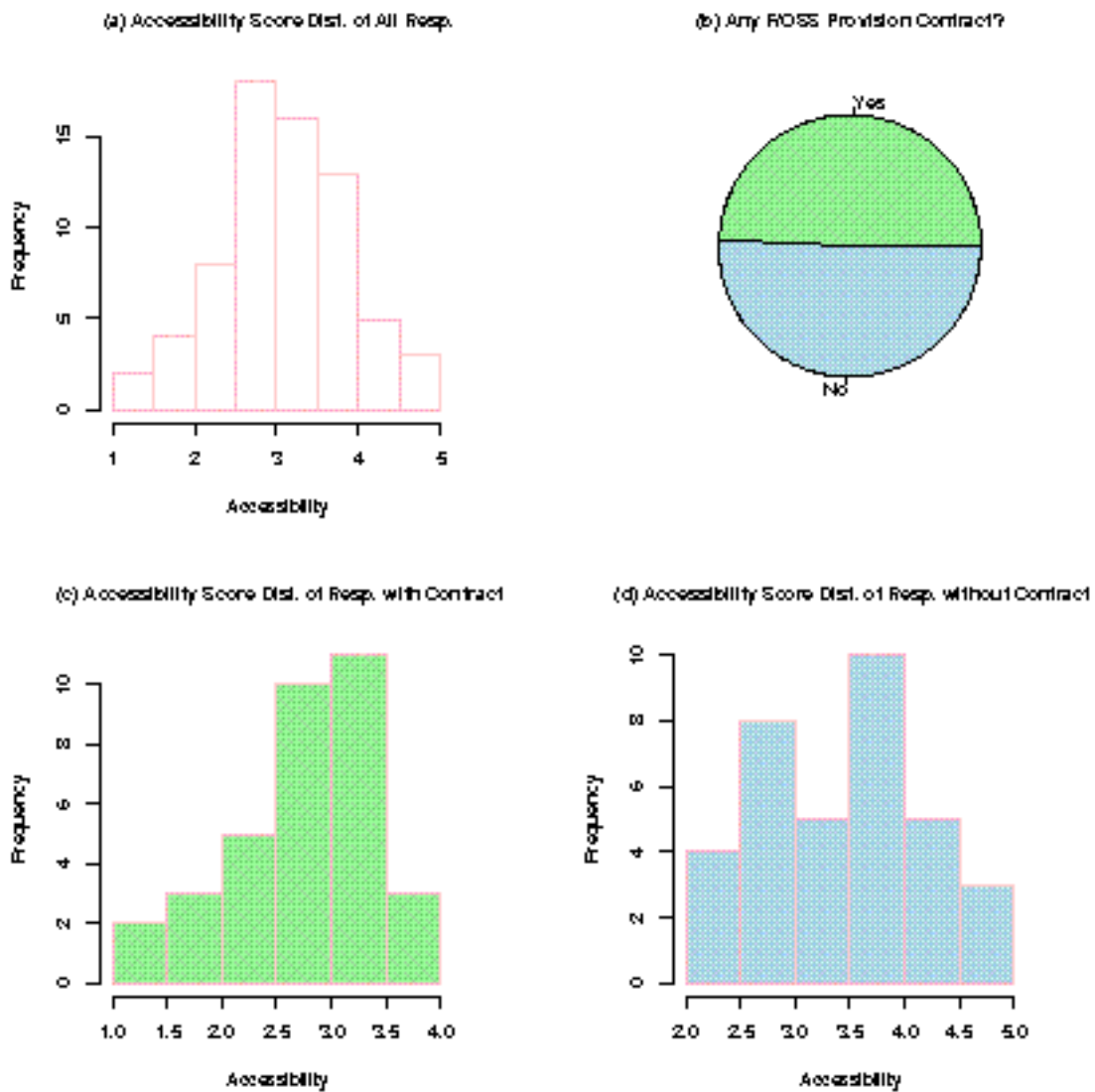


Fig 18: Accessibility and Contract relation

The P-value for the chi-square test is $P(>X^2) = 0.03$, the probability of observing a value at least as extreme as the test statistic for a chi-square distribution with $(r-1)(c-1) = 1 \times 4 = 4$ degrees of freedom. The P-value is highly

significant, indicating that some association between having signed a F/OSS provision contract and attitude formation towards F/OSS is present. We can conclude that having signed a F/OSS provision contract and developed negative attitudes is not due to random variation.

