



Comparing and visualizing the social spreading of products on a large social network

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Agenda

1. Motivation
2. Method
3. Definition and the evolution of adoption networks
4. The social adoption coefficient κ
6. Summary



Motivation

How does the underlying **structure** of a **empirical** social network among **adopters** develop over time?

How does it **vary** with different products?

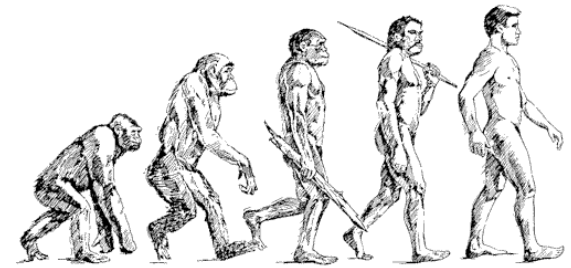
- Today network data are available through:
 - **Electronic phone logs (CDR=Call detail records)**
 - Social network services (linkedIn, facebook, myspace,IM etc)

• We know that social network matters when **purchase decisions** are made and people are **churning**.



Our Study

In this study we present an empirical and comparative study of how product diffusion occurs over time in a telecom market with millions of phone users



Focusing on four products:



Apple iPhone

"This changes everything"
"Highly buzzed"
"Great internet experience and design!"



Apple iPad

"People laughed at us for using the word magical. But you know what? It turned out to be magical!"



Doro

"Great for older people"
"Mobile phones that you can make phone calls with"



Mobile Video Telephony

"Requires 3G phone and 3G coverage"
"Brings people closer together"

Raw CDR data—our starting point

0 0	410883	2,42E+14	3,55E+14		12.11.2006	21	522635	12.11.2006	0	0	NOK		ZERO			Bedrift (Co	52	TAPIMP
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0 0	410883	2,42E+14	3,55E+14		12.11.2006	7	5910	12.11.2006	0	0	NOK		ZERO			Bedrift (Co	52	TAPIMP
0 0	410883	2,42E+14	3,55E+14	Pakkedata Roaming	12.11.2006	5	4989	12.11.2006	0	0	NOK		ZERO	12.11.2006	156	77.17.86.1	VAS	
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0 0	410883	2,42E+14	3,55E+14		12.11.2006	12	110323	12.11.2006	0	0	NOK		ZERO			Bedrift (Co	52	TAPIMP
1363679	410883	2,42E+14	0	ePost Kenth.Eng	12.11.2006	0	479150900	479150900	12.11.2006	0	0	NOK		TM100	156	77.16.162	BT Forbr	
1363679	410883	2,42E+14	0		12.11.2006	0	479051705	479051705	12.11.2006	11160	9820	NOK		SCAND_RATE	110	77.16.54.8	BT Utland	
1363679	410883	2,42E+14	0		12.11.2006	26	479501851	479501851	12.11.2006	2790	2450	NOK		SCAND_RATE	110	77.16.214	BT Utland	
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0 0	410883	2,42E+14	3,55E+14	Pakkedata Roaming	12.11.2006	13	12.11.2006	12.11.2006	0	0	NOK		ZERO			Bedrift (Co	52	TAPIMP
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0 0	410883	2,42E+14	3,55E+14	Pakkedata Internet T	12.11.2006	13	8830	13.11.2006	0	0	NOK	242	01	217.148.14.00000	156	77.16.173	VAS	
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0 0	410883	2,42E+14	3,55E+14	Pakkedata Internet T	12.11.2006	4	4029	13.11.2006	0	0	NOK	242	01	217.148.14.00000	156	77.17.27.2	VAS	

