

THE IMPACT OF IDEOLOGY MISFIT ON OPEN SOURCE SOFTWARE COMMUNITIES AND COMPANIES

Sherae L. Daniel

Carl H. Linder College of Business, University of Cincinnati, Cincinnati, OH 45221 U.S.A. {sherae.daniel@uc.edu}

Likoebe M. Maruping

J. Mack Robinson College of Business, Georgia State University, Atlanta, GA 30303 U.S.A. {lmaruping@gmail.com}

Marcelo Cataldo

Uber, New York, NY 10199 U.S.A. {mcataldo@uber.com}

Jim Herbsleb

Institute for Software Research, Carnegie Mellon University, 5000 Forbes Avenue, Pittsburgh, PA 15213 U.S.A. {jdh@cs.cmu.edu}

Appendix A

Examples of Companies Working with GNOME

Table A1. GNOME's Corporate Interactions

Company	Commercial Company Interaction Type	Illustrative Quote
Supersonic Image	Technology working together	"Supersonic Image makes a scanner that detects breast cancer using GNOME technologies" Annual Report 2008
Motorola	Technology working together, Advisory board	"Motorola is a member of GNOME Mobile and uses GNOME technologies in their cell phones" Annual Report 2008
Google	Pay developers, Match employee donations to GNOME	"Google has been a long time GNOME supporter through projects like Google Summer of Code, GNOME Accessibility Outreach and GUADEC sponsorship" Annual Report 2008
Nokia	Advisory board	"Cody said that he had been working with Nokia to ensure that Qt's approach would be similar, to avoid compatibility issues between Qt and GTK + applications that provide their own CSD (client side decorations)" Annual Report 2009
Hewlett Packard	Pay developers, Adopt GNOME as standard	"The Sun/HP announcement that they will be adopting GNOME as their desktop standard" KDE announcement (https://www.kde.org/announcements/gfresponse.php)

Table A1. GNOME's Corporate Interactions (Continued)		
Company	Commercial Company Interaction Type	Illustrative Quote
Sun	Paid developers to work on GNOME	<p>"Sun will be assigning developers (the figure "50 developers" seems to be in vogue) to work on GNOME" KDE announcement</p> <p>"Sun's existing GNOME hackers will continue down the path they have been following for months, building and maintaining the core accessibility modules (atk, at-spi, gail) and contributing to various GNOME components such as ORBit2 and gnome-core" Mark McLoughlin post to GNOME listserve</p>
Dell	Give hardware to GNOME developers	"provided me with a free laptop for Gnome development/conferences" (https://people.gnome.org/~michael/blog/copyright-assignment.html)
Wipro	Paid developers to work on GNOME	"Sun is partnering with Wipro and Ximian to commit a large team of full-time hackers to help drive GNOME 2.0 forward" Mark McLoughlin post to GNOME listserve (https://mail.gnome.org/archives/gnome-hackers/2002-February/msg00199.html)
RedHat	Paid developers to work on GNOME	RedHat, Sun or Novell, decided to sponsor developer teams and monetary resources to support the platform (Lee 2012)
IBM	Advisory board	N/A
Intel	Advisory board	N/A
Novell	Paid developers to work on GNOME	N/A
Apple	Match employee donations to GNOME	N/A
Microsoft	Match employee donations to GNOME	N/A