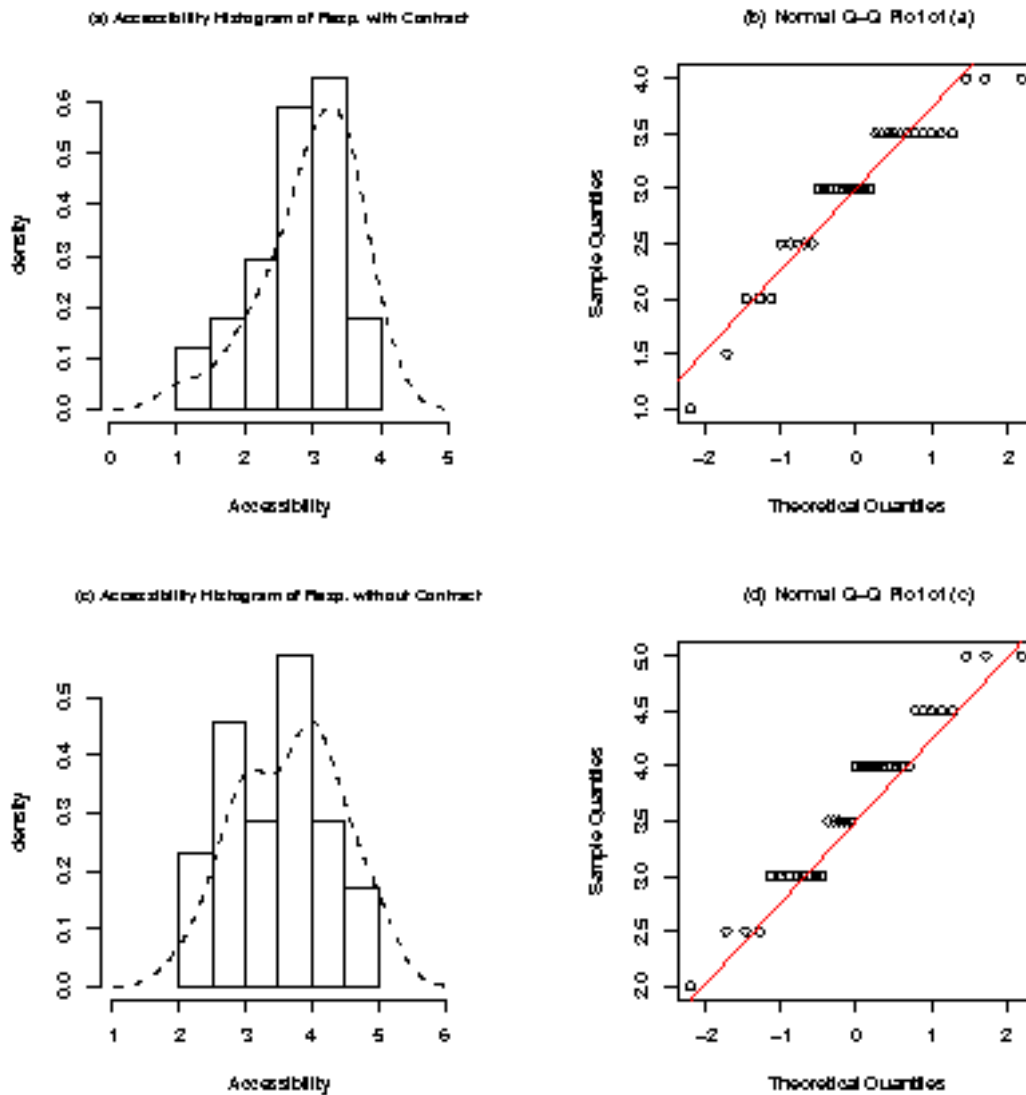


Fig 19. Normality check of accessibility scores

Welch Two Sample t-test

data: Q1011Yes and Q1011No

$t = -2.8265$, $df = 65.876$, $p\text{-value} = 0.006224$

alternative hypothesis: true difference in means is not equal to 0

95 percent confidence interval:

-1.0245520 -0.1762884

sample estimates:

mean of x mean of y
 3.485294 4.085714

We have used a two-sided Welch Two Sample t-test which is an alternative to the two sample t-test with equal variance. It drops the assumption that the variance of scores for those who has signed a F/OSS contract and those who has not signed have to be equal in order to run a valid t-test.

