

# PEOPLE ANALYTICS: COLLABORATION

*Professor Martine R. Haas  
The Wharton School  
University of Pennsylvania*



Wharton  
UNIVERSITY of PENNSYLVANIA

ONLINE

## 1. INTRODUCTION

# What is collaboration?



“Collaboration is the action of working with others to produce or create something”

Our focus:  
**Collaboration between employees inside an organization**

# Why is collaboration important?



SAATCHI & SAATCHI



MONSANTO



McKinsey&Company

ARUP

# The Big Question

---



How can we improve  
collaboration inside  
organizations?

---

# Analyzing Collaboration

---

- ? How can we describe collaboration patterns between employees?
- ? How can we map these collaboration patterns?
- ? How can we evaluate these collaboration patterns?
- ? How can we improve these collaboration patterns?

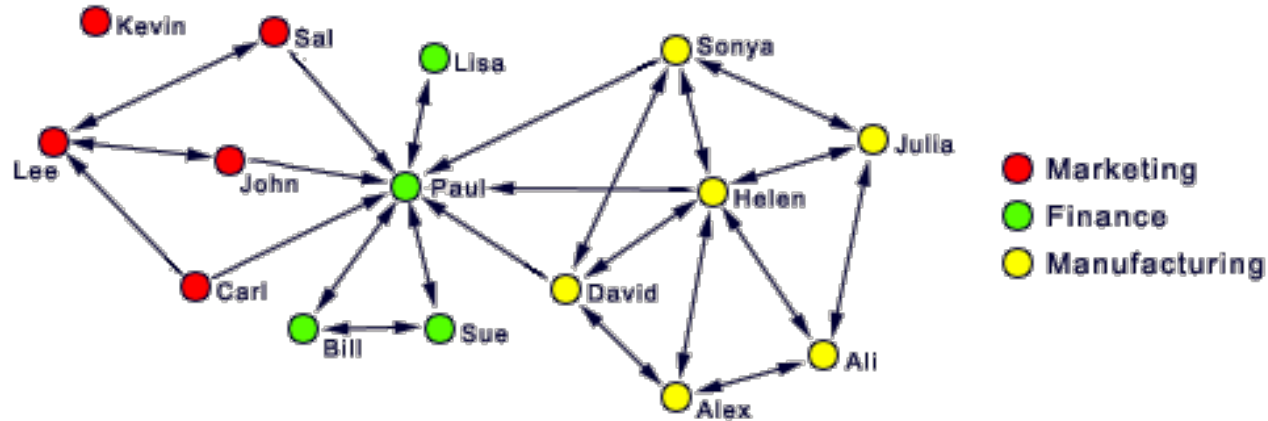
---

# The Role of People Analytics

---

People Analytics is a data-driven approach  
to managing people at work

# Organizational Network Analysis (ONA)



A → B    A seeks information from B  
A ↔ B    A and B seek information from each other

Source: Rob Cross (2014)



# Analyzing Collaboration

- ? How can we describe collaboration patterns between employees?
- ? How can we map these collaboration patterns?
- ? How can we evaluate these collaboration patterns?
- ? How can we improve these collaboration patterns?



**Answer:**  
by using the  
tools &  
techniques of  
**Organizational  
Network  
Analysis**

---

# People Analytics: Collaboration

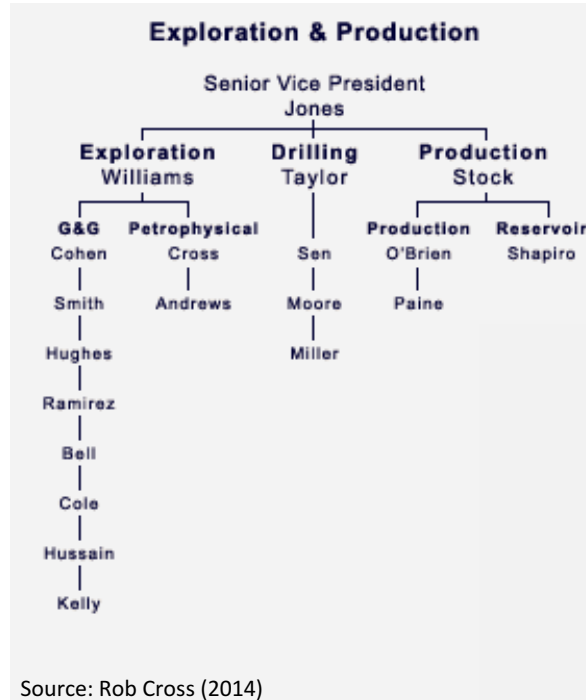
1. Introduction
2. Describing Collaboration Networks
3. Mapping Collaboration Networks
4. Evaluating Collaboration Networks
5. Intervening in Collaboration Networks

---

## 2. DESCRIBING COLLABORATION NETWORKS

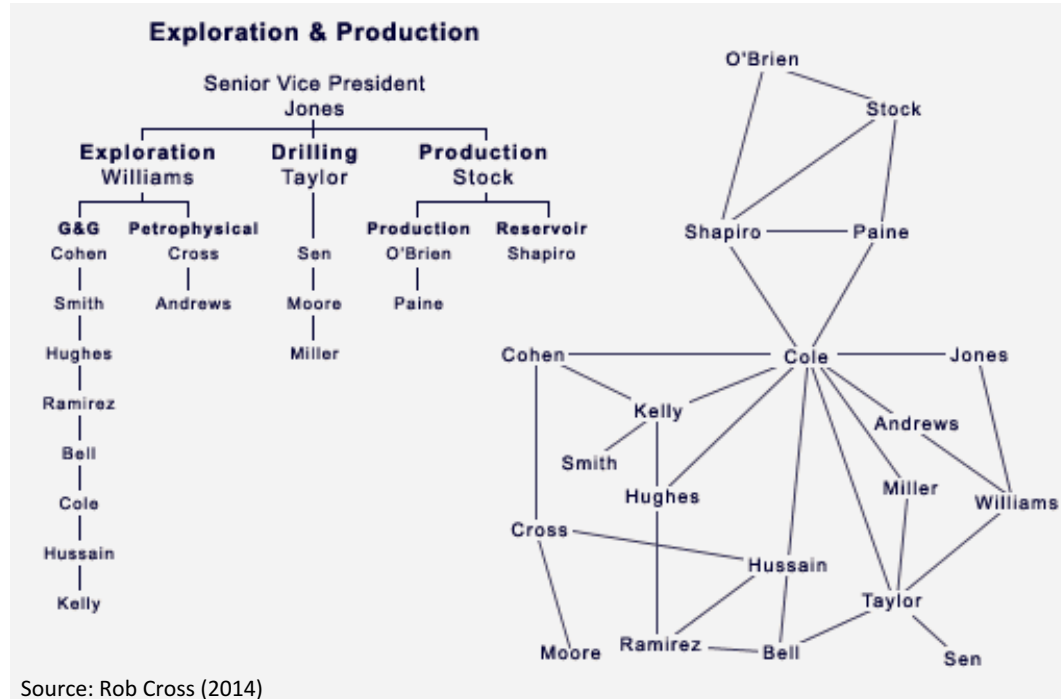
# What are organizational networks?

