

Incentives and Costs in Implementing Private-Collective Innovation: A Case Study

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How Firms, Institutions, Technologies and Strategies co-evolve”



Apple iPhone



Nokia N810



FIC OpenMoko



low

Degree of openness

high

Case study on Nokia Internet Tablet

- **Authors:**
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- **Research question:** What are the incentives, costs and mitigation strategies for firms working with open source software?
- **Theory:** Extending incentives for Private-Collective Innovation with costs and respective mitigation strategies
- **Data:** 22 interviews with Nokia managers and developers, contractors and community members; 25 hours interview; ~250 pages of transcripts
- **Method:** Inductive research; open coding with MAX.QDA; >1000 codings in 80 categories; merged to 12 categories



Theory

Three Innovation Models

1. Private investment model

- Government grants monopolies through IPR

2. Collective innovation model

- Public funding for public good production
- Free riding problem

3. Private-collective model of innovation

- von Hippel and von Krogh, 2003
- Private innovations in public goods (knowledge revealing)
- Example: production of open source software by firms

Private-Collective model of innovation (PCI)

■ 6 incentives for implementing PCI:

1. No cost of **controlling** knowledge (*Foray, 2004; Alavi & Leidner, 1999*)
2. **Learning** benefits (*Allen, 1983; Nuvolari, 2004; Baldwin & Clark, 2006*)
3. **Reputation** gain (*Allen, 1983; Lerner & Tirole, 2002*)
4. Fast and widespread **diffusion** of innovations (*Economides, 1996*)
5. Lower costs of **innovation** (*Chesbrough, 2003; Haefliger et al. 2008*)
6. Lower costs of **manufacturing** (*Kotha, 1995; Harhoff et al. 2003*)

■ Literature gap: “**Hidden costs**” in implementing PCI



Methodology

Research Design

6 Incentives for Private-Collective innovation

deductively testing

Nokia Internet Tablet case study

Extended model of Privat-Collective innovation

New incentive:

7. Faster time to market

Costs:

1. Difficulty to differentiate
2. Guarding business secrets
3. Reducing network entry barriers
4. Giving up control
5. Organizational inertia

Mitigation strategies

inductive findings

22 Conducted Interviews

	Stakeholder	Date	Duration	Contribution, Function
N1	Nokia	Nov 15 2006	89 min	Head Open Source Software Operations at Nokia
C1	Contractor	Nov 22 2006	71 min	Developed Window Manager
V1	Volunteer	Dec 6 2006	55 min	Linux Distribution Release Manager
V2	Volunteer	Dec 7 2006	52 min	Developed Mapping Software
V3	Volunteer	Dec 13 2006	54 min	Developed Music Player
C2	Contractor	Dec 14 2006	89 min	Performance Measurements and more
V4	Volunteer	Dec 15 2006	79 min	Developed Virtual Memory Feature
N2	Nokia	Dec 15 2006	58 min	Maemo Product Manager
N3	Nokia	Jan 12 2007	92 min	Software Architecture Team Leader at Nokia
N4	Nokia	Feb 19 2007	83 min	GNOME Desktop Developer at Nokia
V5	Volunteer	Feb 20 2007	85 min	Ported Remote Control Software
N5	Nokia	Feb 20 2007	96 min	GNOME Desktop Developer for Nokia
N6	Nokia	Feb 28 2007	80 min	Multimedia Player Developer for Nokia
C3	Contractor	Mar 5 2007	81 min	GNOME C++ Bindings Developer
C4	Contractor	Mar 13 2007	email	Software Developer at Contracted Firm
N7	Nokia	Mar 21 2007	60 min	GNOME Desktop Developer for Nokia
V6	Volunteer	Apr 4 2007	71 min	Developed Geolocation Software
C5	Contractor	Apr 10 2007	email	CEO of Contracted Software Company
N8	Nokia	Apr 11 2007	69 min	X Windows Developer for Nokia
N9	Nokia	Apr 12 2007	77 min	Maemo Community Manager
N10	Nokia	Apr 12 2007	91 min	Testing Team at Nokia, Volunteer in Browser Project
V7	Volunteer	Apr 23 2007	66 min	GNOME Foundation Board Member

22

25 hours

Uniqueness of the case (the talking pig*)

1. **Target Group:** New product category
 2. **Hardware:** first non-GSM end user device
 3. **Software:** first Linux end user device
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4. **Approach:** Revealing of substantial knowledge
 5. **Strategy:** Integration in established open source communities, creation of own community
 6. **Partnerships:** Individuals and small software firms
- Nokia**
- Mobile device industry**