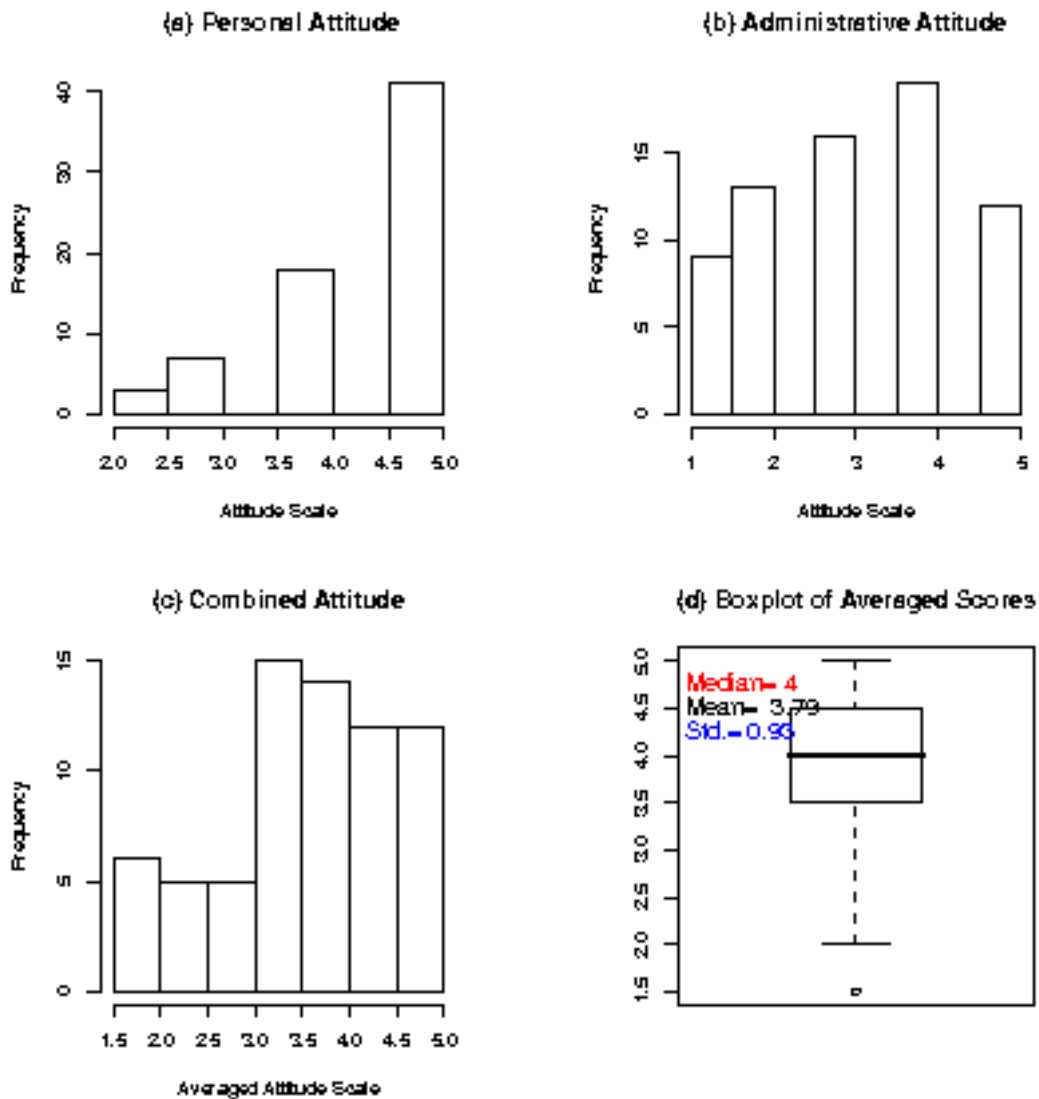


Fig. 20: Combined Attitude

Taking an averaged score of attitudes are twofold. Fig 1 shows Q10 and Q11. It seems that some of the respondents have more positive attitude on F/OSS than their administration. Organizations are composed of members, as such, personal beliefs might have an impact on aggregate behaviour. Although organizational behaviour might act in totally different direction of its members[cite] , in this

particular study, however, since almost of all of our respondents are also part of the administration averaging it helps us... to clear the attitude of putting blame on some others.

