Integrating Brokerage and Closure as Social Capital

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Sociogram of the Org Chart for a Large EU Healthcare Organization

- CEO
- C-Suite
- Heir Apparent
- Other, Respondent
- Other, NonRespondent

Figure 1.1 in Burt (2017, Structural Holes in Virtual Worlds).
Sociogram of Senior Leadership in the Healthcare Organization

Lines indicate frequent and substantive work discussion; heavy lines especially close relationships.

Figure 1.2 in Burt (2017, Structural Holes in Virtual Worlds).
Brokerage \((NA = B \times C)\)
Network Brokers Have a Competitive Advantage in Detecting and Developing Opportunities

Contingency \((NA = B \times C)\)
Only Certain Brokers Benefit from the Advantage

Closure \((NA = B \times C)\)
Closure Generates the Critical Contingency Factor

Robust Theory, Flimsy Empirics
High returns to brokerage (positive reputation, network oscillation)
Low returns to brokerage (diversity, legacy org, contextual extremes [guanxi])
Network Constraint

decreases with number of contacts (size), increases with strength of connections between contacts (density), and increases with sharing the network (hierarchy).

This is Figure 1 in Burt, "Reinforced Structural Holes," (2015, Social Networks, an elaboration of Figure B.2 in Neighbor Networks). Graph above plots density and hierarchy for 1,989 networks observed in six management populations (aggregated in Figure 2.4 in Neighbor Networks to illustrate returns to brokerage). Dot-circles are executives (MD or more in finance, VP or more otherwise). Hollow circles are lower ranks. Executives have significantly larger, less dense, and less hierarchical networks.

To keep the diagrams simple, relations with ego are not presented.
The Network Measures of Access to Structural Holes Are Strongly Correlated

These are network metrics for 801 senior people in two organizations analyzed in Burt, "Reinforced structural holes" (2015, Social Networks). One organization is a center-periphery network of investment bankers (circles). The other is a balkanized network of supply-chain managers in a large electronics company (squares). The point is that networks rich in structural holes by one measure tend to be rich in the other measures.
More Generally: Network Brokers Propose Better Ideas

Graphs show idea quality increasing with more access to structural holes in the networks around supply-chain managers in a large electronics firm. Circles in graph A are average scores on the vertical axis within interval numbers of nonredundant contacts. Circles in graph B are average scores on the vertical axis for five-point intervals of network constraint. Bold line is the vertical axis predicted by a function of nonredundant contacts (graph A, linear and squared terms), or the natural logarithm of network constraint (graph B). Association statistics in the graphs are computed from the displayed data.

see Figure 2.1 in Brokerage and Closure (or Figure 5 in Burt, "Structural holes and good ideas," 2004 American Journal of Sociology)
In Sum, Brokers Do Better

A. High achievement is associated with many nonredundant contacts ($R^2 = .39$, $n = 125$, $t = 6.52$, -4.12)

B. High achievement is associated with large, open networks ($R^2 = .36$, $n = 85$, $t = -6.78$)

Graphs show achievement — evaluation, compensation, and promotion — increasing with more access to structural holes in six populations (analysts, bankers, and managers in Asia, Europe, and North America; Burt, 2010:26, cf. Burt, 2005:56). Circles in graph A are average scores on the vertical axis within integer numbers of nonredundant contacts. Circles in graph B are average scores on the vertical axis for five-point intervals of network constraint. Bold line is the vertical axis predicted by a function of nonredundant contacts (graph A, linear and squared terms; dashed regression line is through zero to six nonredundant contacts, $R^2 = .70$, $n = 39$, $t = 4.97$, -2.70), or the natural logarithm of network constraint (graph B). Association statistics in the graphs are computed from the displayed data.
Returns to Brokerage Aggregate to Companies, Industries, and Communities

People with phone networks that span structural holes live in communities higher in socio-economic rank

Networks are defined by land-line & mobile phone calls (map to left). Socio-economic rank is UK government index of multiple deprivation (IMD) based on local income, employment, education, health, crime, housing, and environmental quality (graph below). Units are phone area codes.