Formal structure  
(organizational  
chart)



# What are organizational networks?

Formal structure  
(organizational  
chart)



Source: Rob Cross (2014)

Informal structure  
(network map)

---

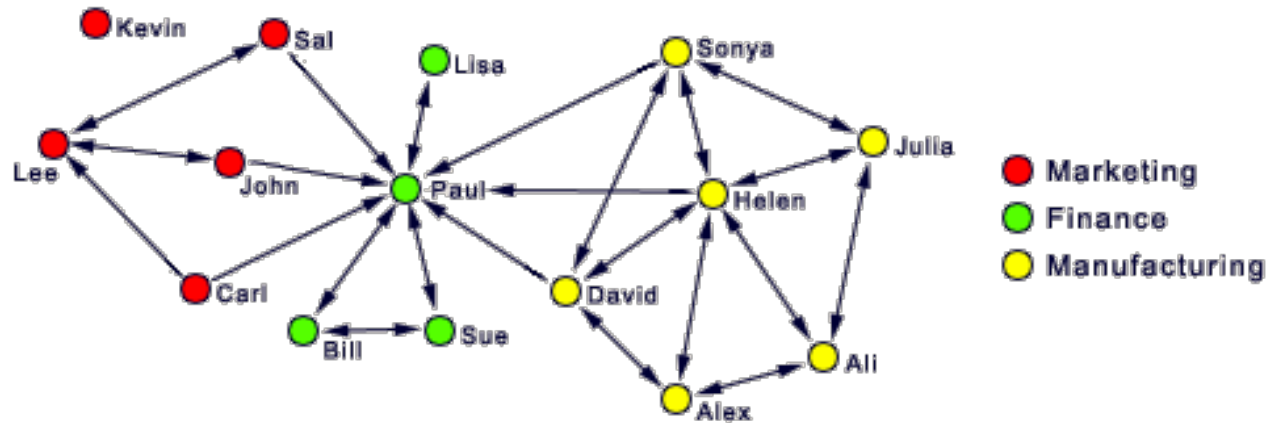
# Types of organizational networks

---

- Collaboration networks (information flows, knowledge sharing)
- Communication networks
- Friendship networks
- Advice networks
- Trust networks

etc

# Example of a collaboration network



A → B    A seeks information from B  
A ↔ B    A and B seek information from each other

Source: Rob Cross (2014)

Who do you want to be, and why?

# How can we describe collaboration patterns?

## 5 Building Blocks:



1. Network size



2. Network strength



3. Network range



4. Network density

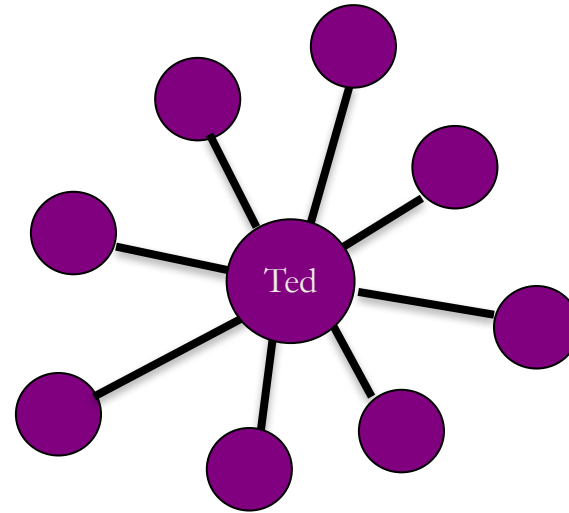
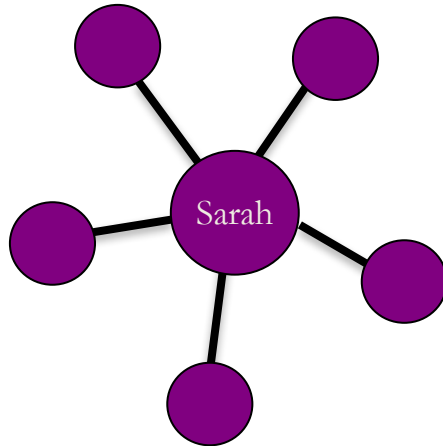