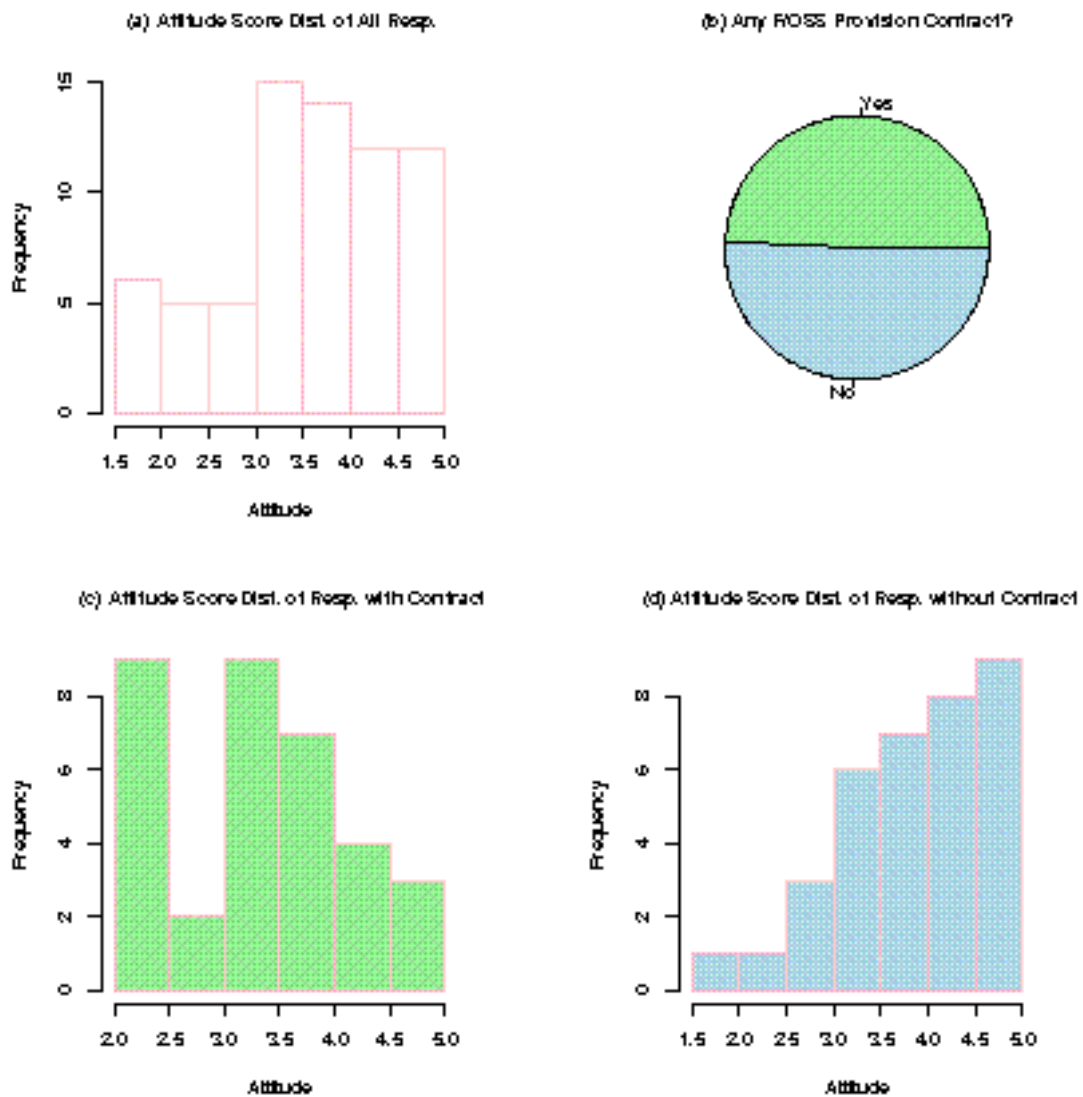


Fig. 21: Attitude and Contract relationship

data: Q0203Yes and Q0203No

t = -3.855, df = 66.663, p-value = 0.000263

alternative hypothesis: true difference in means is not equal to 0

95 percent confidence interval:

-1.0414312 -0.3308377

sample estimates:

mean of x mean of y

2.985294 3.671429

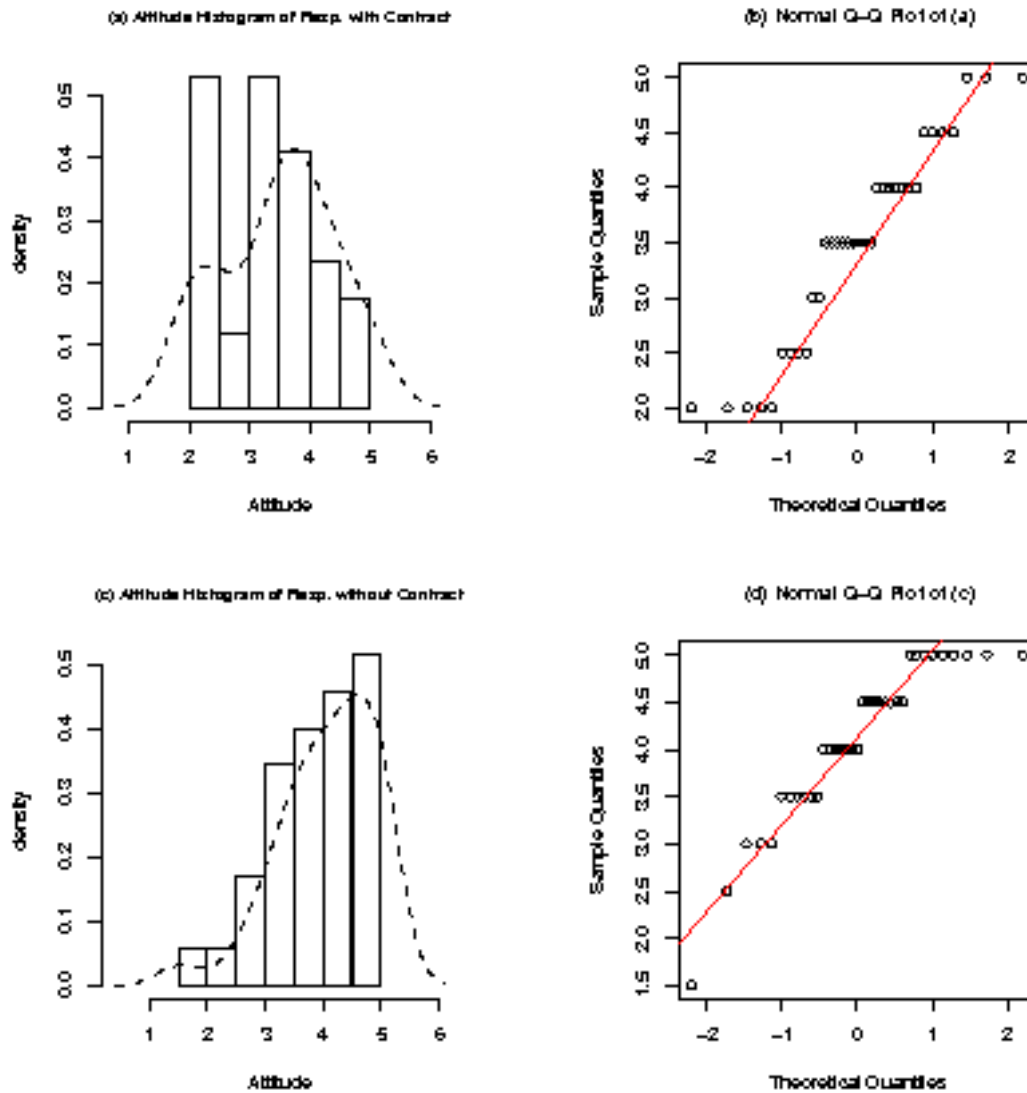


Fig. 22: Normality check of attitude scores

We have combined scores of Q02 and Q03 for each respondent separately. The resulting composite item provides us several advantages. First, we have eliminated perception of....

- The question is whether there is any significant relation in between the experience or opinion about availability of expertise, support, documentation on F/OSS and having signed a contract on any F/OSS adoption.

In this research question our null hypothesis is that there is no such relation. However, observed p-value, $p = 0.000263$, is very significant. That is it strongly suggests that there is a relation in between having signed a contract and

reachability of expertise, documentation, and product support.

In order to examine the direction of relation we can look at the results of the survey. Table 1: Barplot of Q02, Q03, Table 2: Stem plot of developed scale.

- It seems that those who have assigned F/OSS in order to install or acquire additional F/OSS products find it relatively more difficult to access expertise, support, and documentation.

--- Correlation Test

Spearman's rank correlation rho

data: Q1011 and Q0203

S = 37081.97, p-value = 0.003433

alternative hypothesis: true rho is greater than 0

sample estimates:

rho

0.3225801

We have examined whether there is a correlation in between F/OSS attitudes and availability of F/OSS expertise, service, and documentation. We have run nonparametric Spearman's rank correlation test (Best & Roberts, 1975; Hollander & Wolfe, 1973). The test specifically checks the availability of a positive correlation in between having easy access to F/OSS expertise, customer service, and documentation and developing a positive attitude towards F/OSS introduction.

Expectedly, $p = 0.0034$ indicates that there is a statistically significant positive relation. However, a relatively low correlation $\rho = 0.323$ implies that administrative F/OSS attitude is not solely based on the service. This result might suggest the fact that political influence, resistance to change, and initial financial barriers are other key determinants for public administrators and decision makers towards F/OSS adoption.

Chi-Square Tests:

		<i>Administrative Attitude</i>					
		Very Neg.	Negative	Undecided	Positive	Very Pos.	Total
<i>Signed F/OSS Contract</i>	Yes	6	7	12	6	3	34
	No	3	6	4	13	9	35
	Total	9	13	16	19	12	69
<p>X^2 Test Statistics:</p> <p><i>Chi Square Value = 10.64 df = 4, p-value = 0.031</i></p> <p><i>Cramer's Phi (r^2) = 0.15</i></p>							

