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Network Effects of Digital Information Goods

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Today's agenda

- Information as an Economic Good
- Network Effects of Information Goods
- Measuring Network Effects
- Applied Case: Mobile OS
- Results



Information as an Economic Good

An **Information Good** is everything that is or can be available in digital form, and which is regarded as useful by economic agents.



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Network Effects

Networks

Users of an information good that are virtually connected (content, software)

Network Value (NV)

Additional or derivative value that is arising further to the basic or original value of a network good

Direct Network Effects

The more users join a network the greater its value

Indirect Network Effects

The more complements available the greater its value

(Katz/Shapiro 1985, Farrell/Saloner 1986, Arthur 1989, 2004, Sundararajan 2005, Farrell/Klemperer 2008)



What Are Network Effects (NWE)?

Existing Research

Broad overview (Linde 2008, Linde/Stock 2011)

Correlation between software use and the use of complements (e.g. print media, professional trainings) (Shurmer 1993)

Additional WTP for compatible software (Gandal 1994; Brynjolfsson/Kemerer 1996)

WTP depending on size of network (Buxmann 2002)

Expert poll on the strength of NWE (Srinivasan et al. 2004)

DVDs: Hardware demand and software supply (Inceoglu/Park 2010)



What Really Are Network Effects (NWE)?

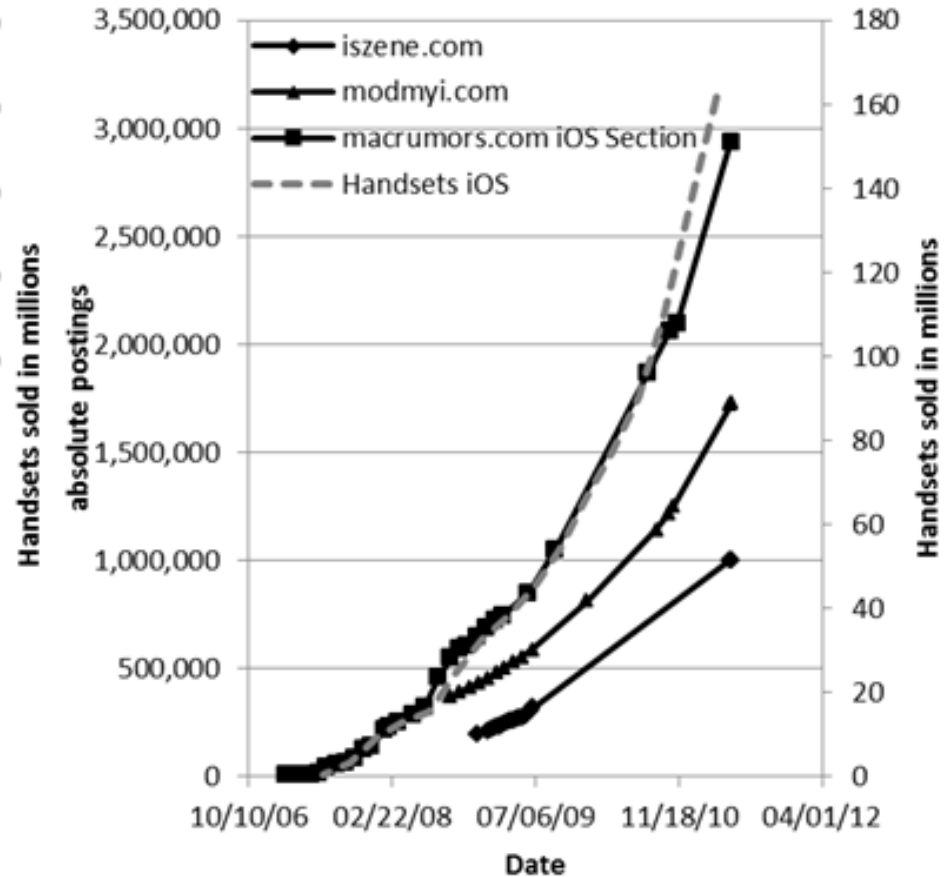
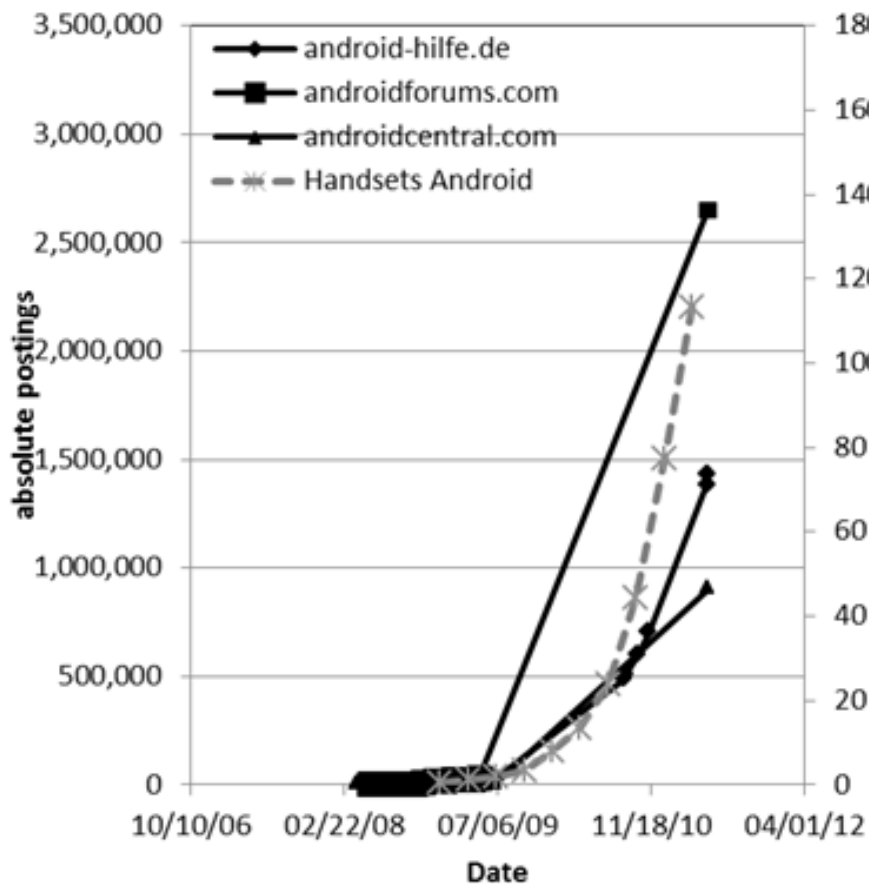
Our Research Aim