IMSI: SIM card

Date & time

A number - Caller

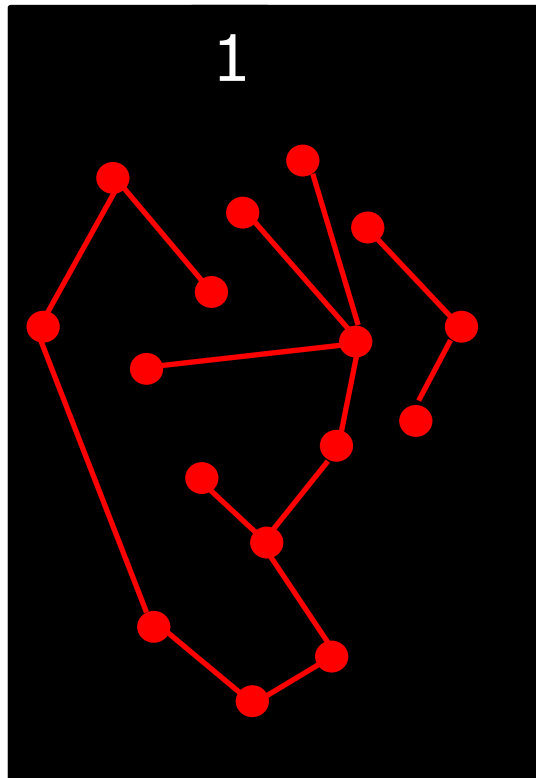
IMEI: Handset

B number - Receiving party

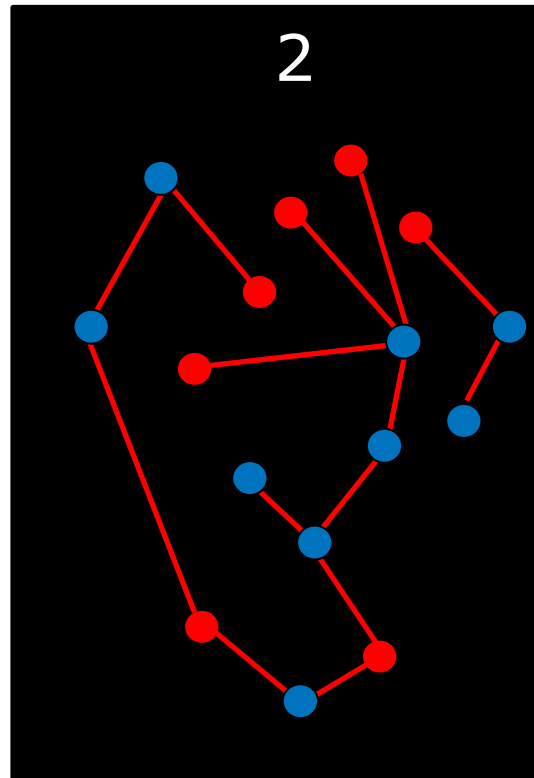
Cell_ID: Location

Type: Call, SMS, Data, etc

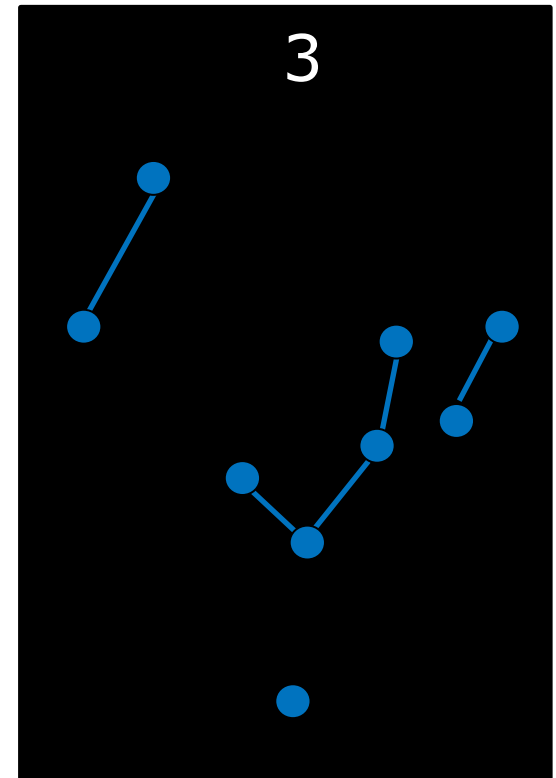
It is practical to define the adoption network