Appendix B

Items for Measurement Scales Used in Study

Table B1. Items for Measurement Scales Used in Study
Items (Source: Stewart and Gosain 2006)
<i>As a software developer...</i>
Employee values 1: I value sharing knowledge.
Employee values 2: I believe in helping others.
Employee values 3: I place great value on technical knowledge.
Employee values 4: I am driven by a desire to learn new things.
Employee values 5: I think cooperation is important.
Employee values 6: I value the reputation I gain by participating in open source projects.
Employee beliefs 1: I believe that the best code wins out in the end.
Employee beliefs 2: I believe free software is better than commercial software.
Employee beliefs 3: I think information should be free.
Employee beliefs 4: I believe that with enough people working on a project, any bug can be quickly found and fixed.
Employee beliefs 5: I believe that you only become a hacker when others call you a hacker.
Employee norm 1: I think that it is wrong to fork a project.
Employee norm 2: I believe it is inappropriate to distribute code changes without going through the proper channels.
Employee norm 3: I think it is OK to remove someone's name from a project without that person's consent.
<i>Members of this organization...</i>
Coworker values 1: value sharing knowledge.
Coworker values 2: believe in helping others.
Coworker values 3: place great value on technical knowledge.
Coworker values 4: are driven by a desire to learn new things.
Coworker values 5: think cooperation is important.
Coworker values 6: value the reputation gained by participating in open source projects.
Coworker beliefs 1:* believe that the best code wins out in the end.
Coworker beliefs 2: believe free software is better than commercial software.
Coworker beliefs 3: think information should be free.
Coworker beliefs 4: believe that with enough people working on a project, any bug can be quickly found and fixed.
Coworker beliefs 5: believe that you only become a hacker when others call you a hacker. (dropped)

*Some questions were inappropriate to ask in reference to the company. We did not measure this item and also did not measure behavioral norms with reference to the company.

Table B1. Items for Measurement Scales Used in Study (Continued)
<i>In my view, members of the OSS community...</i>
OSS community values 1: value sharing knowledge.
OSS community values 2: believe in helping others.
OSS community values 3: place great value on technical knowledge.
OSS community values 4: are driven by a desire to learn new things.
OSS community values 5: think cooperation is important.
OSS community values 6: value the reputation gained by participating in open source projects.
OSS community beliefs 1: believe that the best code wins out in the end.
OSS community beliefs 2: believe free software is better than commercial software.
OSS community beliefs 3: think information should be free.
OSS community beliefs 4: believe that with enough people working on a project, any bug can be quickly found and fixed.
OSS community beliefs 5: believe that you only become a hacker when others call you a hacker.
OSS community norm 1: think that it is wrong to fork a project.
OSS community norm 2: believe it is inappropriate to distribute code changes without going through the proper channels.
OSS community norm 3: think it is OK to remove someone's name from a project without that person's consent.
Source: Ahuja et al. (2007)
Company commitment 1: I am willing to put in effort beyond the norm for the success of my primary employer.
Company commitment 2: For me, this is the best of all possible organizations for which to work
Company commitment 3: I am extremely glad to have chosen my primary employer to work for over other organizations.
Company commitment 4: This organization inspires the very best in the way of job performance.
Company commitment 5: I show by my actions that I really care about the fate of this organization.
OSS community Commitment 1: I am willing to put in effort beyond the norm for the success of GNOME.
OSS community Commitment 2: For me, this is the best of all possible OSS projects for which to work.
OSS community Commitment 3: I am extremely glad to have chosen GNOME to work for over other projects.
OSS community Commitment 4: GNOME inspires me to do my best technical work.
OSS community Commitment 5: I show by my actions that I really care about the fate of GNOME.
Source: Randel and Jaussi (2003)
OSS social identification1: In general my role as an OSS developer is an important part of my self-image.
OSS social identification2: My role as an OSS developer is an important reflection of who I am.
OSS social identification3: My role as an OSS developer is important to my sense of what kind of person I am.
OSS social identification4: Overall, my role as an OSS developer has little to do with how I feel about myself. (reverse coded)

Appendix C

Alternative Operationalization of OSS Ideology

For the main analysis, we operationalized OSS ideology as a second-order reflective construct. However, as Stewart and Gosain's (2006) found that the underlying dimensions of OSS ideology (i.e., values, beliefs, and norms) had different effects on OSS team trust and effectiveness; we also conducted an analysis where we specified ideology as a formative construct. Specifically, given the already established support for first-order reflective specification for values, beliefs and norms, we specified OSS ideology as a second-order formative construct. Although formative measures are not required to exhibit reliability (Petter et al. 2007) they can be checked for stability by assessing multicollinearity. Multicollinearity may suggest that items are tapping into the same dimension of the construct and can result in model instability (Diamantopoulos and Winklhofer 2001). The VIFs were less than 3.0, indicating that multicollinearity was not a concern. Following the