Fig. 1. An image of regional communication diversity and socioeconomic ranking for the UK. We find that communities with diverse communication patterns tend to rank higher (represented from light blue to dark blue) than the regions with more insular communication. This result implies that communication diversity is a key indicator of an economically healthy community. [C29] Crown copyright material is reproduced with the permission of the Controller of Her Majesty’s Stationery Office.

Fig. 2. The relation between social network diversity and socioeconomic rank. Diversity was constructed as a composite of Shannon entropy and Burt’s measure of structural holes, by using principal component analysis. A fractional polynomial was fit to the data.

figures from Eagle, Macy, and Claxton (2010, Science), “Network diversity and economic development”
This is Figure 3.5 in Burt, *Structural Holes in Virtual Worlds* (2017). Dots are average Y scores within integer (left) or five-point (right) intervals on horizontal axis. *EverQuest II* achievement variable is the predicted character level in Model 8, Tables 3.4 and 3.5. *Second Life* achievement is the canonical correlation dependent variable in Model 15, Tables 3.5 and 3.6 (associations with individual achievement dimensions in *Second Life* are given in graphs in Appendix V).
Three Summary Points

Network Structure Is a Proxy for the Distribution of Information

For reasons of opportunity, shared interests, experience — simple inertia — organizations and markets drift toward the bridge-and-cluster structure known as a “small world.” Over time, information becomes "sticky" within clusters, different between clusters.

In Which Network Brokers Have a Competitive Advantage

Bridge relations across the structural holes between clusters provide information breadth, timing, and arbitrage advantages, such that network brokers managing the bridges are at higher risk of “productive accident” in detecting and developing good ideas. They are the source of significant innovation in organizations and markets. In return, network brokers tend to be better compensated than peers, more widely celebrated than peers, and promoted more quickly to senior rank relative to peers; in short, brokers do better.

Three Points Follow from the Link between Network Brokerage & Innovation

- Closed networks do not identify unintelligent managers so much as expert specialists.
- Innovation is an import/export process. Value is not created at the innovation source. It is created each time productive knowledge produces innovation in a target audience.
- Innovation depends on the network as well as the person. Innovation does not depend on individual genius so much as it depends on employees finding opportunities to broker knowledge from where it is routine to where it would create value.
Brokerage (NA = B x C)
Network Brokers Have a Competitive Advantage in Detecting and Developing Opportunities

Contingency (NA = B x C)
Only Certain Brokers Benefit from the Advantage

Closure (NA = B x C)
Closure Generates the Critical Contingency Factor

Robust Theory, Flimsy Empirics
High returns to brokerage (positive reputation, network oscillation)
Low returns to brokerage (diversity, legacy org, contextual extremes [guanxi])
Contingency Factors: Different Returns to Brokerage

Graph A below is from *Brokerage & Closure* and the previous handout showing achievement increasing with more access to structural holes. Circles are z-score residual achievement for 1,986 observations averaged within five-point intervals of network constraint in each of six management populations (analysts, bankers, and managers in Asia, Europe, and North America, see discussion of Figure 2.3 in Chapter 2; heteroscedasticity is negligible, $X^2 = 2.97$, 1 d.f., $P \sim .08$). Bold line is the vertical axis predicted by network constraint.

Graph B to the right shows the raw data that were averaged to create Graph A. Vertical axis is wider to accommodate more variable achievement. Heteroscedasticity is high due to achievement differences between advantaged individuals ($X^2 = 269.5$, 1 d.f., $P < .001$), but the association between achievement and network advantage remains statistically significant when adjusted for heteroscedasticity (Huber-White, $t = -8.49$).