Social network



Social network +
adoption history



Adoption network





The iPhone adoption network evolution

Q307

Q407

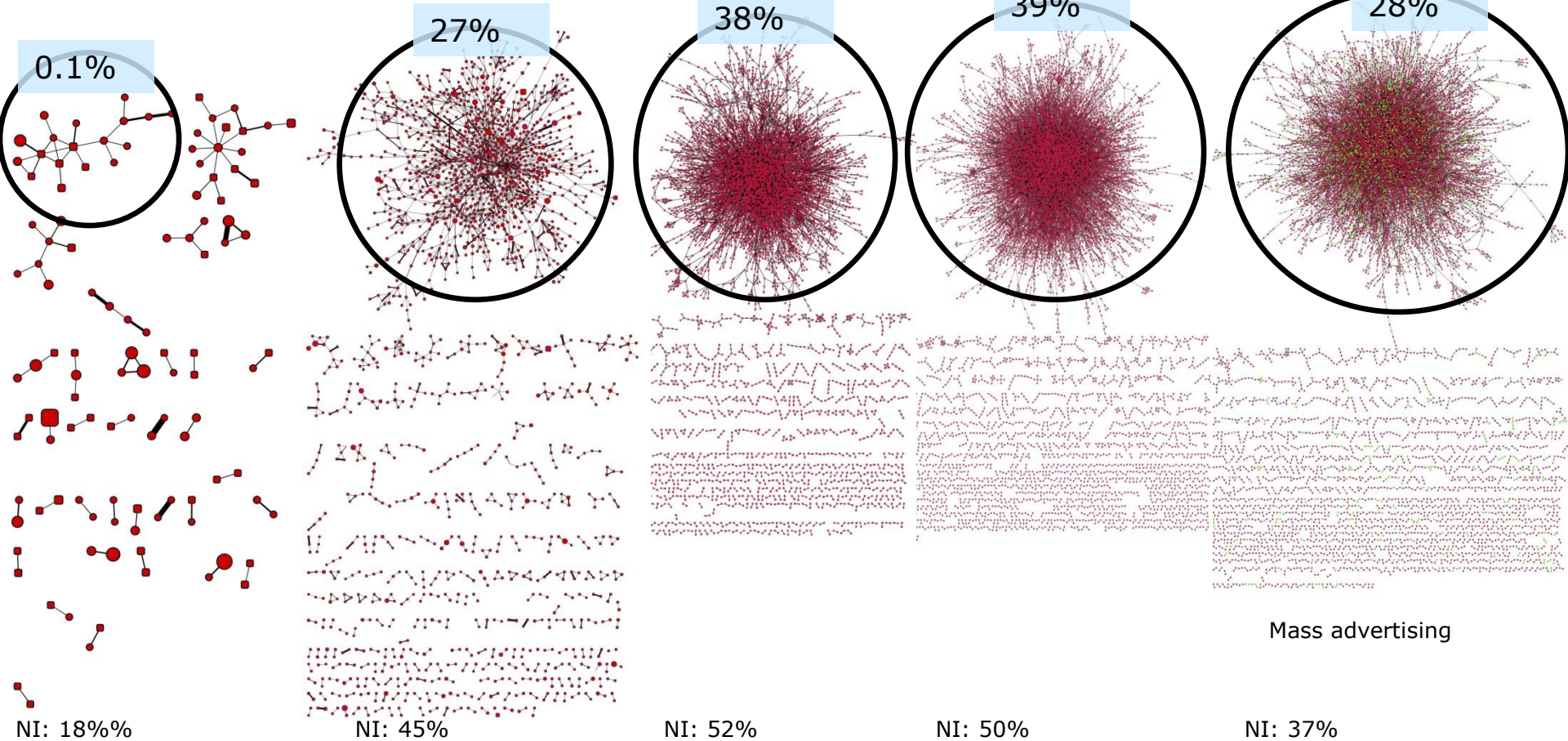
Q108

Q208

Q308

2G release
in US

3G release



iPhone not yet
available in specific
market:
"Cracked iPhones"
bought in the US.
Much traffic in US