5. Network centrality





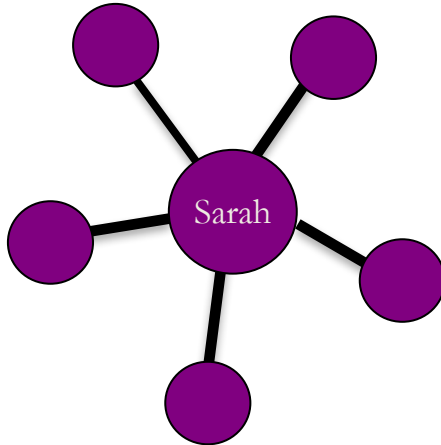
## Building Block 1: Network Size



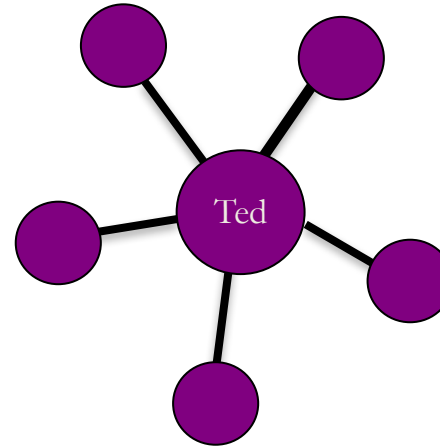


## Building Block 2: Network Strength

Stronger ties



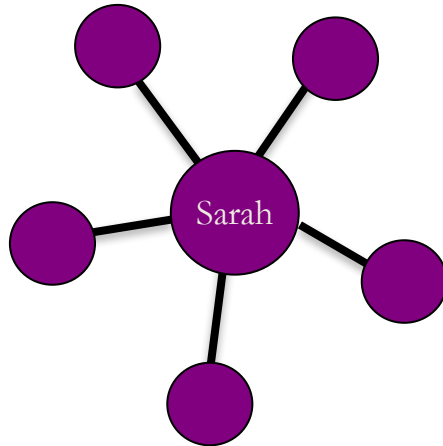
Weaker ties



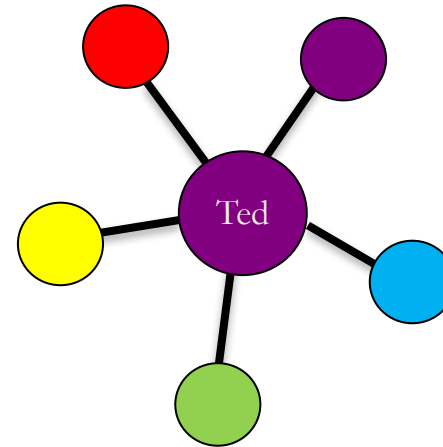


## Building Block 3: Network Range

Low range  
network



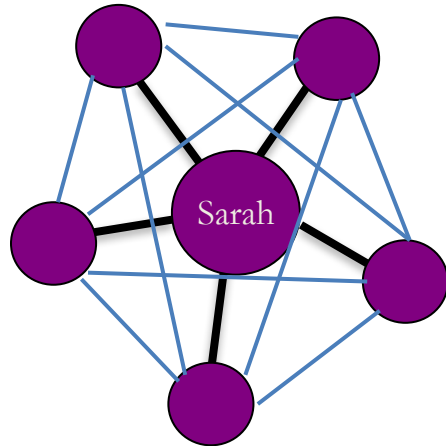
High range  
network



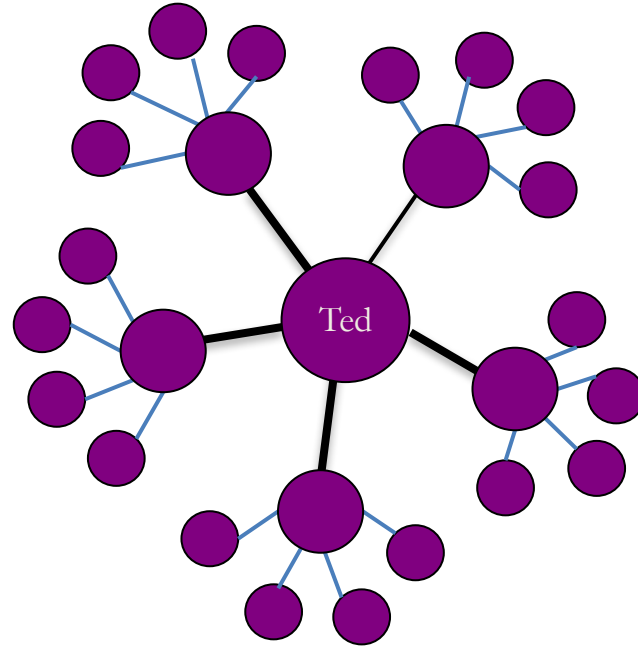


## Building Block 4: Network Density

High density network



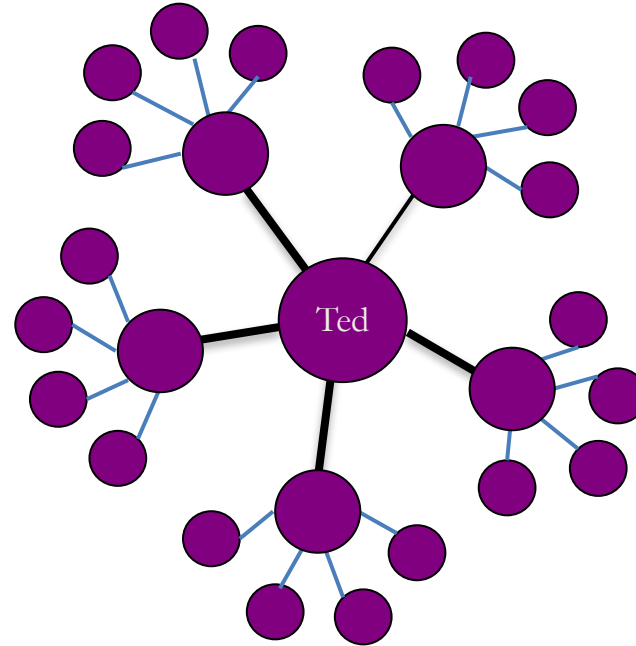
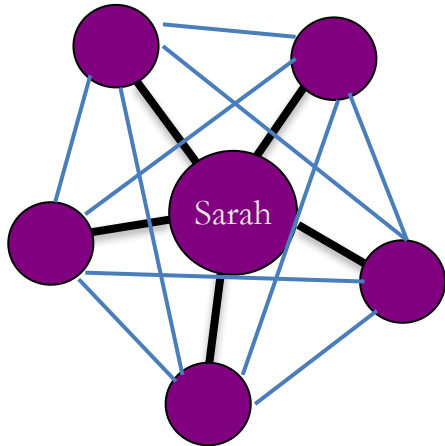
Low density network





## Building Block 5: Network Centrality

Sarah and her contacts all have the same centrality in the network

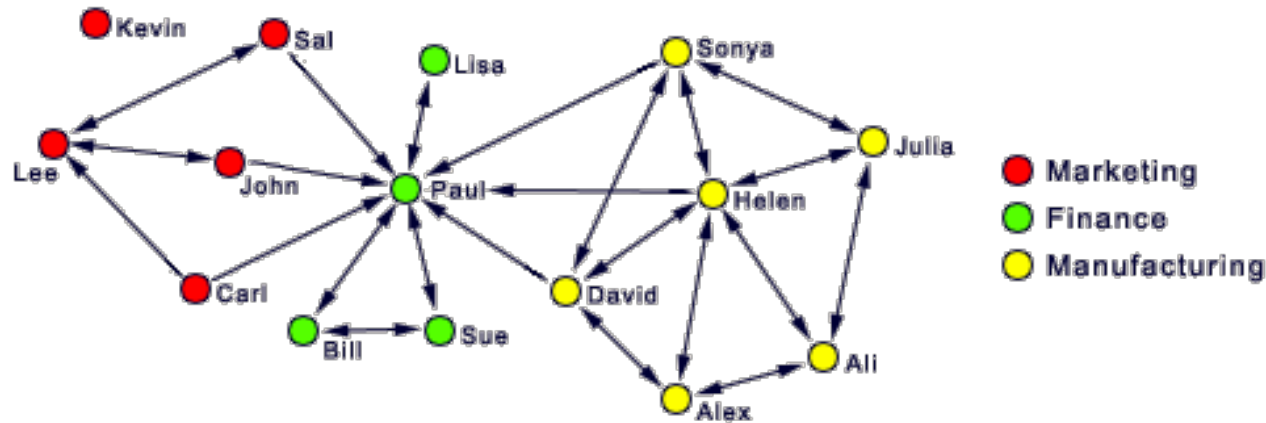


Ted has the highest centrality

his first-order contacts have moderate centrality

his second-order contacts have low centrality

# Example of a collaboration network



A → B    A seeks information from B  
A ↔ B    A and B seek information from each other

Source: Rob Cross (2014)

Who do you want to be, and why?