A. Achievement Scores for People in Open Networks Are Higher than Peers on Average ($r = -.58$, $t = -6.78$, $n = 85$)

B. But Vary Widely between the Advantaged Individuals (overall $r = -.24$, $t = -9.98$, $n = 1,989$)

Figure adapted from Figure 1 in Burt (2012, "Network Related Personality," *American Journal of Sociology*).
Audience Effect, I: Broker's Job Rank Reassures or Concerns the Target Audience

Which means the network around a senior person is especially important for his or her achievement.

| Salary |
|-----------------|-----------------|
| Manager 1       | $-31,099^{**}$ (2,882) |
| Manager 2       | $-16,652^{**}$ (2,745) |
| Manager 3 (reference) | 0   |
| Sr. manager     | $19,638^{**}$ (3,782) |
| Executive       | $65,394^{**}$ (4,522) |
| Purchasing      | 754 (1,351)        |
| Age             | 338** (52)         |
| Bachelor        | 1,610 (1,003)      |
| Graduate        | 734 (864)          |
| Hightech        | $3,516^{**}$ (880) |
| Lowtech         | $-6,927^{**}$ (1,481) |
| Urban 1         | $3,613^{**}$ (1,046) |
| Urban 2         | $5,049^{**}$ (1,010) |
| Network constraint | $-7$ (25)       |
| Mgr2 × constraint | $-19$ (35)       |
| Mgr3 × constraint | $-47$ (38)       |
| SrMgr × constraint | $-214^*$ (75)  |
| Executive × constraint | $-681^{**}$ (124) |
| N               | 673               |

Graphs for executives, managers, and junior managers to the right show z-score compensation relative to peers (controlling for background differences) across levels of network constraint. Table to the left is from page 371 of Burt, "Structural holes and good ideas" (2004, American Journal of Sociology).

See pp. 156-162 and Figure 3.8 in Brokerage and Closure for general discussion showing the form of contingency functions. On problem vs. paradox as the proper focus for leadership, see Dotlich, Cairo, and Cowan (2014, The Unfinished Leader).
Audience Effect II: Broker's Social Standing Reassures or Concerns the Target Audience

Network status is on the vertical axis of the top graph. It is computed like price in the general equilibrium model: \( S_i = \sum_j z_{ji} S_j \), where \( S_i \) is status of person i, and \( z_{ji} \) is connection from j to i (see Appendix V for details). Like price, status is only meaningful in reference to the status of some numeraire benchmark person. Here, status is normalized at the mean, so a score of 1.0 indicates a person of average status in the network.

\[
S_i = \sum_j z_{ji} S_j
\]
Audience Effect III, Cont.

Graph plots relative banker compensation across levels of constraint in the banker’s discussion network. Compensation is averaged within intervals of network constraint, but the test statistic is for all 469 observations, holding constant job rank, peer evaluation, years with the organization, minority, and working in US headquarters (Burt, 2010:91-93).

There are two predictions: one for bankers with above-average reputations (solid squares), the other for bankers with below-average reputations (hollow squares). Network status is added to each prediction as a control for a banker’s social standing across all senior people in the bank.

As Rider (2009:578-579) explains for placement agents: “a broker’s reputation for consistently representing actors of high quality is a valuable, intangible asset that enables a broker to realize future rents on the brokerage position. . . If a positive reputation reduces the costs of assuaging potential exchange partners’ concerns, then the returns to brokerage should be positively related to a broker’s reputation.” Similarly, Nee and Opper (2012: 211) describe Chinese entrepreneurs building reputation in the course of brokering connections: “Through personal introductions and fine-grained information passed through social networks, the ‘broker’ typically signals trustworthiness and reputation of the prospective business partners. Moreover, it is in the broker’s interest to make good recommendations, as most business partners will tend to reward their networking contacts in one way or another. Such introductions can span the social gaps, or ‘structural holes’ between groups.

Figure 3.3 in Burt (2017, *Structural Holes in Virtual Worlds*). The boutique investment bank, Moelis — “Best Global Independent Investment Bank” in 2010 and “Most Innovative Boutique of the Year” in 2011 — nicely illustrates the competitive advantage of reputation as an entree to brokerage opportunities (download free Moelis case from www.sbs.oxford.edu/reputation/cases).
Most important, more people are enabled by reputation to be successful brokers.

Relative to job rank and network status, reputation opens organizations and markets to the largest number of people with good ideas.