guidelines of Petter et al. (2007), we also examined the item weights. Although there is no recommended cut-off value, significant weights provide insight into the importance of each indicator. The weights of the first-order constructs on the second-order formative ideology construct were: .50 (developer beliefs), .69 (developer values), -.60 (developer forking norms), .65 (developer distribution norms) and .65 (developer named credit norms). The weights of the first-order constructs for OSS community ideology were .61 (perceived OSS beliefs), .78 (perceived OSS values), -.58 (perceived OSS forking norms), .70 (perceived OSS distribution norms), and .77 (perceived OSS named credit norms). Finally, the weights for second-order company ideology were: .50 (organizational beliefs) and .50 (organizational values). Since polynomial regression analysis does not use latent constructs, we computed linear composite scores for ideology based on the weights of the first-order factors. The results of the analysis involving this formative second-order specification did not differ from those of our initial reflective specification. This is to be expected since our variables are linear composites of highly correlated first-order factors (Rozeboom 1979). Rai et al. (2006) note that when first-order factors are highly correlated the linear composites based on different weighting schemes will also tend to be correlated. Moreover, the coefficient estimates based on these different weighting schemes will tend to be quite similar (Rai et al. 2006).

Appendix D

Results of Confirmatory Factor Analysis

	1	2	3	4	5	6	7	8	9	10	11
DV_VAL1	.78	.08	.04	.19	.09	.05	.23	.18	.18	.18	.05
DV_VAL2	.70	.03	.08	.29	.01	.02	.15	.12	.11	.21	.03
DV_VAL3	.78	.10	.08	.03	.01	.11	.06	.00	.02	.09	.06
DV_VAL4	.74	.06	.05	.17	.07	.04	.15	.07	.11	.11	.10
DV_VAL5	.66	.09	.22	.19	.01	.24	.21	.08	.22	.16	.32
DV_VAL6	.28	.12	.10	.22	.04	.03	.09	.09	.08	.05	.19
DV_BEL1	.17	.67	.14	.17	.08	.04	.00	.06	.01	.20	.13
DV_BEL2	.18	.62	.07	.18	.04	.12	.07	.04	.05	.33	.00
DV_BEL3	.22	.68	.02	.22	.17	.11	.18	.09	.14	.26	.13
DV_BEL4	.22	.84	.11	.22	.18	.08	.02	.37	.06	.05	.05
DV_BEL5	.07	.82	.01	.07	.06	.11	.06	.08	.02	.07	.14
DV_NOR1	.11	.00	.79	.12	.10	.01	.05	.12	.11	.06	.00
DV_NOR2	.21	.03	.74	.02	.01	.10	.05	.04	.05	.12	.10
DV_NOR3	.24	.11	.59	.12	.18	.08	.05	.09	.02	.06	.13
OSS_VAL1	.23	.09	.06	.83	.07	.01	.18	.03	.16	.14	.13
OSS_VAL2	.22	.06	.01	.83	.09	.05	.17	.04	.14	.08	.14
OSS_VAL3	.16	.07	.02	.77	.16	.13	.12	.10	.07	.19	.06
OSS_VAL4	.18	.05	.13	.74	.07	.00	.14	.18	.08	.19	.00
OSS_VAL5	.09	.04	.16	.81	.02	.12	.13	.01	.13	.13	.09
OSS_VAL6	.10	.08	.07	.67	.31	.09	.03	.17	.02	.18	.13
OSS_BEL1	.06	.48	.12	.53	.57	.01	.00	.05	.01	.28	.12
OSS_BEL2	.04	.13	.03	.27	.68	.03	.16	.05	.14	.23	.03
OSS_BEL3	.02	.21	.07	.36	.66	.02	.17	.03	.18	.24	.09
OSS_BEL4	.05	.12	.01	.20	.71	.09	.09	.09	.05	.23	.08
OSS_BEL5	.19	.02	.08	.19	.74	.02	.03	.19	.01	.01	.00
OSS_NOR1	.05	.03	.10	.21	.01	.75	.07	.06	.06	.07	.12
OSS_NOR2	.10	.04	.08	.33	.03	.71	.06	.13	.03	.11	.49
OSS_NOR3	.09	.49	.05	.17	.02	.60	.06	.00	.08	.06	.37
ORG_VAL1	.26	.02	.08	.09	.01	.09	.75	.04	.10	.09	.02
ORG_VAL2	.27	.13	.09	.17	.02	.09	.75	.07	.17	.07	.12
ORG_VAL3	.17	.09	.10	.20	.11	.10	.73	.01	.17	.06	.06
ORG_VAL4	.20	.01	.07	.15	.05	.07	.82	.03	.13	.09	.10
ORG_VAL5	.14	.04	.12	.16	.05	.12	.83	.01	.16	.17	.08
ORG_VAL6	.00	.02	.06	.02	.05	.08	.68	.06	.14	.06	.05
ORG_BEL1	.02	.05	.01	.02	.16	.01	.37	.87	.14	.20	.08
ORG_BEL2	.02	.11	.05	.09	.10	.07	.27	.79	.04	.02	.06
ORG_BEL3	.00	.12	.04	.13	.06	.05	.35	.71	.05	.05	.01
ORG_BEL4	.00	.08	.05	.01	.06	.05	.03	.90	.03	.03	.05
ORG_COM1	.03	.06	.08	.01	.03	.05	.06	.06	.67	.02	.08