*: Nicolay Siggelkow 2007 “Persuasion with Case Studie” AMJ Vol. 50, No. 1

Contractors of Nokia

Company	Expertise	Country
KernelConcepts	GPE and Embedded Linux	Germany
OpenedHand	Matchbox	United Kingdom
Collabora	Telepathy	United Kingdom
Imendio	GNOME and D-BUS	Sweden
Fluendo	GStreamer	Spain
Movial	Scratchbox	Finland

Total contracts with over 20 different (mostly small) software firms

Evidences of Innovation Success (dependent variable)

1. **Product decision** in 2003 for Nokia 770
2. Development of **successor device** N800
3. Inclusion into **N series**, Nokia's multimedia device platform (high visibility because of high marketing budget)
4. **Launch of N800 by CEO** himself at CES 2007
5. **Community** size, contributed applications, bug fixes...

Business success (sales figures, number of staff, future investments...) depends largely on marketing effort.



Case

Nokia N810



Hardware

- 800x480 Touch Screen, WLAN & Bluetooth
- 128MB RAM, 2 SD Flash Memory Slots
- 330 Mhz Texas Instruments OMAP Processor
- 640x480 video camera, weight: 200g

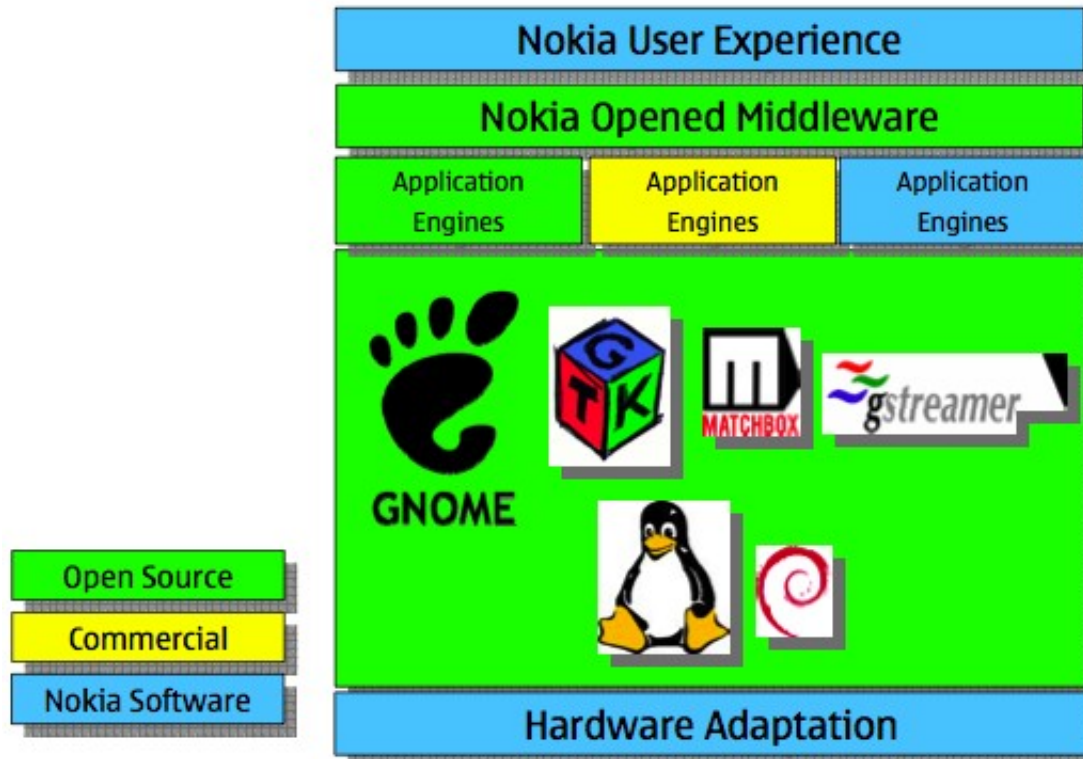
Infrastructure

- Customized Debian GNU/Linux
- X Windows, GTK, GStreamer, D-BUS

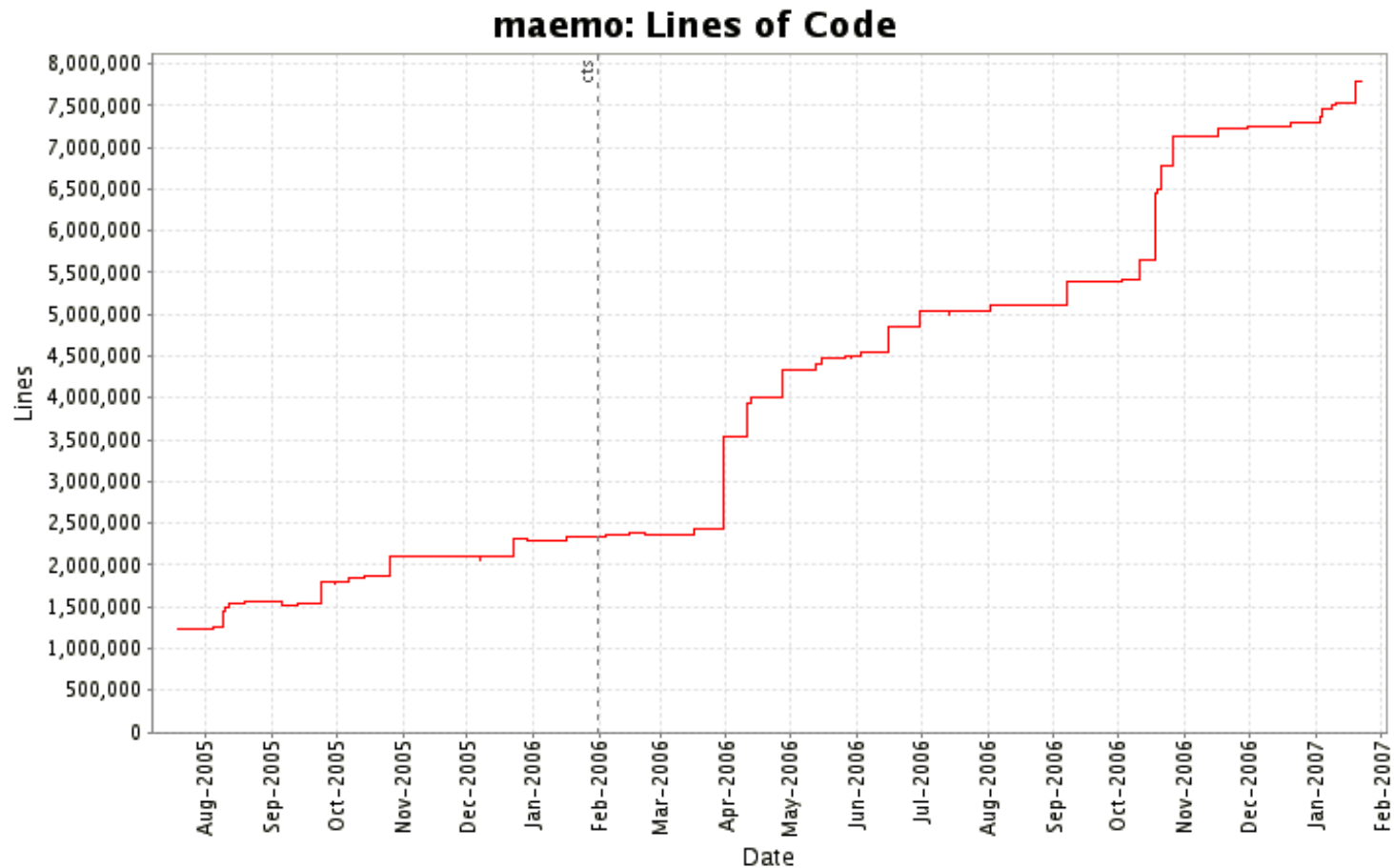
Applications

- Open: VNC Viewer, MaemoMapper, Ogg Player...
- Proprietary: Opera, Canola, Google Talk...

The Hybrid Software Stack



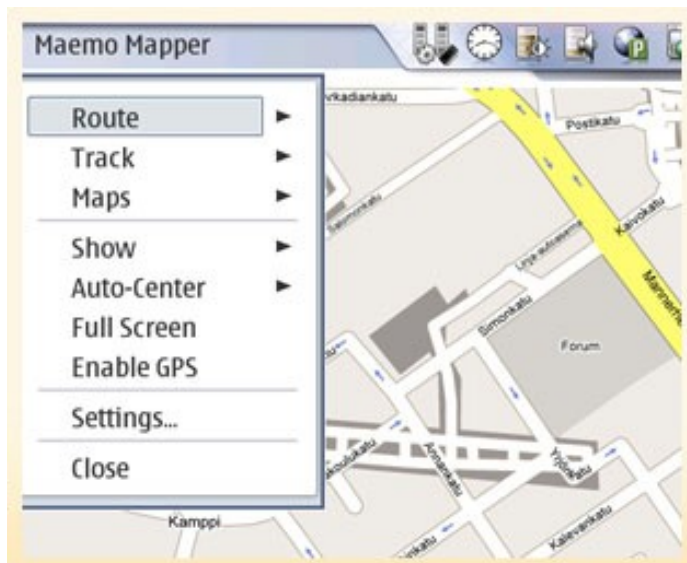
Source Code Analysis (Subversion Repository)