Horizontal axis ranks banker observations from highest status (hollow dots) or most-positive reputation (solid dots) to the opposite extreme. Vertical axis is the correlation between compensation and log network constraint for a sample of observations adjacent to each banker (24 of higher social standing plus 24 of lower). Displayed data are smoothed by averaging across 24 adjacent observations.

Figure 3.4 in Burt (2017, Structural Holes in Virtual Worlds).
Figure 3.4
Reputation Makes Eligible a Broader Population of Would-Be Brokers

Horizontal axis ranks banker observations from highest status (hollow dots) or most-positive reputation (solid dots) to the opposite extreme. Vertical axis is the correlation between compensation and log network constraint for a sample of 48 observations adjacent to each banker (24 of higher social standing plus 24 of lower social standing). Displayed data are smoothed by averaging across 24 adjacent observations.
Brokerage (NA = B x C)
Network Brokers Have a Competitive Advantage in Detecting and Developing Opportunities

Contingency (NA = B x C)
Only Certain Brokers Benefit from the Advantage

Closure (NA = B x C)
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Robust Theory, Flimsy Empirics
High returns to brokerage (positive reputation, network oscillation)
Low returns to brokerage (diversity, legacy org, contextual extremes [guanxi])
More connections allow more rapid communication, so poor behavior can be more readily detected and punished. Bureaucratic authority was the traditional engine for coordination in organizations (budget, head count). The new engine is reputation (e.g., eBay). In flattened-down organizations, leader roles are often ambiguous, so people need help knowing who to trust, and the boss needs help supervising her direct reports. Multi-point evaluation systems, often discussed as 360° evaluation systems, gather evaluative data from the people who work with an employee. These are "reputational" systems in that evaluations are the same data that define an employee's reputation in the company. In essence, reputation is the governance mechanism in social networks.
Graph A describes 147,153 observed and potential relations between 543 HR managers in a large financial organization. The positive, negative, and trust kinds of relations are discussed in the text. Graph B describes 46,231 observed colleague relations with analysts and bankers over a four-year period (adapted from Burt, 2010:174-175). Vertical axis is number of mutual contacts this year. Z-score test statistics in both graphs are estimated with controls for differences in network size and adjusted for autocorrelation between relationships (Stata “cluster” option).

Figure 3.7 in Burt (2017, Structural Holes in Virtual Worlds).
And the Same Holds for Online Social Relationships

Dots are average Y scores within intervals of X. Second Life trust is friendship rights granted to contact as predicted in Table 3.1 by Model 2. EverQuest II trust is housing rights granted to contact as predicted in Table 3.2 by Model 4 for social relations and Model 5 for economic relations. Standard errors in parentheses are adjusted for autocorrelation between relations from same character using STATA “cluster” option.

Figure 3.3 in Burt (2017, Structural Holes in Virtual Worlds).
Despite a High Average Rate of Network Decay

(which implies volatile reputations because so much of evaluation variance is in the pair of people connected rather than either individual, see Appendix VI),

Reputations Persist from One Year to the Next

Figure 6.3 in *Neighbor Networks.*
Closure Is Essential to Reputation

(James Coleman, 1988:S107, "Reputation cannot arise in an open structure.")

Positive and Negative Reputations Quickly Stabilize.

What Implications for Building Reputation?

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Positive and Negative Reputations Quickly Stabilize.

What Implications for Building Reputation?

From Figure 4.6 in Brokerage and Closure, Figure 6.4 in Neighbor Networks.

See Appendix V on third-party ties as a network-closure metric. See Appendix VII for detail separating positive versus negative embedding, and analysts versus bankers. See Appendix VIII on groupthink and unlearning.
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Building Your Network: A Broker Network Can Result from Always Being a Broker or from Network Oscillation

Figure 1 in Burt & Merluzzi, "Network Oscillation" (2016, Academy of Management Discoveries)
In Sum: Individuals Receive Different Returns to Brokerage