---

# People Analytics: Collaboration

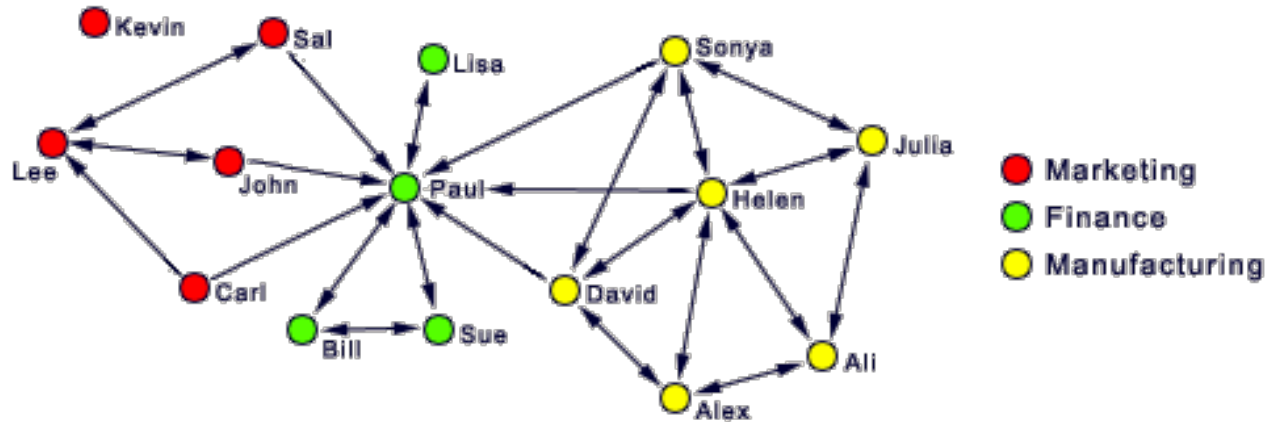
1. Introduction
2. Describing Collaboration Networks
3. Mapping Collaboration Networks
4. Evaluating Collaboration Networks
5. Intervening in Collaboration Networks

---

# 3. MAPPING COLLABORATION NETWORKS



# How can we capture collaboration patterns?



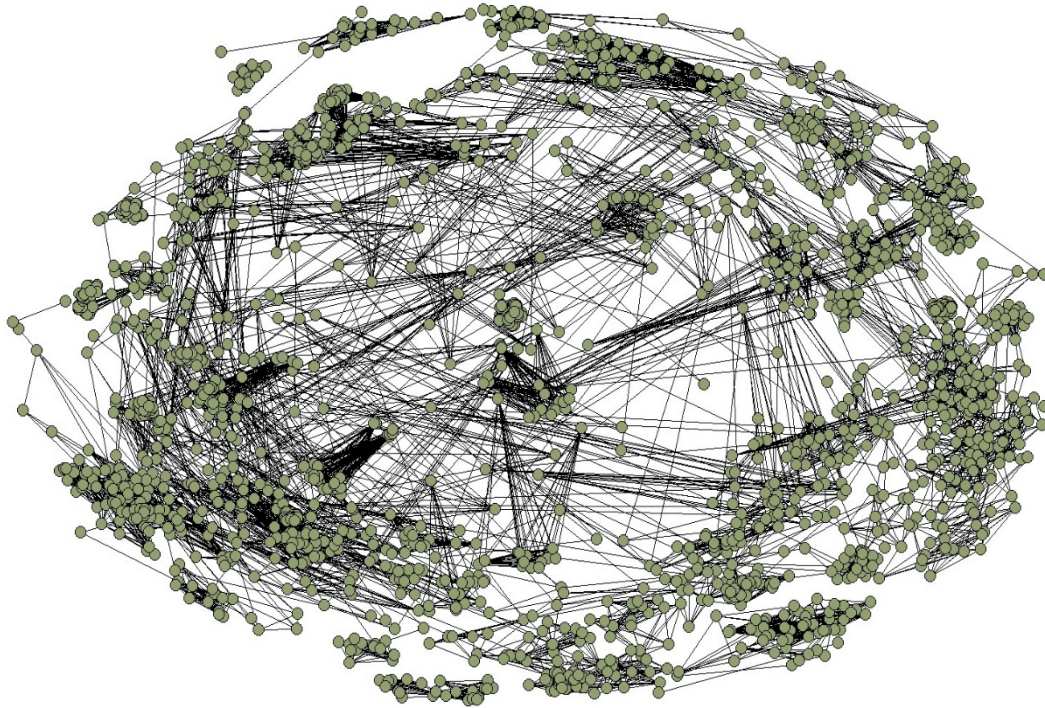
A → B    A seeks information from B  
A ↔ B    A and B seek information from each other

Source: Rob Cross (2014)

---

# How can we capture collaboration patterns?

---



# Network Data: Example

How frequently does A seek information from B?

	Alex	Ali	Bill	Carl	David	Helen	John	Julia	Kevin	Lee	Lisa	Paul	Sal	Sonya	Sue
Alex	x														
Ali		x													
Bill			x												
Carl				x											
David					x										
Helen						x									
John							x								
Julia								x							
Kevin									x						
Lee										x					
Lisa											x				
Paul												x			
Sal													x		
Sonya														x	
Sue															x

---

# Collecting Network Data

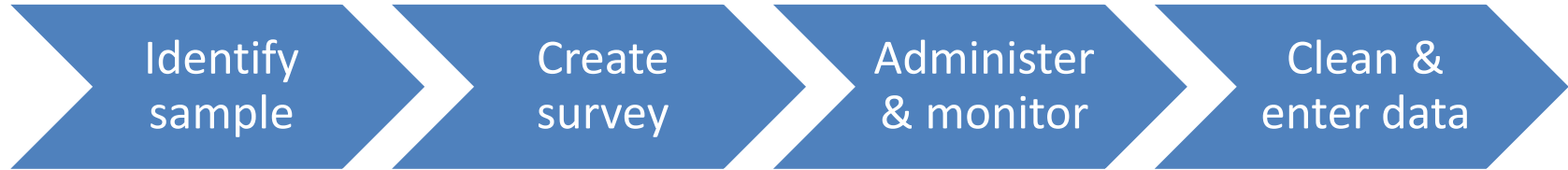
---

- Surveys
- Other sources

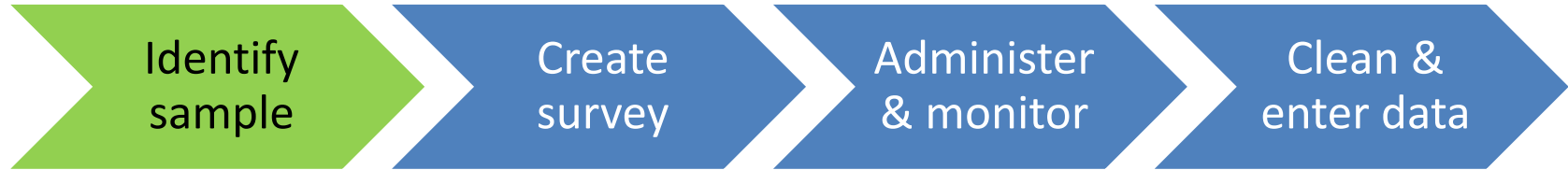
---

# Collecting Network Data via Surveys

---



# Collecting Network Data via Surveys



- Sample boundaries:
  - formal units
  - locations
  - communities
  - cohorts
  - teams, etc
- Sample size:
  - N=25-300

