

# Viable Online Communities

## Two case studies

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# Content-based online communities

Two categories of content-based communities:

- ▶ **Peer production systems**  
(e.g. Wikipedia, open source communities)
  
- ▶ **Social media**  
(e.g. Flickr, YouTube)

Communities of **users** collaboratively producing **content**, complying with **norms** about content production and social interaction and regulated by **governance** policies and administrator control.

# Sustaining the viability of online communities

## **Typical risks** threatening online communities:

- ▶ content explosion
- ▶ active population extinction
- ▶ high user turnover/low member persistence
- ▶ high user drop-off rate

# Overview

What factors drive the growth and sustain the viability of content-based online communities?

## 1. Case study: Peer production systems

- ▶ Growth enhancers and regulators in wiki-based communities

## 2. Case study: Social media

- ▶ Group affiliation and social network dynamics in Flickr groups

## 3. Modelling content-based communities

- ▶ How to build realistic models of viable communities

# Peer production systems: the case of wikis

Collaborative structure of a wiki:

- ▶ **population**

- ▶ editors (contributing content)
- ▶ administrators (managing edit revisions, user access restrictions)

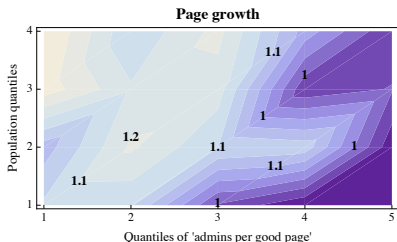
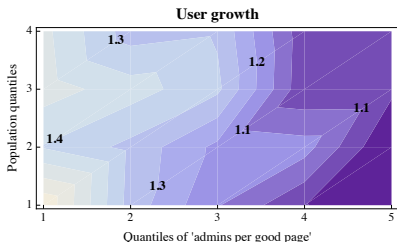
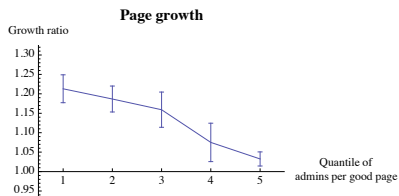
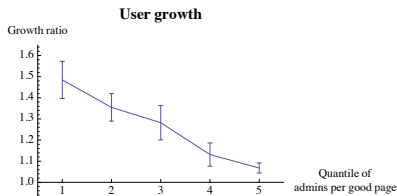
- ▶ **content**

- ▶ individual edits
- ▶ collaborative edited content (pages)

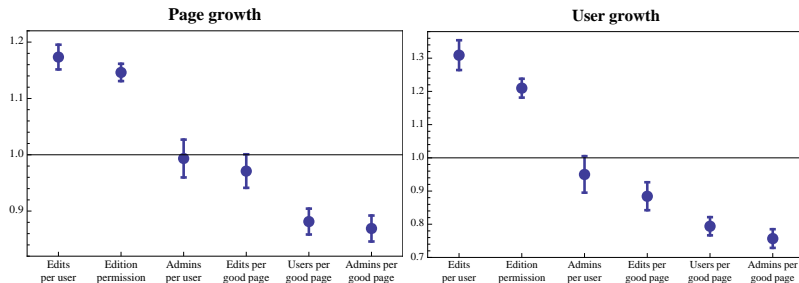
- ▶ **governance**

- ▶ access restriction (determine who can edit what)

# Example of growth regulator: admin density



# Summary of results



C. Roth, D. Taraborelli, N. Gilbert (2008)

Measuring wiki viability. An empirical assessment of the social dynamics of a large sample of wikis. *Proceedings of the 4th International Symposium on Wikis (WikiSym 2008)*, New York, NY, USA, September 2008, ACM.

# Social media: the case of Flickr groups

Collaborative structure of a Flickr group:

- ▶ **population**

- ▶ contributors (sharing photos with a group)
- ▶ moderators (selecting submitted photos for publication from the group moderation queue, when applicable)
- ▶ administrators (managing member rights)

- ▶ **content**

- ▶ photos shared by members with the group (group pool)
- ▶ group discussions

- ▶ **governance**

- ▶ privacy level (public/invite-only/private)
- ▶ moderation queue (if enabled, photos must be selected by moderators to appear in the pool)
- ▶ throttling (limits the max. number of photos users can post to the group per time period)



# Flickr dynamics: regression analysis

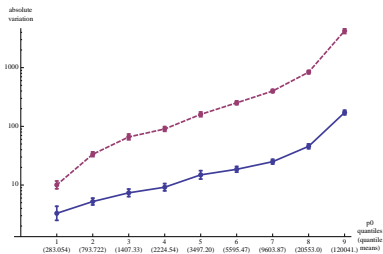
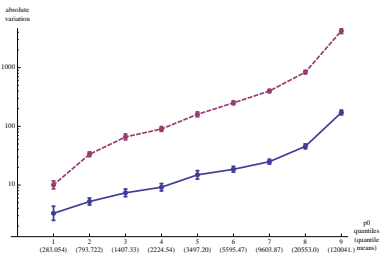
<i>parameter</i>	population variation		content variation		population turnover joining		leaving	
	<i>value</i>	<i>(p)</i>	<i>value</i>	<i>(p)</i>	<i>value</i>	<i>(p)</i>	<i>value</i>	<i>(p)</i>
intercept	-0.27	> .1	-2.20	***	-1.02	***	-4.91	***
$u_0$	0.87	***	-		0.77	***	0.78	***
$p_0$	-		0.94	***	0.11	***	-0.03	***
$r$	0.99	***	2.09	***	-		-0.19	**
$c_3$	-1.87	***	-1.73	***	-1.49	***	-1.27	***
$k$	0.10	*	0.18	***	-		0.23	***
$ms$	-0.57	***	-0.33	***	-0.43	***	0.35	***
$\mu$	-		-		0.08	**	0.07	***
$mod$	0.05	**	0.09	***	0.08	***	0.02	***
$\theta$	-		0.10	***	-		-	
$adm/u_0$	-		-		-0.06	***	-	
$R^2$	0.65		0.75		0.68		0.82	