		<i>Vendor Lock-in Barrier via Previously Signed Contracts</i>					
		Very Diff.	Usually	Difficult	Of Little	Not Diff.	Total
<i>Signed F/OSS Contract</i>	Yes	7	5	9	7	6	34
	No	2	10	9	7	7	35
	Total	9	15	18	14	13	69
<p>X^2 Test Statistics:</p> <p><i>Chi Square Value = 4.51 df = 4, p-value = .34</i></p> <p><i>Cramer's Phi (r^2) = 0.065</i></p>							

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		<i>Any Bad Experience at F/OSS Adoption</i>		
		Yes	No	Total
<i>Signed F/OSS Contract</i>	Yes	26	8	
	No	20	15	
	Total	46	23	
<p>X^2 Test Statistics:</p> <p><i>Chi Square Value = 2.095</i></p> <p><i>df = 1, p-value = .148</i></p> <p><i>Cramer's Phi (r^2) = 0.03</i></p>				

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		<i>Importance of TCO Estimates</i>					
		Not Imp.	Of Little	Important	Moderate	Very Imp.	Total
<i>Signed F/OSS Contract</i>	Yes	1	2	7	14	10	34
	No	3	6	3	12	11	35
	Total	4	8	10	26	21	69
<i>X² Test Statistics:</i>							
<i>Chi Square Value = 4.79 df = 4, p-value = 0.31</i>							
<i>Cramer's Phi (r²) = 0.07</i>							

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		<i>Employee Training Affordability</i>					
		Def. Not	Negative	Undecided	Positive	Def. Yes	Total
<i>Signed F/OSS Contract</i>	Yes	3	5	17	7	2	34
	No	3	6	9	11	6	35
	Total	6	11	26	18	8	69
<i>X² Test Statistics:</i>							
<i>Chi Square Value = 5.43 df = 4, p-value = 0.25</i>							
<i>Cramer's Phi (r²) = 0.08</i>							

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		<i>Importance of Political Influence</i>					
		Not Imp.	Of Little	Important	Moderate	Very Imp.	Total
<i>Signed F/OSS Contract</i>	Yes	4	4	6	10	10	34
	No	2	2	5	10	16	35
	Total	6	6	11	20	26	69
<i>X² Test Statistics:</i>							
<i>Chi Square Value = 2.80 df = 4, p-value = 0.59</i>							
<i>Cramer's Phi (r²) = 0.04</i>							

Student's t-Tests:

Access ($H_0 : \mu_1 = \mu_2$)		
H₁: (Alternative Hypothesis) True difference in means is not equal to 0		
Sample	Mean of Respondents with Contract (μ_1)	2.99
	Mean of Respondents without Contract (μ_2)	3.67
Estimates	95 percent confidence interval ($\alpha = .05$)	(-1.04, -0.33)
	t	-3.86
	df	66.66
	p-value	0.00026

Attitude ($H_0 : \mu_1 = \mu_2$)		
H₁: (Alternative Hypothesis) True difference in means is not equal to 0		
Sample	Mean of Respondents with Contract (μ_1)	3.485
	Mean of Respondents without Contract (μ_2)	4.086
Estimates	95 percent confidence interval ($\alpha = .05$)	(-1.03, -0.18)
	t	-2.83
	df	65.876
	p-value	0.006

Correlation Test:

Correlation ($H_0 : r_s = 0$)		
H_1: (Alternative Hypothesis) True rho (r_s) is greater than 0		
Sample	Variables	<i>Attitude, Access</i>
	Method	<i>Spearman's rank correlation</i>
Estimates	α	.05
	$rho (r_s)$	0.3225801
	df	67
	S	37081.97
	p-value	0.003433

References:

D. J. Best & D. E. Roberts (1975), Algorithm AS 89: The Upper Tail Probabilities of Spearman's rho. *Applied Statistics*, 24, 377-379.

Myles Hollander & Douglas A. Wolfe (1973), *Nonparametric statistical inference*. New York: John Wiley & Sons. Pages 185-194.