# Collecting Network Data via Surveys



- Sample boundaries:

- formal units
- locations
- communities
- cohorts
- teams, etc

- Sample size:

- N=25-300

- Opening statement

- Purpose
- Confidentiality

- Network questions

- Additional questions

- Order & format

- Test & refine

- 10-15 mins MAX

# Network Questions: Example

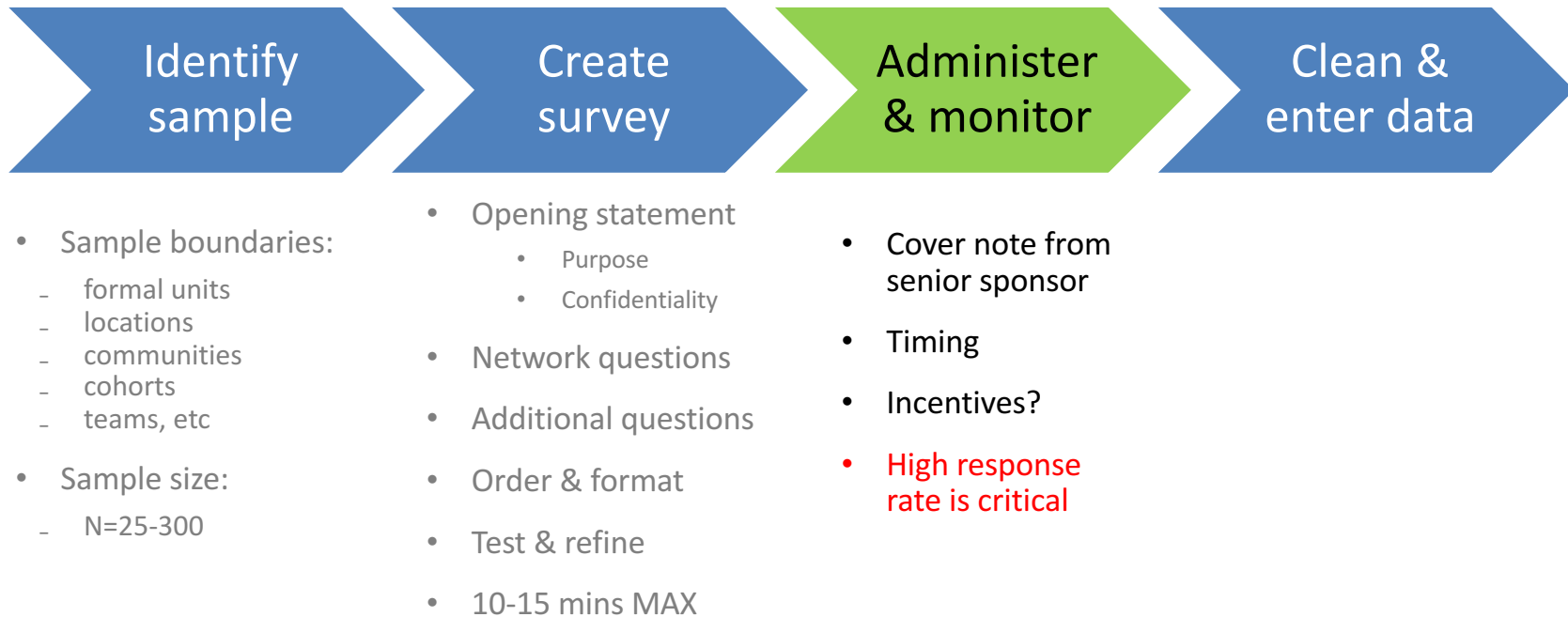
Below is a list of all the members of your product development team.

How frequently do you go to each of these individuals to seek information related to your work?

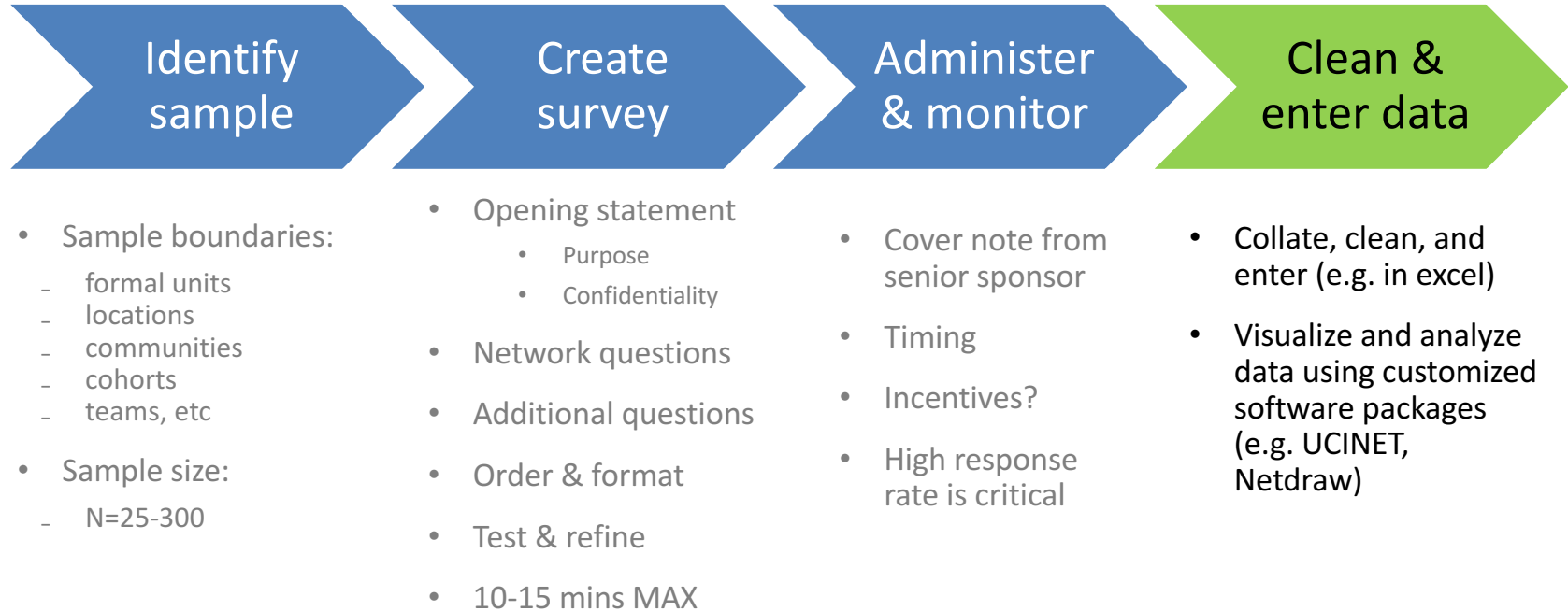
	Less than once a month	About once a month	About 2 or 3 times per month	About once per week	About 2 or 3 times per week	Daily or almost daily
Alex	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Ali	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Bill	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Carl	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
David	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Helen	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
John	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Julia	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Kevin	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Lee	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Lisa	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Paul	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Sal	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Sonya	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Sue	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>



# Collecting Network Data via Surveys



# Collecting Network Data via Surveys



# Network Data: Example

How frequently does A seek information from B?