ORG_COM2	.03	.20	.11	.10	.04	.03	.14	.12	.73	.01	.11
ORG_COM3	.06	.17	.12	.06	.04	.09	.13	.05	.76	.04	.12
ORG_COM4	.00	.16	.07	.06	.03	.01	.16	.02	.74	.00	.07
ORG_COM5	.10	.10	.03	.09	.08	.07	.12	.12	.66	.14	.03
OSS_COM1	.16	.02	.28	.23	.03	.07	.04	.04	.07	.75	.11
OSS_COM2	.04	.01	.01	.17	.09	.17	.04	.08	.04	.84	.06
OSS_COM3	.12	.04	.07	.23	.13	.11	.07	.10	.03	.84	.09
OSS_COM4	.12	.00	.02	.28	.05	.05	.04	.03	.03	.83	.07
OSS_COM5	.11	.14	.07	.32	.03	.02	.06	.00	.03	.72	.06
OSS_ID1	.16	.13	.12	.10	.16	.05	.14	.23	.17	.12	.80
OSS_ID2	.07	.00	.14	.18	.17	.03	.18	.24	.16	.07	.81
OSS_ID3	.22	.17	.11	.18	.09	.14	.17	.09	.10	.20	.83
OSS_ID4	.22	.18	.08	.02	.37	.06	.20	.01	.07	.15	.81

Appendix E

Descriptive Statistics and Correlations

Variable	Mean	S.D.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
1. Company commitment	5.06	1.22																
2. OSS commitment	4.96	1.20	.07															
3. Employee ideology	4.74	0.87	.10	.37***														
4. Perceived coworker ideology	5.21	1.36	.67***	.21***	.25**													
5. Perceived OSS community ideology	6.41	0.61	.08	.49***	.49***	.27***												
6. USA	n/a	n/a	.03	.07	.17*	-.02	.03											
7. Germany	n/a	n/a	.01	.01	.09	.08	.08	-.15*										
8. Spain	n/a	n/a	.12†	.14†	-.27***	-.20**	-.24**	-.14†	-.09									
9. Age	30.00	8.08	-.07	-.06	-.05	-.06	.02	.00	.03	.05								
10. Gender	n/a	n/a	.11	.06	.06	-.19*	-.11	.04	-.07	-.06	-.08							
11. Education	n/a	n/a	.05	-.08	-.14†	-.02	-.01	-.18*	.15*	.03	.15*	.09						
12. Organizational tenure	3.70	3.92	-.08	-.18*	.21**	.13†	.12†	.05	.05	-.04	.45***	.00	.08					
13. Paid volunteer	n/a	n/a	-.46***	-.31***	.11	.47***	.22**	-.06	.10	-.16*	-.08	-.18*	.01	-.02				
14. Pre-survey activity	80.61	360.88	.15*	.16*	.00	-.07	.01	.01	-.01	.05	-.02	-.04	-.04	-.05	-.19**			
15. Pre-survey number of projects	2.35	5.53	.09	.18*	-.08	-.11	-.13†	-.08	.04	.07	-.07	.01	-.08	-.01	-.07	.24**		
16. Social identity	3.20	1.60	-.09	.19*	.26***	.15*	.15*	.09	.04	-.07	.11	-.03	-.02	.25**	.06	-.11	-.09	
17. Post-survey activity	27.59	121.63	.14*	.16*	.01	-.08	.06	.00	.02	.02	-.01	-.01	.04	-.03	-.23**	.65***	.18*	-.03