(\* , \*\* and \*\*\* mean a  $p$ -value smaller than 0.05, 0.01 and 0.001 respectively)

# Demography-driven growth enhancers

## Do larger groups grow faster?

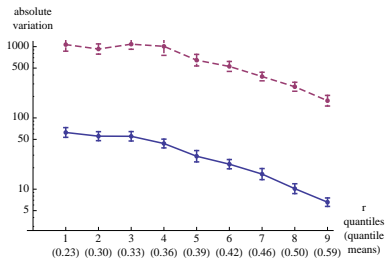
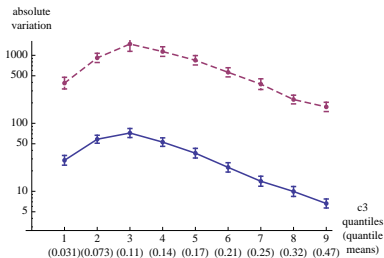
Initial group size: **population** (left) and **content** (right)



# Social network-driven growth regulators

## Do cohesive groups grow slower?

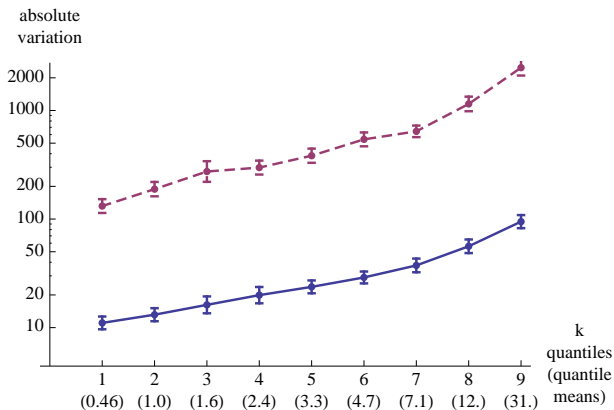
**clustering coefficient** (left) and **link reciprocity** (right)



# Social network-driven growth enhancers

Do groups with more socially active members grow faster?

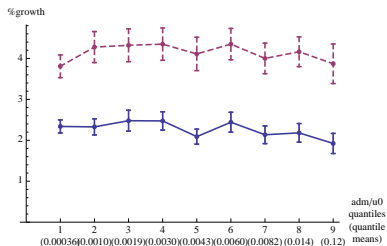
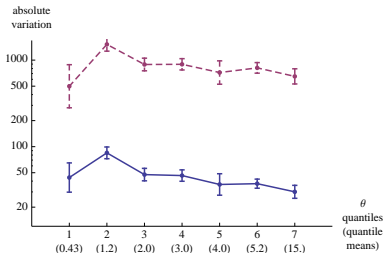
## Average degree



# Governance-driven growth regulators

Do curated groups grow differently from regular groups?

throttling (left), admin density (right)



# Flickr group dynamics: results

- ▶ distinct drivers behind absolute growth and user turnover
- ▶ strong correlation of growth landscapes for content and population (consistent with wikis)
- ▶ no significant effects on relative growth rates (size matters)
- ▶ key role of network structure in enhancing or regulating growth
- ▶ negligible role of governance-driven factors

D. Taraborelli, C. Roth (2009)

Affiliates or friends? Drivers of group dynamics in online social media (in preparation).

# Peer production vs. social media

## Macroscopic discrepancies

- ▶ demographic and governance properties are **good predictors** of growth in the case of wikis
- ▶ ...but **surprisingly poor** at predicting growth rates in social media communities.

## Reasons

1. distinct underlying **modes of collaboration** (collaborative vs. atomistic).
2. effects of the underlying **social network** as a recruitment factor in social media groups.
3. different effect of **governance policies**.

# Modelling viable online communities

How to build **realistic** models of viable online communities.

## (1) Take into account different content production modes

- ▶ **collaborative** in peer production systems  
(users contribute to a common good collaboratively authored by a collective of users where maintaining control over individual contributions is not possible, e.g. *edits to a wiki page or code modifications to an open source project*)
- ▶ **atomistic** in social media  
(users contribute to a common good by maintaining control over their contribution, e.g. *photos shared in a group pool*)



# Modelling viable online communities

## (2) Make empirically-grounded hypotheses of micro-level behaviour

- ▶ Existing models of group affiliation and social network coevolution focus on recruitment drivers such as:
  - ▶ social influence
  - ▶ social fringe recruitment

(Backstrom et al. 2006; De Choudury 2009; Hui et al. 2009)

- ▶ **However** this assumption can be challenged on empirical grounds (Zheleva et al. 2009)

**Ground models in realistic hypotheses of what drives joining/leaving behaviour.**

# Modelling viable online communities

## (3) Characterize viability

- ▶ maintain monotonic population growth
- ▶ keep the number of leaving members below a desired rate
- ▶ minimize member turnover
- ▶ maintain a manageable content/population ratio

**Explore scenarios based on different sets of assumptions and disrupting any of these viability criteria.**