● 2G ● 3G ● 3GS



The iPhone adoption network evolution

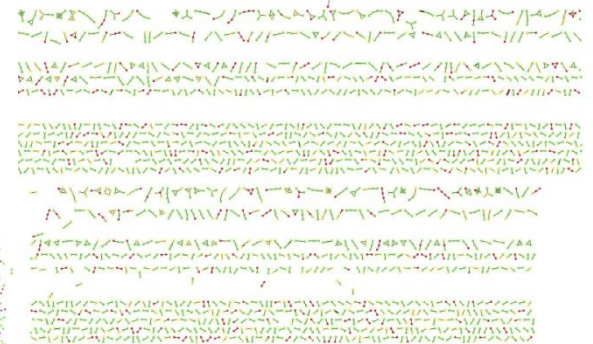
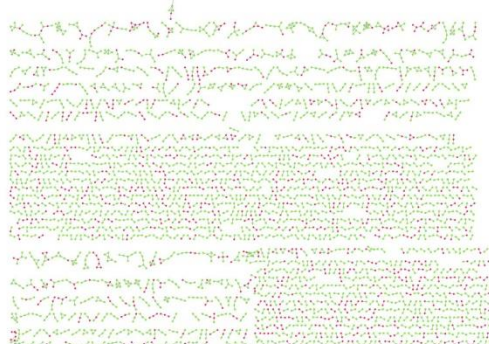
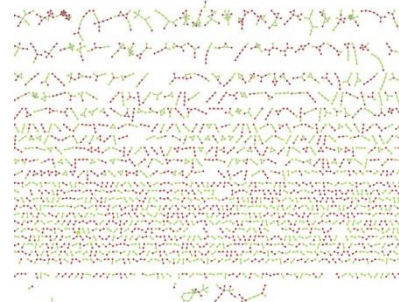
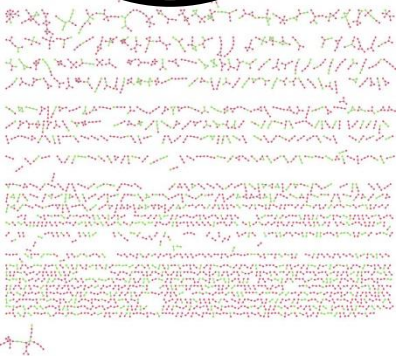
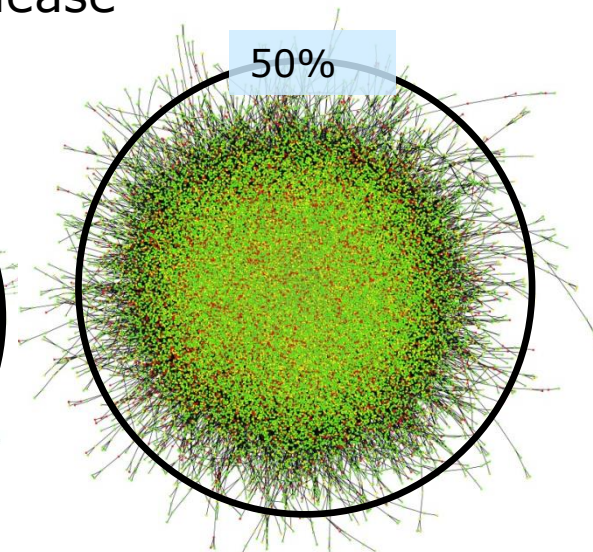
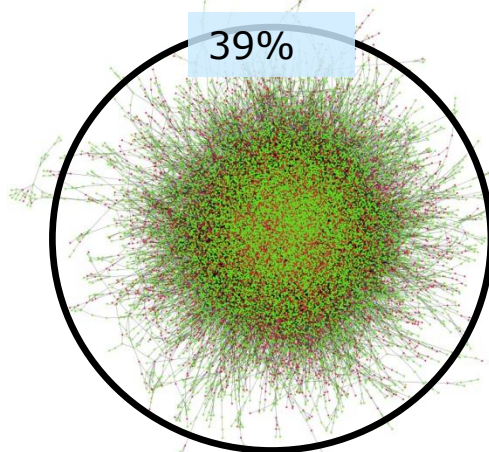
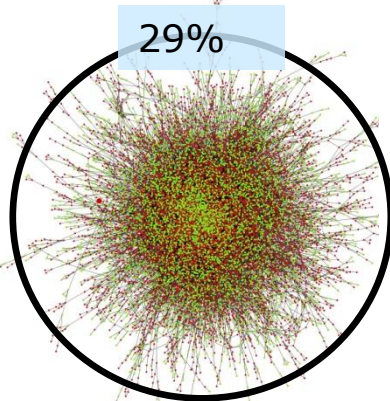
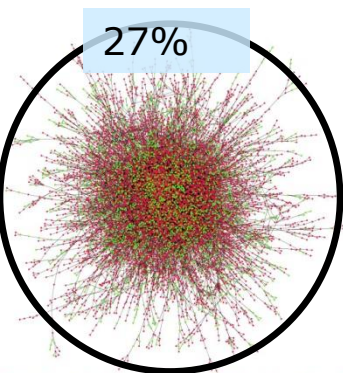
Q408

