Tie strength in job change : Evidence from business card exchange in Japan

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Introduction

◆ Strength of weak ties hypothesis (Granovetter, 1973)

- "The significance of weak ties is that they are far more likely to be bridges than are strong ties"
- "Only bridging weak ties are of special value"

◆ Weak ties vs Strong ties

Some studies show the benefits of weak bridging ties, whereas other studies show the advantage of strong cohesive ties.

◆ Empirical challenges

1. Lack of data on large social ties and job change
2. Operation of BWT concept
3. Structure-dynamic relationship of job

Descriptive statistics

◆ Business card exchange network is scale-free network (Figure2).

◆ When number of edges increase over time, density and cluster coefficients are not greatly changed (Table1).

◆ Those who exchange business cards frequently are likely to contact with people similar to themselves (Table1).

◆ Other social networks are denser than business card exchange network (Table1).

◆ Transitivity is more likely to occur in other social networks because its network is based on closer friendship than business network (Table 2).

Table1 : Basic characteristics of business card exchange network

Date	Node	Edge	Density	Cluster Coefficient	Assortativity	The rate of job change
14-Mar	82,517	578,765	0.0002	0.070	0.190	0.082
14-Sep	106,378	968,128	0.0002	0.067	0.211	0.074
15-Mar	142,625	1,555,578	0.0002	0.058	0.221	0.074
15-Sep	193,217	2,641,164	0.0001	0.065	0.204	0.086
16-Mar	232,454	3,879,251	0.0001	0.064	0.203	0.069
16-Sep	272,824	5,485,679	0.0001	0.063	0.199	0.074
17-Feb	296,974	6,844,052	0.0002	0.063	0.191	0.094

Identification strategy

Explanatory variable

Constraint (Bridging Weak ties)

Dependent variable

whether users change their job or not

Control variable

- Egocentric network feature
- Socio-centric network feature

- Using panel data divided into six waves by six months
- Fixed effect estimation

Results

◆ We find positive relationship between network constraint and job change, meaning that not bridging weak ties but strong cohesive ties are the contributing factor for social mobility.

◆ This is inconsistent with original SWT which emphasized the importance of bridging weak ties.

◆ Recent researches (e.g. Aral & Dhillon(2016) and Gee, Jones and Burke(2017)) propose that type of novel information is different whether it is transmitted through bridging weak ties or strong cohesive ties.

Using Data

◆ Anonymous user's profile and records of exchanging business cards from Eight, which business networking service by Sansan,Inc.

◆ Over 1.5M individuals from March. 2014 to March. 2017 and sample 82,517 users since 14-Mar using random node sampling to be proportional to its degree weight.

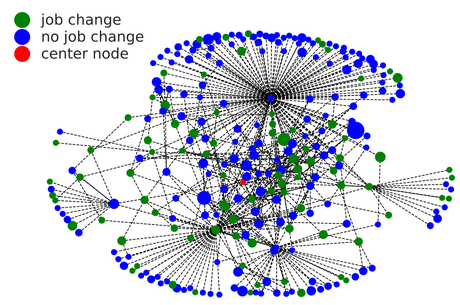

Figure1. The business network of a certain user(red node) who change jobs : Red and green nodes means those who have changed jobs. The following analysis shows that they are likely to have dense networks.

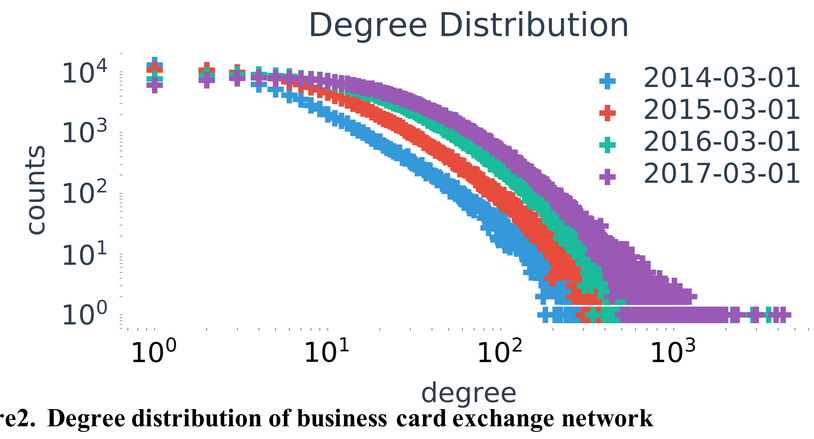

Figure2. Degree distribution of business card exchange network

Table2 : Comparison with other social networks

Network	Node	Edge	Density	Cluster coefficient	Assortativity
Business cards Exchange Network (Feb-17)	296,974	6,844,052	1.55×10^{-4}	0.066	0.191
Business cards Exchange Network (top 5000nodes, Feb-17)	5,000	293,635	2.35×10^{-2}	0.153	0.115
Facebook*	4,039	88,234	1.08×10^{-2}	0.614	0.115
LiveJournal*	3,997,962	34,681,189	4.34×10^{-6}	0.346	0.121
Orkut*	3,072,441	117,185,083	2.48×10^{-5}	0.175	0.077
Youtube*	1,134,890	2,987,624	4.64×10^{-6}	0.173	-0.025

*Leskovec J, Krevl A (2014) SNAP Datasets: Stanford large network dataset collection(https://snap.stanford.edu/data/)

Table3. Estimation results : "Is bridging weak ties or constrain (Burt, 2004) related with job change?"

	Dependent variable:			
	Job change			
	(1)	(2)	(3)	(4)
Constraint(Bridging weak tie)	0.039***		0.024***	0.025***
	(0.003)		(0.003)	(0.003)
Cluster coefficient	0.012***			0.009**
	(0.004)			(0.004)
Degree		−0.002***	−0.00001	0.0001
		(0.001)	(0.001)	(0.001)
Pagerank		−743.623***	−667.525***	−665.439***
		(49.197)	(50.165)	(50.174)
Betweenness centrality		2.921	1.924	1.911
		(2.090)	(2.094)	(2.094)
Observations	495,102	495,102	495,102	495,102
R^2	0.001	0.001	0.001	0.001
Standard errors in parentheses				*p<0.1; **p<0.05; ***p<0.01

Conclusion

March and Simon(1958) opened a new research area to develop general theory of job change and Granovetter proposed SWT hypothesis to stress the importance of network level perspective. To the best of our knowledge, this is the first study to examine the role that bridging weak tie plays in the structure and dynamic relations of job change within a large-scale network data. Future research is warranted to deepen our understanding of the role that not only bridging weak tie but other network characteristics play in the evolution of social system.

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