Graph A is from Figure 2.3 showing achievement increasing with more access to structural holes in open networks. Circles are z-score residual achievement for 1,986 observations averaged within five-point intervals of network constraint in each of six management populations (analysts, bankers, and managers in Asia, Europe, and North America, see discussion of Figure 2.3 in Chapter 2: heteroscedasticity is negligible, $X^2 = 2.97, 1 \text{ d.f.}, P \sim .08$). Bold line is the vertical axis predicted by the natural logarithm of network constraint. Graph B shows the raw data averaged in Graph A. Vertical axis is wider to accommodate more variable achievement. Heteroscedasticity is high due to achievement differences between advantaged individuals ($X^2 = 269.5, 1 \text{ d.f.}, P < .001$), but the association between achievement and network advantage remains statistically significant when adjusted for heteroscedasticity (Huber-White, $t = -8.49$). Bold lines in graph B are hypothetical, distinguishing high-yield from low-yield network advantage.

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- B. But Vary Widely between the Advantaged Individuals (overall $r = -.24$, $t = -9.98, n = 1,989$)

Personality is not the slope adjustment here, see Appendix I, from Burt, "Network-relevant personality and the agency question" (2012 AJS)

from the second handout, "Creating Value, Contingencies"
Returns to Brokerage Are Contingent on Oscillation

Vertical axis is a banker’s z-score annual compensation — adjusted for the banker’s job rank, evaluation by colleagues, years with the bank, gender, race, and geographic location — averaged across the four-year observation period. Horizontal axis is annual network constraint averaged across the four years. Symbols indicate averages of individual scores on the horizontal and vertical axes, within five-point intervals of network constraint. The three lines distinguish bankers by the extent to which oscillation across the four years is visible in their annual networks: Definite oscillation refers to bankers who experienced reversals in network status and constraint. Probable oscillation refers to bankers who experienced a reversal in status or constraint, but not both. No oscillation refers to bankers who experienced no reversals. As a summary test for oscillation, compensation was regressed for all 346 bankers across the control variables plus a dummy variable for probable oscillation and a dummy variable for definite oscillation, plus two interactions between the oscillation dummies and log network constraint. Negligible association between constraint and compensation for “no oscillation” bankers (-.86 t-test, P = .39), increases to significantly higher associations for probable and definite oscillation (15.28 F2,333, P < .001), yielding significantly higher levels of compensation for broker bankers (17.20 F2,333, P < .001).
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Status contingency is also illustrated by the positive effect for outsiders of endorsements from insider sources — here in an organization within which gender triggered audience acceptance.

"That's an excellent suggestion, Miss Triggs. Perhaps one of the men here would like to suggest it." (Punch, 8 January, 1988)
Common Network Forms

What Is the Active Ingredient in Closure that is the Advantage for Outsiders?

Broker
\[ C = 23.6 \]
\(.07 \text{ density,} \quad .05 \text{ hierarchy} \)

Bowtie
\[ C = 46.3 \]
\(.40 \text{ density,} \quad .00 \text{ hierarchy} \)

Partner
\[ C = 51.7 \]
\(.40 \text{ density,} \quad .21 \text{ hierarchy} \)

Clique
\[ C = 54.0 \]
\(.80 \text{ density,} \quad .00 \text{ hierarchy} \)

from Burt, "Sometimes they don't want to hear it from a person like you," (2012, L’Impresa)
Partnering Is the Active Ingredient that Links Network Constraint with Success for People Excluded from Brokerage

Kinds of Networks Are Similarly Likely across Kinds of Managers
($\chi^2 = 0.15, 2$ d.f., $P = .93$)

(Kinds of Networks Have Different Consequences for Kinds of Managers
($F = 3.77, 5-278$ d.f., $P < .01$)

from Burt, "Gender of social capital" (1998, *Rationality and Society*) and Figure 7.4 in *Neighbor Networks*. See Appendix II on mapping individuals into the three network categories, Appendix VI on network diagnostics identifying outsiders.
A random sample of 500 people was drawn in the virtual world Second Life, then snowballed out to include friends of the sampled people, resulting in a network of 1,533 people.
Sociogram of Directors in Chicago Index Companies

1,380 Chicago directors.

Gold indicates Commercial Club member, concentrated in center (13.2 t-test).