Q109

Q209

Q309

3GS release



NI: 36.7%

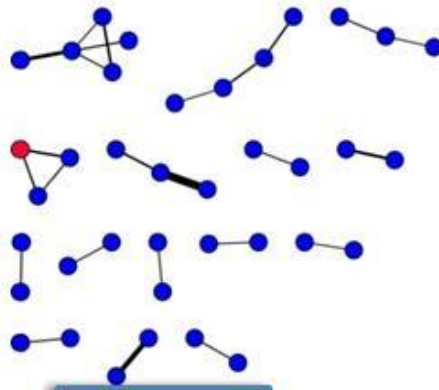
NI: 36.9%

NI: 44.7%

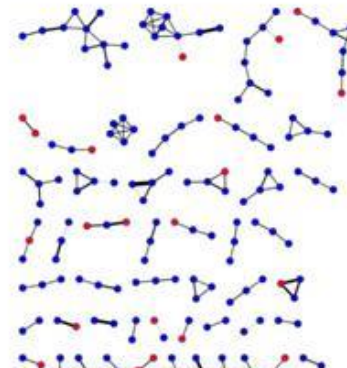
NI: 51.3%

● 2G ● 3G ● 3GS

iPad 3G



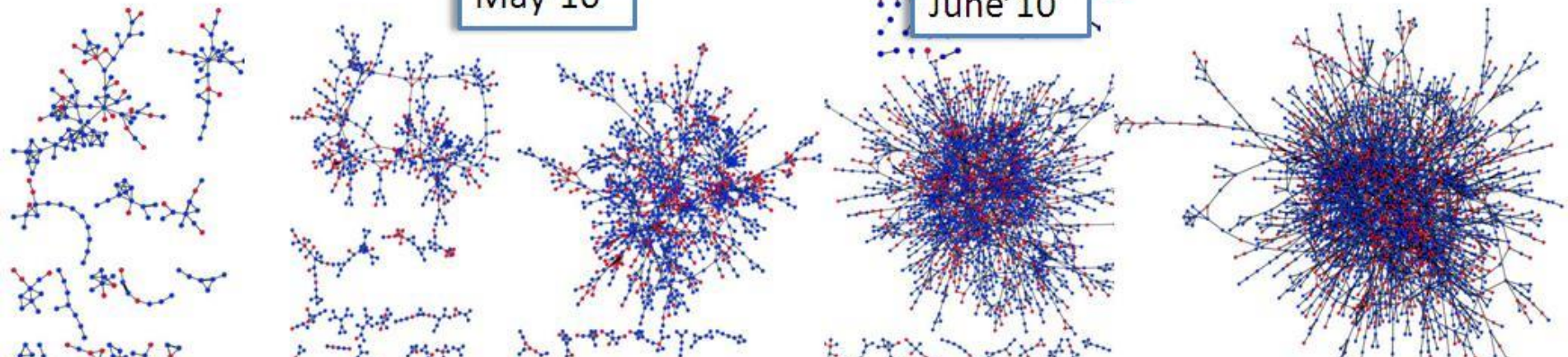
May'10



June'10

- =iPad user with iPhone
- =iPad user with other handset

Links are social relations based on *SMS+Voice*



•The Apple Tribe

- 54% of the iPad users also uses iPhone (5% market penetration of iPhone)
- If the iPad user is connected to another iPad user the chance of having an iPhone is 72%

