Kerstin Balka

Open Source Product Development

The Meaning and Relevance of Openness

With a foreword by Prof. Dr. Cornelius Herstatt



Contents

Contents			IX
Li	st of	Figures X	Ш
Li	st of	Tables	W
Li	st of	Abbreviations XV	ΊΙ
I	Fo	ocus and scope	1
1	1.1 1.2	Statement of the research problem and relevance	3 6 7
2	Def	inition of terms	9
II	\mathbf{T}	Theoretical and methodological foundation	11
3	Per : 3.1	rspectives from prior literature The private and collective investment models	13 13
	3.2	The meaning of openness	15 16 18 19
	3.3	Open source software versus hardware	20 21 22 23

		3.3.4 But, hardware is becoming much more like software	24
	3.4	Why do firms get involved?	25
		3.4.1 The firm as a collection of productive resources and	
		dynamic capabilities	25
		3.4.2 Value creation and value capture	26
		3.4.3 Reasons for firms to freely reveal	28
		3.4.4 OS business models	29
	3.5	Conclusions and implications for this research	30
4	Res	search design and methodology	33
	4.1	Open source innovation (OSI)	33
		4.1.1 A disambiguation of OSI	33
		4.1.2 A conceptual framework for studying OSI	34
	4.2	Detailed research questions and resultant propositions	35
	4.3	Methodological research approach	42
		4.3.1 To discover the variety of open design	44
		4.3.2 To understand how open design works	47
		4.3.3 To investigate the meaning of openness	48
11	[] (On the variety of open design	49
5	Stu	dy 1: The open design landscape	51
J	5.1	The variety of open design	51
	5.1	Multivariate analysis	60
	5.3	Discussion of outcomes and research propositions rethought	63
			00
6		dy 2: Open design of tangible goods – A comparative e study	
			67
	6 1		67
	6.1	Overview of cases	67
	6.2	Overview of cases	67 68
		Overview of cases	67 68 72
	6.2	Overview of cases	67 68 72 72
	6.2	Overview of cases	67 68 72 72 73
	6.2	Overview of cases	67 68 72 72 73 75
	6.2	Overview of cases	67 68 72 72 73
7	6.2 6.3	Overview of cases Case descriptions How does open design work? 6.3.1 Who drives open design projects? 6.3.2 What is being developed? 6.3.3 How are open designs developed and produced? 6.3.4 Is open design really open? ermediate conclusions and implications for proceeding	67 68 72 73 75 76
7	6.2 6.3 Inte	Overview of cases Case descriptions How does open design work? 6.3.1 Who drives open design projects? 6.3.2 What is being developed? 6.3.3 How are open designs developed and produced? 6.3.4 Is open design really open? ermediate conclusions and implications for proceeding Discussion of first findings	67 68 72 73 75 76 79
7	6.2 6.3	Overview of cases Case descriptions How does open design work? 6.3.1 Who drives open design projects? 6.3.2 What is being developed? 6.3.3 How are open designs developed and produced? 6.3.4 Is open design really open? ermediate conclusions and implications for proceeding	67 68 72 73 75 76 79 81

ΙV	<i>'</i> C	On openness in open design	87
8	Surv	vey approach	89
	8.1	Questionnaire development	89
	8.2	Selection of communities	91
	8.3	Data collection	91
	8.4	The sample $\ \ldots \ \ldots \ \ldots \ \ldots \ \ldots \ \ldots \ \ldots$	92
	8.5	Data preparation	93
9	Stud	ly 3: The meaning of openness is not trivial	l 0 1
	9.1	Software is more open than hardware	102
	9.2	Openness is important to open design communities	103
	9.3	Openness of software components is more important than open-	
		ness of hardware components	104
	9.4	Highly active developers value openness more than less active	
		developers	105
	9.5	The duration of participation does not influence perceived im-	107
		portance	107
10		ly 4: How openness impacts developer's satisfaction and	
	thei	r contribution	109
		Ordinary linear regression models on satisfaction	
		Multilevel models on developer satisfaction	
		Do expectations towards openness influence this relationship?	
	10.4	Effects on contributed working hours	125
		·	
V	In	tegration of findings 1	31
11	Disc	cussion of findings	133
	11.1	Summary of findings	133
	11.2	Open source software versus hardware - revisited	138
	11.3	Scope of generalization and limitations	140
12	Con	clusions	143
		Implications for theory	143
		Managerial implications	
		Implications for future research	

37	T	T
Х	ı	1

V.	I A	Appendices	149
A	Vari	table explanations	151
В		ails – Case study	155
		Interview guideline	
C	Det	ails – Survey	159
	C.1	Questionnaire: How open is open source - software and beyond	159
		Survey results	
		Stability tests	
D	Alte	ernative models	169
	D.1	More ordinary linear models	169
	D.2	Details for selected multilevel models	171
	D.3	Transformations to normality	173
		Models considering expectations	
R	efere	nces	181