	Alex	Ali	Bill	Carl	David	Helen	John	Julia	Kevin	Lee	Lisa	Paul	Sal	Sonya	Sue
Alex	x														
Ali		x													
Bill			x												
Carl				x											
David					x										
Helen						x									
John							x								
Julia								x							
Kevin									x						
Lee										x					
Lisa											x				
Paul												x			
Sal													x		
Sonya														x	
Sue															x

# Collecting Network Data via Surveys:

## Some issues

---

### PROS:

- Customized, detailed information from target sample

### CONS:

- High response rates are critical
- Network cannot be too large
- Survey cannot be too long
- Questions must be worded and interpreted with care
- Confidentiality is critical
- Relatively costly method of data collection

---

# Collecting Network Data from Other Sources

---

- Big Data:

- interactions via email, phone calls, computer conferencing, bulletin boards, social media, etc

- Archival records:

- corporate databases - e.g. info on shared project assignments, work histories, event attendance
- public databases - e.g. info on co-patenting, co-authorship, co-citations

- Fieldwork:

- observations, diaries, electronic tags, etc

# Collecting Network Data from Other Sources:

## Some issues

---

### PROS:

- Information on larger networks may be available
- May be less invasive
- May be less expensive
- May provide more objective measures

### CONS:

- Privacy concerns
- What do available measures actually capture?
- Large datasets can generate statistically significant but unimportant findings

---

# People Analytics: Collaboration

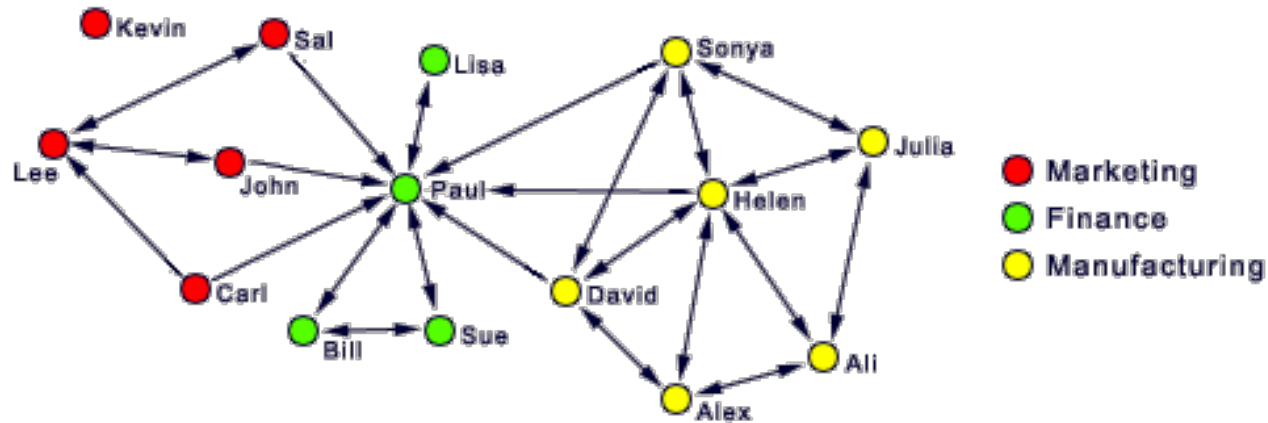
1. Introduction
2. Describing Collaboration Networks
3. Mapping Collaboration Networks
4. Evaluating Collaboration Networks
5. Intervening in Collaboration Networks

---

# 4. EVALUATING COLLABORATION NETWORKS



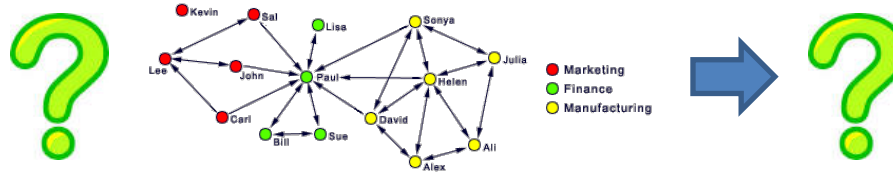
# How can we evaluate collaboration patterns?



A → B    A seeks information from B  
A ↔ B    A and B seek information from each other

Source: Rob Cross (2014)

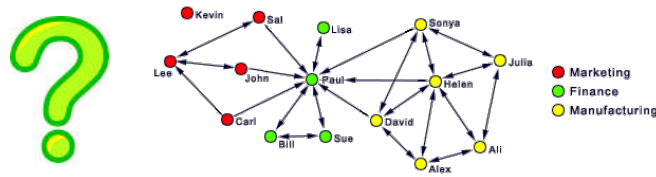
# How can we evaluate collaboration patterns?



How do  
collaboration  
patterns  
vary?

How do  
collaboration  
patterns matter  
for important  
outcomes?  
(individual, group,  
or organizational)

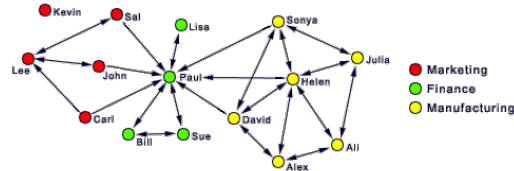
# How do collaboration patterns vary?