Notes: N = 186

1. Pre-survey activity = log-transformed number of files changed. Mean and standard deviation of non-transformed number of files changed shown for descriptive purposes only.
2. †p < .10, *p < .05, **p < .01, ***p < .001.

Appendix F

Examination of Key Features of the Response Software

The principal axes of a response surface reflect the overall orientation of the response surface relative to the X,Y plane (Edwards 2002). The first and second principal axes are perpendicular to one another. In our model the first principal axis represents the line along which employee commitment is maximized. This would be represented along the line of fit, where $X = Y$. On the X, Y plane, the line of fit runs at a 45-degree angle from the origin (where $X = 0$ and $Y = 0$) and has a slope of 1. Therefore, it is useful to know if the first principal axis of the surface runs parallel to the line of fit. This can be accomplished by determining whether the slope of the first principal axis along the X, Y plane is significantly different from 1. A first principal axis whose slope is not significantly different from 1, likely runs parallel to the line of fit (Edwards 2002). The second principal axis is the line along which employee commitment decreases. Per our hypotheses H1 and H3, commitment is expected to increase with increasing OSS ideology over-fit. In contrast, as indicated by our hypotheses H2 and H4, commitment is expected to decrease as OSS ideology under-fit increases. The effect of these forms of misfit would be reflected along the line of misfit, where $X = -Y$. The slope of the line of misfit along the X, Y plane is -1. Hence, we can determine if the second principal axis runs parallel to the line of misfit by examining whether its slope differs significantly from -1 (Edwards 2002).

Another feature of interest is the slope of the response surface along the principal axes. It can be informative to know if the response surface is upward sloping, downward sloping, curvilinear, or flat along these axes. This is particularly important for testing our hypotheses because the slope is expected to have a negative overall orientation. A negative slope would indicate that commitment increases with increasing OSS ideology over-fit (region to the left of the line of fit) and decreases with increasing OSS ideology under-fit (region to the right of the line of fit).

Testing the significance of these key features requires non-parametric techniques. Following the recommendation of Edwards (2002), we used a bootstrapping procedure to test the significance of the key response surface features (i.e., stationary point, slopes along lines of interest, and first and second principal axes) (Efron and Tibshirani 1993). Bootstrapping is generally preferred over jackknifing, especially when sample sizes are smaller as in this study (Efron and Tibshirani 1993). Using the bootstrapping approach, we constructed bias-corrected confidence intervals around the estimates of these key features of the response surface (Edwards 2002). The results are shown in Table F1.

Table F1. Results of Tests of Key Features Response Surface Predicting OSS Commitment

Dependent variable	Stationary point		Fit Tests						Misfit Tests (H1, H2, H3, H4)					
			First principal axis		Slopes along first principal axis		Slopes along fit axis (X = Y)		Second principal axis		Slopes along second principal axis		Slopes along misfit axis (X = -Y)	
			p_{10}	p_{11}	a_x	a_x^2	a_x	a_x^2	p_{20}	p_{21}	a_x	a_x^2	a_x	a_x^2
Company commitment	-3.62	.25*	3.87	1.00*	1.37**	.19	.64***	.19	-3.37	-1.00*	-1.09*	-.15	-.58*	-.15
OSS commitment	-5.24	-4.26	.68*	.94*	.60*	.06	.58**	.06	-9.82	-1.06*	-3.12	-.30*	-.18	-.28*