- Detailed operationalization of NWE
- Measurement of indicators for NWE
- Proof of NWE for a distinct industry

	Direct network effects	Indirect Network effects
Product features that support network effects	Integrated technologies Integrated communication applications	File formats System interfaces Source code access (open source)
Network effects	Data exchange Information exchange Mutual support Product evaluations	End devices Media reviews Additional applications Additional content Additional media Content and software suppliers Accessories Professional trainings



Measuring Mutual Support: Postings about Mobile OS





Network Effects of Mobile OS

	Direct effects	network	iOS	Android	Indirect network effects	iOS	Android
Product features that support network effects	Integrated technologies		n.a.	n.a.	File formats	n.a.	n.a.
	Integrated communication applications		n.a.	n.a.	System interfaces	+++	++
					Source code access (Open Source)	0	+
	Direct effects	network			Indirect network effects		
Network effects	Date exchange		n.a.	n.a.	End devices	+++	++
	Information exchange		n.a.	n.a.	Media reviews	n.a.	n.a.
	Mutual support		+++	+++	Additional applications	+++	++
	Product evaluations		+++	++	Additional content	n.a.	n.a.
					Additional media	++	+
					Content and software suppliers	+++	++
					Accessories	n.a.	n.a.
					Professional training	0	0
0 = no effect + = weak ++ = medium +++ = strong n.a.= not available							



Results

- Direct and indirect Network Effects (NWE) can be operationalized further than so far done
- For all operationalizations of NWE indicators can be found
- All indicators are potentially verifiable
- Applied to mobile OS not all indicators are assessable: direct NWE 2 out of 4 (6); indirect NWE 7 out of 8 (11)
- Reciprocity between the growth of the installed base and network effects
- Prediction of future lead in numbers of the installed base and in terms of network effects of Android OS



Literature

- For all references mentioned see:
Linde, F., Gorges, A., Kock, M., Network effects of digital information goods – a proposal for the operationalization of direct an indirect network effects, International Journal of Business Research, forthcoming.
- For an overview and further reading see:
Linde, F., Ökonomie der Information, 2nd ed., Göttingen 2008
Linde, F., Stock, W.G., Information Markets. A Strategic Guideline for the I-Commerce, Berlin, New York 2011.



Thank you for your attention!



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