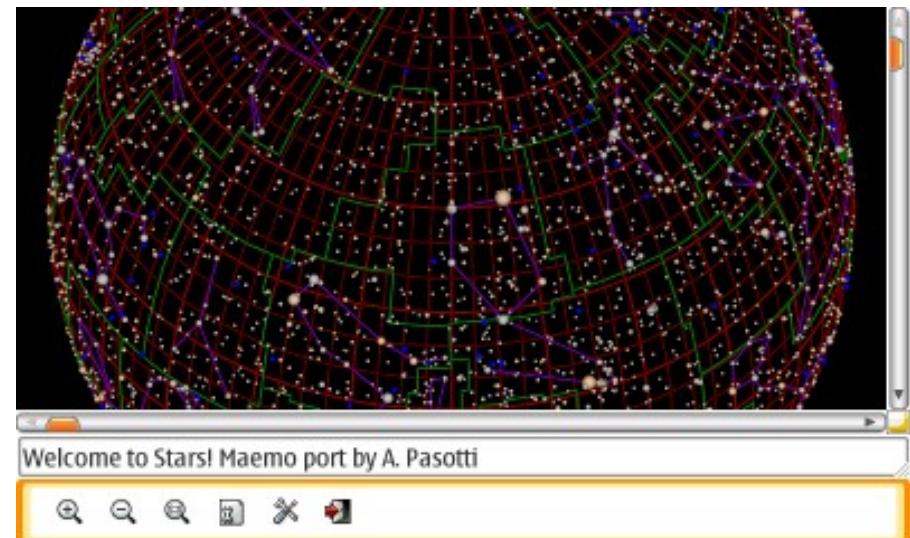
Community contributions

Hundreds of applications on maemo.org for Nokia Internet Tablets, e.g.

Maemo-Mapper



Maemo-Stars



Community Building by Nokia

- Sale of **1500 discounted Tablets** to active OSS developers
- **maemo.org** for tutorials, road map, API docs, Wiki, Blog Planet...
- 244 registred **Maemo projects** on garage.maemo.org [2007-06-30]
- **Mailing Lists** (June 2005 - December 2006) and IRC chat
 - Developer: 6795 mails from 832 email addresses (79 Nokia)
 - User: 2534 mails from 511 email addresses (33 von Nokia)
- Bugzilla for **bug reporting**: about 1000 reported issues
- Maemo **software development kit (SDK)**
- **Sardine**: development (unstable) version of the operating system



Results

Incentives and their findings in the case

<i>Incentive</i>	<i>Findings in the Nokia case</i>
Low knowledge protection costs	Revealing of source code
Learning effects	Collaboration with external firms and individuals
Reputation gain	Increased attraction of Nokia as employer and for building an own developer community
Adoption of innovation	Standard setting of the platform configuration
Lower costs of innovation	Reuse of open source software, outsourcing of software testing and bug fixing, and maintenance to open source communities
Lower manufacturing costs	No licensing fees for software platform
NEW: Faster time to market	Tapping of distributed technology expertise and high flexibility of software platform

Costs and possible mitigation strategies

Cost	Findings in the Nokia case	Mitigation strategy
Difficulty to differentiate	Released source code can be reused by competitors	Partial revealing of source code to retain control of hardware integration and look and feel
Guarding business secrets	Plans for new products	Selective revealing of future plans and protection of information through NDAs
Reducing network entry barriers	Investments for Software Development Kit, preview version of platform, device program, staff for community management, and increased communication effort	Sharing the costs with other actors in the network.
Giving up control	Development direction such as scope of functionality of open source projects are controlled by external parties	Hiring of key developers and participation in upstream communities. No single vendor controls platform.
Organizational inertia	Required internal restructuring of processes	Adapt and open up processes.

Ari Jaaksi, Head of OSS Operations Nokia

But we believe the world is changing and the competitive advantage comes from how many others can you get from participating in this network. This network becomes more important than trade secrets.

Questions, comments?

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