July'10

Aug'10

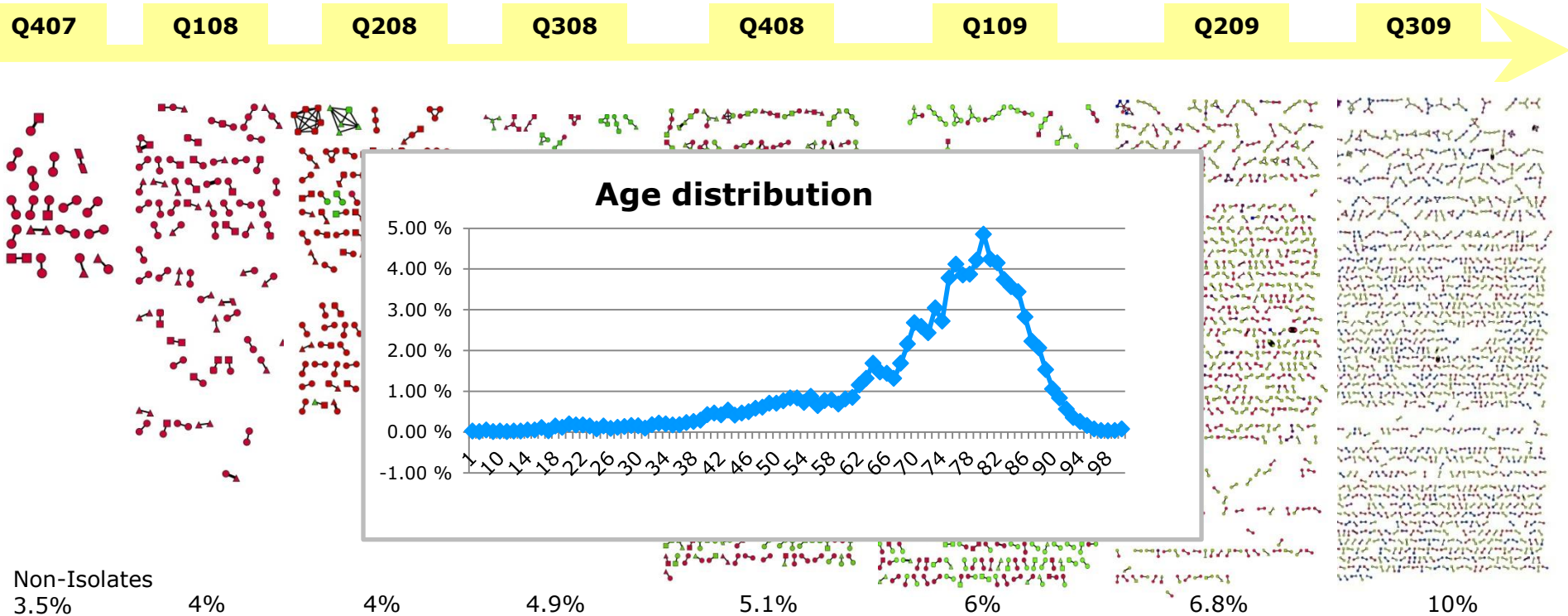
Sept'10

Oct'10

Nov'10



The DORO adoption network evolution

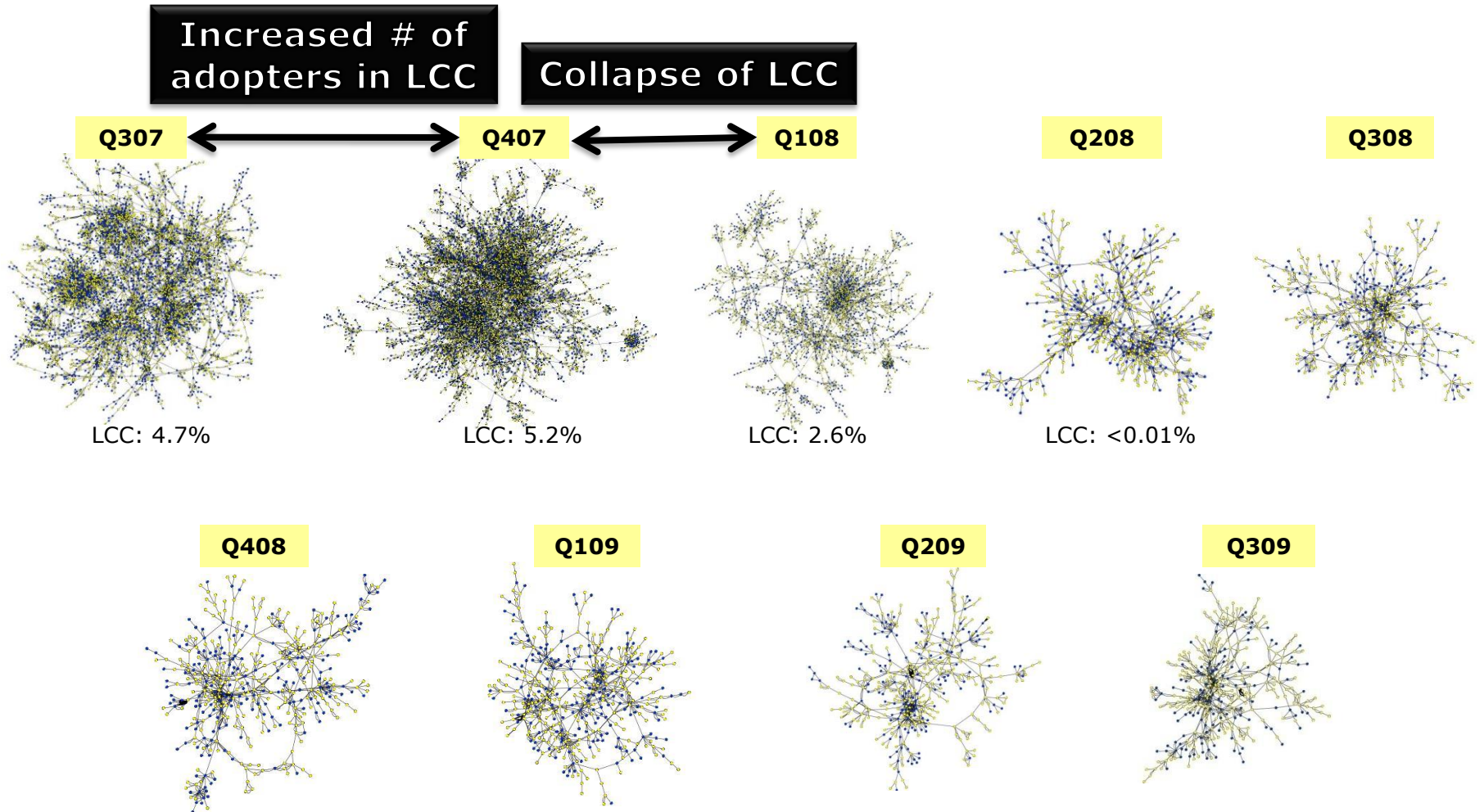


Adoption of Doro, an individual choice?
 Or The choice of the user's children who wish to be in contact with their elderly parents?

- Doro HandleEasy 326,328
 - Doro PhoneEasy 410
 - Doro HandleEasy 330
 - Other Doro (338,345,409)
- Age: □ <25 △ 25-55
 ▽ 55-70 ○ >70



The Mobile Video Telephony network evolution



K-test: We look for adoption pairs/links

- Do connected people adopt more often together than chance would predict?

- A highly viral product will have many influence links in the adoption network

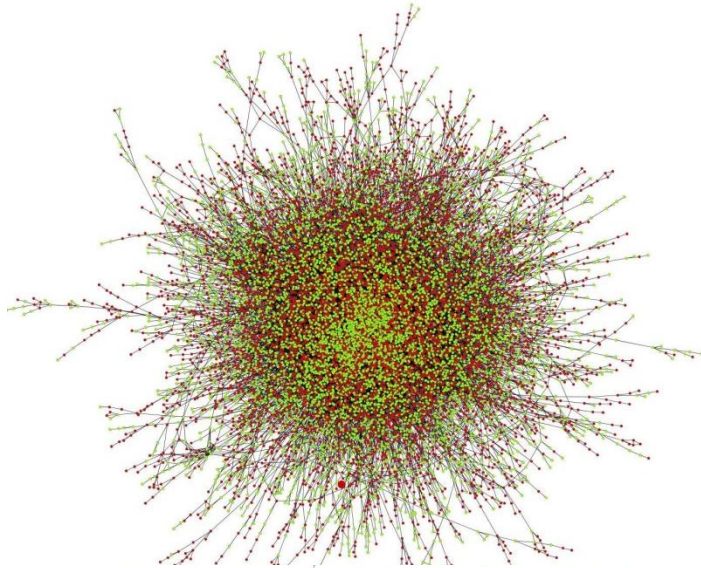


$$K = \frac{\text{\# connected adopters)}}{\text{\# expected connected adopters}}$$