## 5 Building Blocks:

- Network size
- Network strength
- Network range
- Network density
- Network centrality

# How do collaboration patterns vary?



	Lee	John	Paul	Helen	Julia
Network size (inbound ties: number of people who seek information from X)	3	1	9	5	3
Network size (outbound ties: number of people from whom X seeks information)	2	2	3	6	3

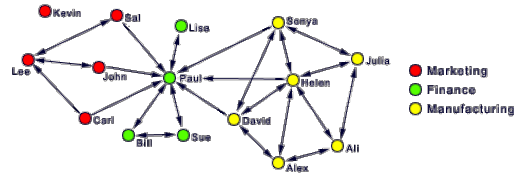
*Simple descriptive statistics:*

- Compare across individuals
- Compare changes over time

*Implications for managing employees:*

- Performance assessment
- Roles & responsibilities
- Pay & promotions
- Training & mentoring

# How do collaboration patterns matter for important outcomes?



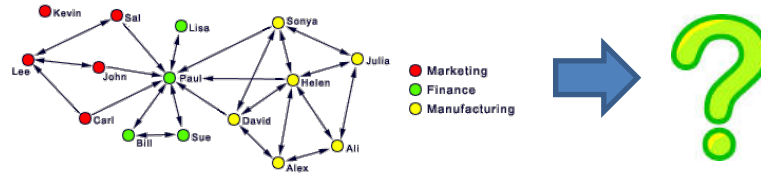
## 5 Building Blocks:

- Network size
- Network strength
- Network range
- Network density
- Network centrality

## Individual outcomes:

- Performance
- Satisfaction
- Commitment
- Burnout
- Turnover etc

# How do collaboration patterns matter for important outcomes?



## *Correlational & multivariate analysis*

- *Identify relationships between network variables and outcomes*

## *Implications for managing employees:*

- Performance assessment
- Roles & responsibilities
- Pay & promotion
- Training & mentoring
- Job rotations & career development
- Retention

	Outcome variable:
	Performance
<b>Network variables:</b>	
Network size (inbound ties: number of people who seek information from X)	+
Network size (outbound ties: number of people from whom X seeks information)	-



**BEWARE!**

---

There is no one “best” collaboration network for every organization in every situation!

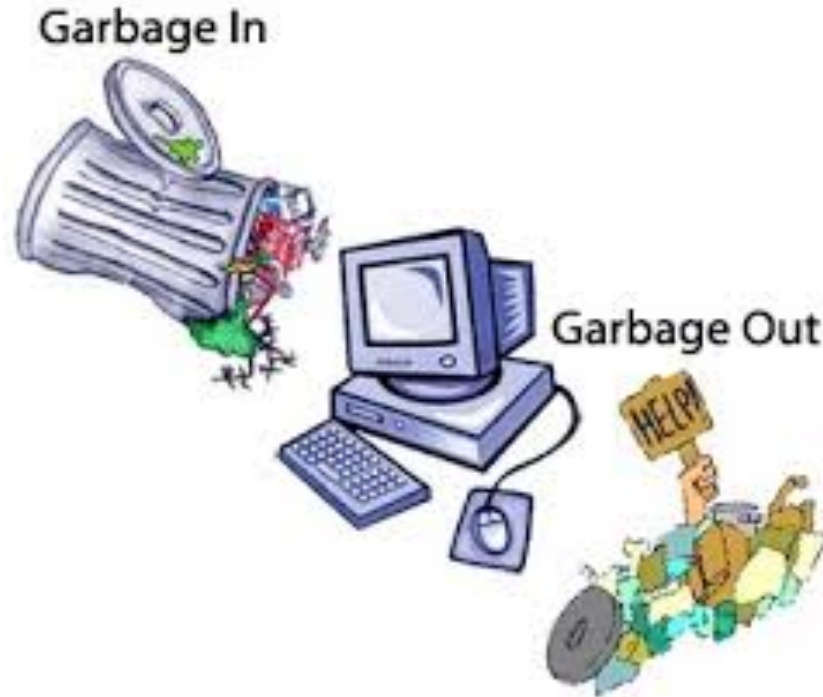
To understand what’s best for your particular organization in your particular situation, you’ll need to collect and analyze the data!

---

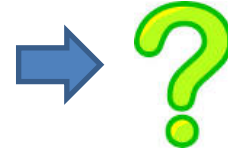
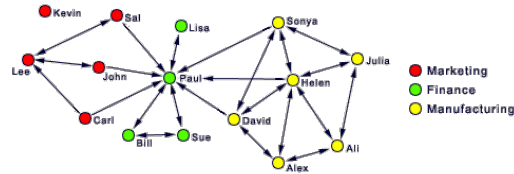
# Measuring Outcomes



# REMEMBER!



# How do collaboration patterns matter for important outcomes?



## 5 Building Blocks:

- Network size
- Network strength
- Network range
- Network density
- Network centrality

## Individual outcomes:

- Performance
- Satisfaction
- Commitment
- Burnout
- Turnover etc

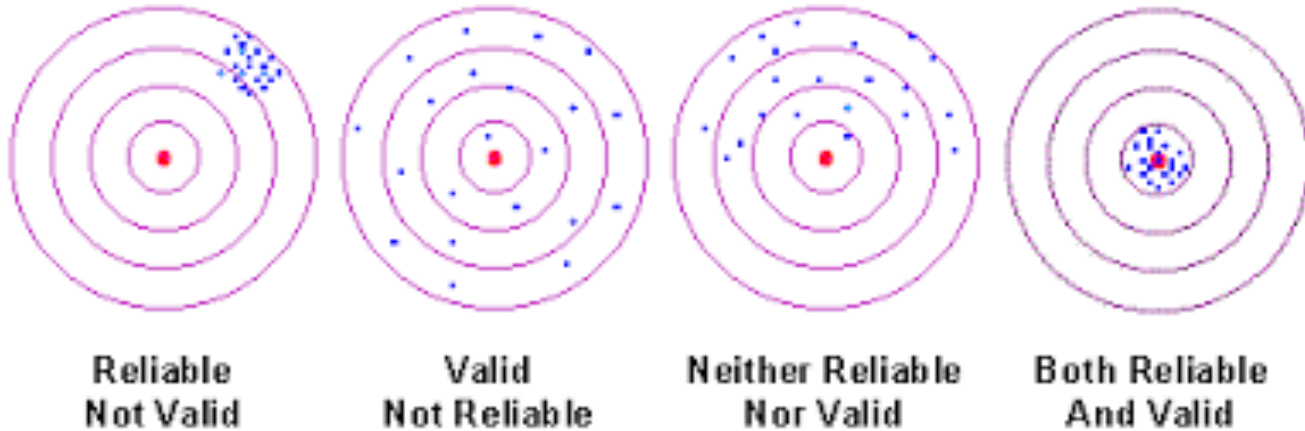
---

# Example: Measuring Performance

---

- What is a strong measure of performance?
  - **Level of analysis** – is the focus on performance of employees? teams? organization?
  - **Reliability** – are assessments consistent? (e.g., over time, across raters)
  - **Validity** – are assessments accurate? (i.e. measure what they are supposed to measure)

# Validity & Reliability



---

# Example: Measuring Performance

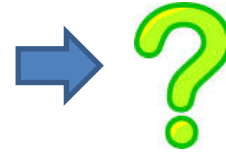
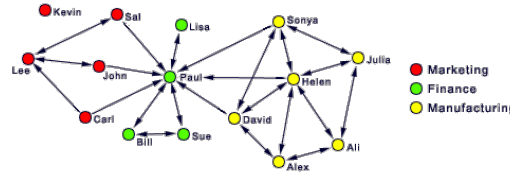
---

- **What is a strong measure of performance?**
  - **Level of analysis** – is the focus on performance of employees? teams? organization?
  - **Reliability** – are assessments consistent? (e.g., over time, across raters)
  - **Validity** – are assessments accurate? (i.e. measure what they are supposed to measure)
  - **Comparability** – consistently measured and meaningful for all units in the dataset
  - **Comprehensiveness** – available for all or most units in the dataset
  - **Cost effectiveness** – not too expensive to collect
  - **Causality** – defensible as an outcome variable

# Example: Measuring performance

- What is a strong measure of performance?