Notes:

1. N = 186.
 2. Significance levels are based on bias-corrected confidence intervals constructed from coefficients from 10,000 bootstrap samples.
 3. For the first principal axis, significance levels for p_{10} are based on bias-corrected confidence intervals around 0 and significance levels for p_{11} are based on bias-corrected confidence intervals around 1.
 4. For the second principal axis, significance levels for p_{20} are based on bias-corrected confidence intervals around 0 and significance levels for p_{21} are based on bias-corrected confidence intervals around -1.
 5. For a_x and a_x^2 , significance levels are based on bias-correct confidence intervals around 0.
- * $p < .05$, ** $p < .01$, *** $p < .001$.

Test of H1 and H2

The results for company commitment in Table F1 show that the slope of the second principal axis (p_{21}) does not differ significantly from -1 ($p < .05$) (i.e., the bias-corrected confidence interval around p_{21} includes -1). This suggests that the second principal axis is parallel to the line

of misfit (i.e., the line along which $X = -Y$). We can conclude from this result that somewhere along this line, employee commitment to the company is minimized as OSS ideology misfit increases. In examining the slope of the response surface along this second principal axis, we find a negative linear slope ($a_x = -1.09, p < .05$). This suggests that employee commitment increases with increasing OSS ideology over-fit (i.e., the region to the left of the line of fit). Thus, H1 is supported. In contrast, the negative linear slope suggests that the negative effect of misfit in ideology occurs only in the region of the response surface representing OSS ideology under-fit (i.e., the region to the right of the line of fit, where an employee embraces the OSS ideology more than they perceive their coworkers do). This supports H2.

Test of H3 and H4

The results show that the slope of the second principal axis (p_{21}) is not significantly different from -1 ($p < .05$) (i.e., the bias-corrected confidence interval around p_{21} includes -1). This suggests that the second principal axis is parallel to the line of misfit and that OSS commitment is minimized along this line. An examination of the slope of the response surface along the second principal axis indicates an inverted U-shape slope ($a_x^2 = -.30, p < .05$). This shows that employee commitment to the community decreases both with increasing OSS ideology under-fit and with increasing OSS ideology over-fit. This supports H4 but is counter to H3.

In sum, the results suggests some potential theoretical differences between the company context and the OSS community context with respect to the impact of misfit.

Appendix G

Equations for Response Surface Key Equations (Edwards 2002)

1. Stationary Point

$$X_0 = \frac{b_2 b_4 - 2b_1 b_5}{4b_3 b_5 - b_4^2}$$

$$Y_0 = \frac{b_1 b_4 - 2b_2 b_3}{4b_3 b_5 - b_4^2}$$

2. First Principal Axis

$$Y = p_{10} + p_{11}X$$

where p_{11} is the slope of the first principal axis and is given by

$$p_{11} = \frac{b_5 - b_3 + \sqrt{(b_3 - b_5)^2 + b_4^2}}{b_4}$$

and p_{10} is the intercept of the first principal axis and is given by

$$p_{10} = Y_0 - p_{11}X$$

3. Second Principal Axis

$$Y = p_{20} + p_{21}X$$

where p_{21} is the slope of the second principal axis and is given by

$$p_{21} = \frac{b_5 - b_3 - \sqrt{(b_3 - b_5)^2 + b_4^2}}{b_4}$$

and p_{20} is the intercept of the second principal axis and is given by

$$p_{20} = Y_0 - p_{21}X_0$$

4. Slope of Surface along Line of Fit (Y = X)

$$Z = b_0 + (b_1 + b_2)X + (b_3 + b_4 + b_5)X^2 + e$$

where $(b_1 + b_2)$ represents the linear slope of the surface along the line of fit and $(b_3 + b_4 + b_5)$ represents the curvature of the surface along the line of fit.