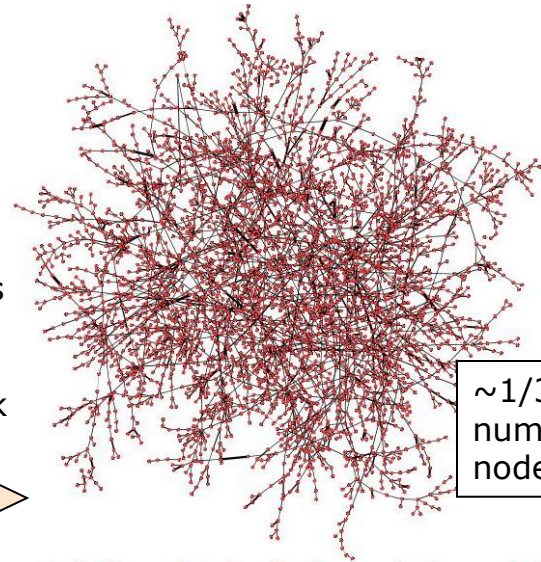
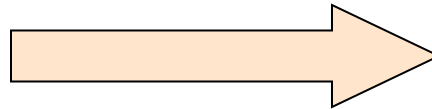
A model simulating random adoption among our subscribers

Strong social spreading effects $\rightarrow \kappa \rightarrow 1$
Random adoption $\rightarrow \kappa = 1$

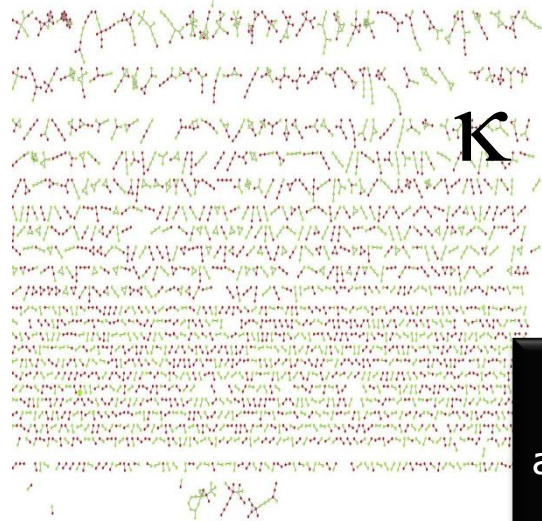
iPhone adopter-pairs are over represented in the empirical data



Shuffle the 47813 nodes from the empirical network randomly over the whole social network

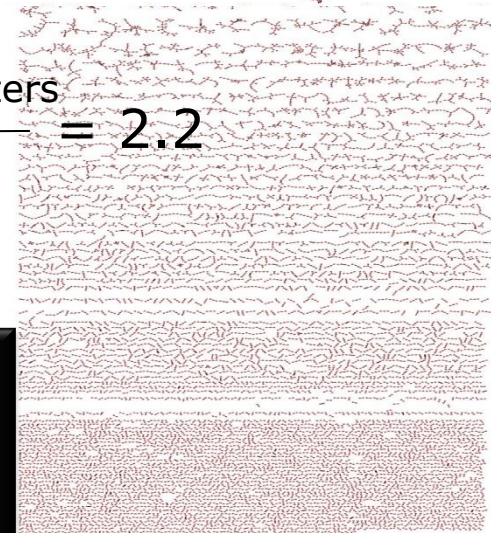


~1/3 the number of nodes in core



$$K = \frac{24\,879 \text{ connected adopters}}{11\,412 \text{ expected connected adopters}} = 2.2$$