818 isolates sit on one Chicago board or one Chicago board plus outside boards containing no other Chicago elites.
These are the senior leaders at the top of a large bank.

Lines indicate people who have frequent and substantial face-to-face contact. Average such connection is embedded in 28 mutual friends (0 minimum, 63 maximum).
Context Contingent Network Advantage

Jar-Der Luo adapts the concept of a “guanxi circle” to Chinese management. Guanxi circles can develop around formal or informal leaders, but where they do develop, their essential characteristic is trust and obligation between people in the circle. The concept is in many ways similar to the concept of an “inner circle” in sociological views of business elites, but a guanxi circle is more precise than the usual elite imagery with respect to the role of trust and obligation for network advantage within an organization.

The story begins with the core guanxi circle around a Chinese manager (Luo et al., 2015:3-4, citations deleted): “Chinese people have high levels of commitment not only to their organization, but also to the patron-client network they belong to. This type of network is often built around a powerful or resource-rich ego, and forms a significant part of Chinese organizational structure. Chinese call it a ‘guanxi circle’ or ‘small circle’ (in Chinese Xiao Quan Zi). . . . The guanxi circle phenomenon in the Chinese work place is rooted in traditional Chinese culture. The Chinese sociologist Hsu argues that Chinese are ‘situation-determinists,’ which has two meanings: particularistic treatment of different relations and ‘clan-like’ grouping principles. First, a Chinese person applies the principles of family-ethics to his or her various types of social relations. The most intimate others are viewed as family members. That is why the inner most ring of an ego-centered network is likened to ‘family ties,’ which include real and pseudo-family members. This ring of guanxi applies ‘need rules’ in which family ties used to more or less satisfy each other’s need without asking for anything in return.” Similarly, Bian, distinguishes three qualities to the strong ties in China known as guanxi ties: (1) familiarity, intimacy, (2) trust, and (3) mutual obligation, or lose face (“Bringing strong ties back in: indirect ties, network bridges, and job searches in China,” 1997, American Sociological Review).

Luo, Chang, and Chen go on to distinguish middle and peripheral zones beyond the core guanxi circle (Luo et al., 2015:4, citations deleted): “The middle ring is composed of familiar ties, which are mainly good friends who follow the ‘renqing rule’ (i.e. favor-exchange rules). This category is categorized by long-term favor-exchanges, where both parties combine expressive and instrumental exchanges, and carefully maintain trustworthiness under the principles of reciprocity. Each side exchanges resources as pseudo-brothers, but keeps a “favor account” to record the other side’s favors and take any chance to return the favor in the future. Outside the familiar-tie-ring are acquaintance ties, which are mainly instrumental. Asking instant return and bargaining in social exchanges are allowed in this ring. The “equity rule” indicates that trust comes from fair exchanges following generally accepted norms. The outmost ring is full of strangers, and family ethics are completely unimportant in this category.”

One-Page Integration, Brokerage and Closure

Achievement = f(Network Advantage) + Controls

Network advantage is usually measured in either of two ways: brokerage (information & control advantage; Granovetter, Cook, Freeman, Burt), or closure (trust & reputation advantage; Tullock, Granovetter, Coleman, Putnam, Uzzi; or resources & perceived quality advantage; Lin, Podolny)

In fact, the qualities mix to define Network Advantage = Brokerage x Closure
= ACCESS x ACTION x AUDIENCE

One needs ACCESS to structural holes for brokerage opportunities to coordinate sticky information (e.g., lack of holes in ego’s network [constraint, density], number of bridges in ego’s network [bridge count, number of non-redundant contacts], or exclusive holes in ego’s network [ego-network betweenness])

One needs to take ACTION brokering information across holes (creating value by clearing a sticky-information market)

One needs to be accepted by the target AUDIENCE as a source of the brokered information (e.g., authority of broker’s job, quality implied by broker’s network status, trustworthiness implied by broker’s positive reputation – all closure-based: job rank triad, status reflection, status & reputation gossip)
Appendix Slides For “Integrating Brokerage and Closure”
False Contingency

Neighbor networks
Personality
Age
Closure Details
Integration Details