5. Slope of Surface along Line of Misfit (Y = -X)

$$Z = b_0 + (b_1 - b_2)X + (b_3 - b_4 + b_5)X^2 + e$$

where $(b_1 - b_2)$ represents the linear slope of the surface along the line of misfit and $(b_3 - b_4 + b_5)$ represents the curvature of the surface along the line of misfit.

6. Slope of Surface along First Principal Axis

$$Z = b_0 + b_1p_{10} + b_5p_{10}^2 + (b_1 + b_2p_{11} + b_4p_{10} + 2b_5p_{10}p_{11})X + (b_3 + b_4p_{11} + b_5p_{11}^2)X^2 + e$$

where $(b_1 + b_2p_{11} + b_4p_{10} + 2b_5p_{10}p_{11})$ represents the linear slope of the surface along the first principal axis and $(b_3 + b_4p_{11} + b_5p_{11}^2)$ represents the curvature of the surface along the first principal axis.

7. Slope of Surface along Second Principal Axis

$$Z = b_0 + b_2p_{20} + b_5p_{20}^2 + (b_1 + b_2p_{21} + b_4p_{20} + 2b_5p_{20}p_{21})X + (b_3 + b_4p_{21} + b_5p_{21}^2)X^2 + e$$

where $(b_1 + b_2p_{21} + b_4p_{20} + 2b_5p_{20}p_{21})$ represents the linear slope of the surface along the first principal axis and $(b_3 + b_4p_{21} + b_5p_{21}^2)$ represents the curvature of the surface along the first principal axis.

Appendix H

Results of Marker Variable Test

	Correlation with Employee Commitment to the Company		Correlation with Employee Commitment to the OSS Community	
	Without Marker	With Marker	Without Marker	With Marker
Employee ideology	.10	.05	.37***	.34***
Perceived OSS community ideology	.07	.02	.49***	.46***
Perceived coworker ideology	.67***	.65***	.21**	.17*

Notes: *p < .05, **p < .01, ***p < .001.

References

- Ahuja, M. K., Chudoba, K. M., Kacmar, C. J., McKnight, D. H., and George, J. F. 2007. "IT Road Warriors: Balancing Work-Family Conflict, Job Autonomy, and Work Overload to Mitigate Turnover Intentions," *MIS Quarterly* (31:1), pp. 1-17.
- Diamantopoulos A., and Winklhofer, H. 2001. "Index Construction with Formative Indicators: An Alternative to Scale Development," *Journal of Marketing Research* (38:2), pp. 269-277.
- Edwards, J. R. 2002. "Alternatives to Difference Scores: Polynomial Regression and Response Surface Methodology," in *Advances in Measurement and Data Analysis*, F. Drawsgow and N. W. Schmitt, San Francisco: Jossey-Bass, pp. 350-400.
- Efron B., and Tibshirani R. J. 1993. *An Introduction to the Bootstrap*, New York: Chapman & Hall.
- Lee, V. 2012. *How Firms Can Strategically Influence Open Source Communities: The Empowerment of "Men on the Inside,"* New York: Springer Science & Business Media.
- Petter S., Straub D., and Rai, A. 2007. "Specifying Formative Constructs in Information Systems Research," *MIS Quarterly* (31:4), pp. 623-656.
- Rai, A., Patnayakuni, R., and Seth, N. 2006. "Firm Performance Impacts of Digitally Enabled Supply Chain Integration Capabilities," *MIS Quarterly* (30:2), pp. 225-246.
- Rozeboom, W. W. 1979. "Sensitivity of a Linear Composite Predictor Items to Differential Item Weighting," *Psychometrika* (44:3), pp. 289-296.
- Randel, A. E., and Jaussi, K. S. 2003. "Functional Background Identity, Diversity, and Individual Performance in Cross-Functional Teams," *Academy of Management Journal* (46:6), pp. 763-774.
- Stewart K., and Gosain, S. 2006. "The Impact of Ideology on Effectiveness in Open Source Software Development Teams," *MIS Quarterly* (30:2), pp. 291-314.