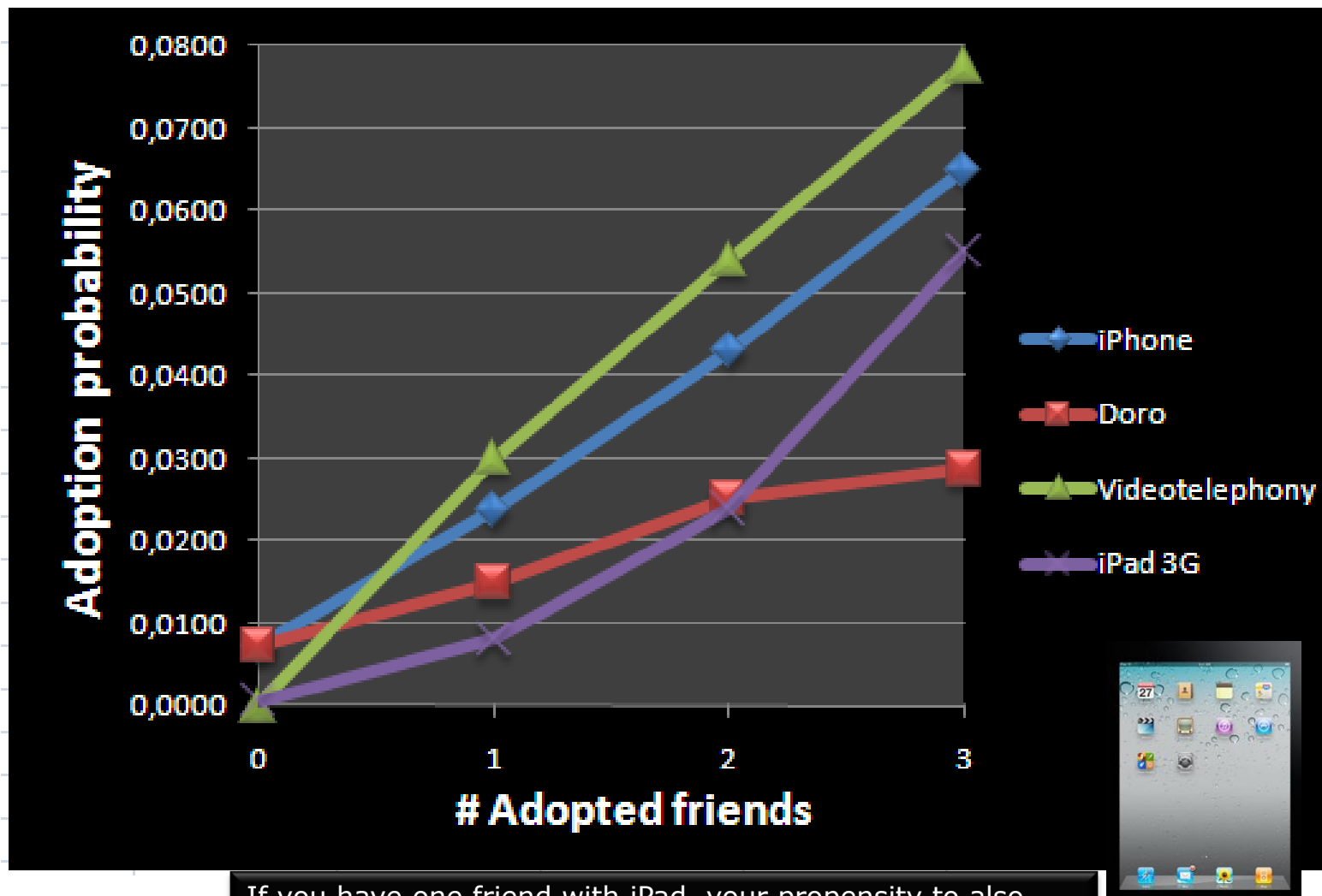
People who talk together adopt together much more often than chance would predict



Empirical network

Random network

You do what your **friends** do



If you have one friend with iPad, your propensity to also buy iPad will be **14** times higher.

Exploit the social circle to target customers with high social product pressure

- Summing up -



•The iPhone and iPad has very strong social spreading effects, and has truly taken off

- LCC grows monotonically in absolute values, while it has percentwise variation at the expense of isolates
- Communicating iPhone users are adopting together (κ -test)



•The Doro handsets have only very weak social spreading effects. This device will probably never take off in the same sense as the iPhone

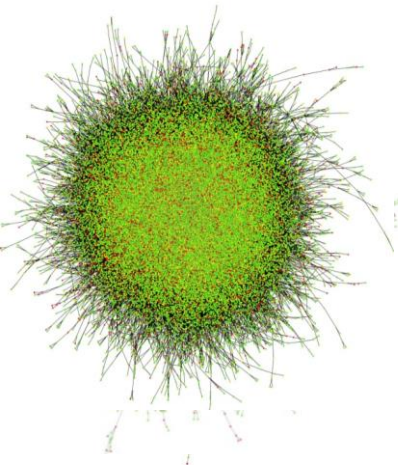
- LCC has not much variation with time
- Dominance of isolates (>90%)
- Communicating subscribers are usually not adopting together (κ -test)



•Video Telephony started spreading very strongly, however its early takeoff was stopped by a new price model

• Empirical data shows that the time evolution of the structure of the adoption network is very different for various mobile products.

THANK

Y  **U!**