- Level of analysis
- Reliability
- Validity
- Comparability
- Comprehensiveness
- Cost effectiveness
- Causality



Individual outcomes:


- Performance

Sales per quarter?  
Cost savings?  
Self-reported 1-3 ratings?  
Manager-reported 1-3 ratings?  
Bonus? etc

# The Role of People Analytics

---

People Analytics is a data-driven approach  
to managing people at work



***Collecting and analyzing  
high quality data  
is critical!***

---

# People Analytics: Collaboration

1. Introduction
2. Describing Collaboration Networks
3. Mapping Collaboration Networks
4. Evaluating Collaboration Networks
5. Intervening in Collaboration Networks



---

# 5. Intervening in Collaboration Networks

---

# How can we improve collaboration patterns?

---

## Is more collaboration needed?

- More is not always better!

## Where is more collaboration needed?

- Build ties strategically

## How to increase collaboration?

- Provide motivation to build ties:
  - Emphasize & promote collaboration
  - Recognize & reward collaboration
- Provide opportunities to build ties:
  - Cross-functional meetings, conference calls, job rotations, site visits, events, etc

---

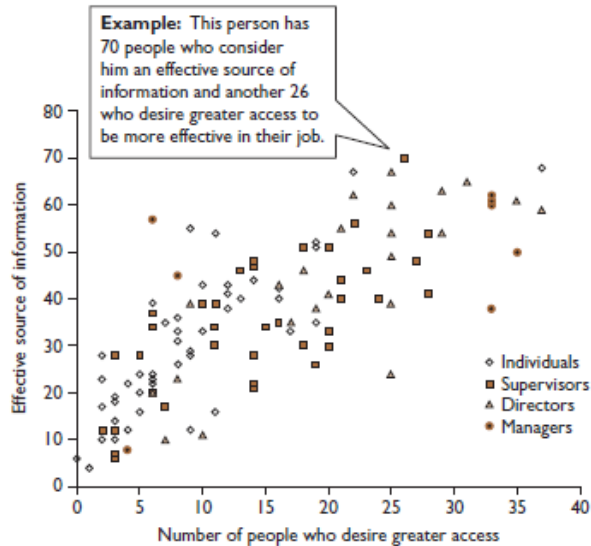
# Intervening in Collaboration Networks: Five Examples

---

1. Reducing employee overload
2. Improving resiliency of global teams
3. Reducing collaboration inefficiencies
4. Eliminating organizational silos
5. Enhancing career paths

# 1: Reducing employee overload

## ... by rebalancing collaboration demands



Source: Cross & Gray (2013), California Management Review

### Problem:

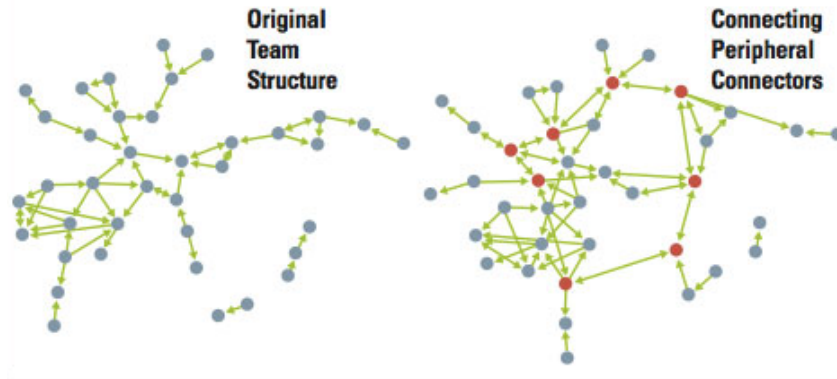
- In this **financial services organization** (like many organizations), a network analysis revealed that about 5% of people accounted for up to 35% of the value-added collaborations; **these valuable people often felt very overloaded**.

### Intervention:

- Identify overloaded people (top right corner), and match them with well-regarded employees who are relatively underutilized (often from bottom left corner), who can relieve some of the burden.

# 2: Improving resiliency of global teams

## ... by connecting peripheral members



Source: Cross et al. (2010), MIT Sloan Management Review

### Problem:

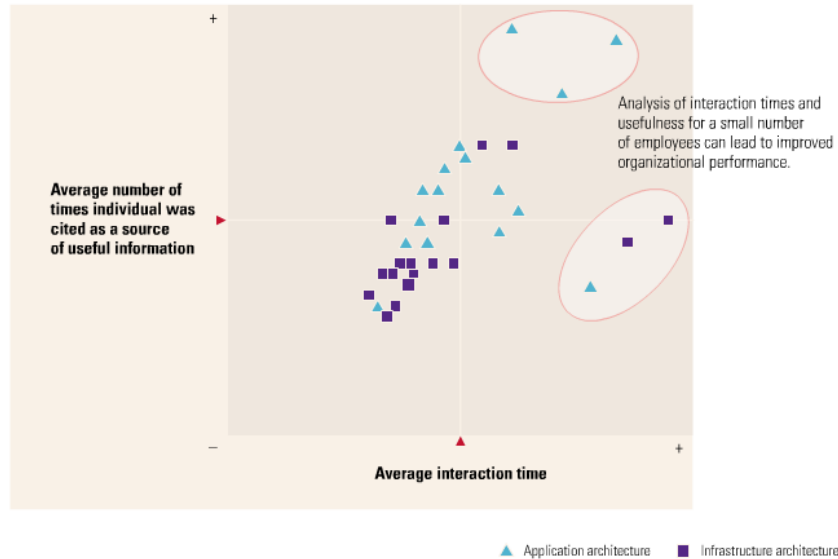
- A **multinational agribusiness company** found that its global IT teams often relied on only a few key people to connect their members across the world; **if a few key people left, these teams were vulnerable to breakdown.**

### Intervention:

- Identify a small number of new connections that would have the biggest positive impact on team connectivity, and shift responsibilities more evenly across the members.

# 3: Reducing collaboration inefficiencies

## ... through targeted coaching



Source: Cross, Martin & Weiss (2014), McKinsey Quarterly

### Problem:

- A **major utility company** asked employees how much time they spent interacting with each other and how useful those interactions were; the analysis revealed some employees who were very highly regarded, but also **a small number of employees who were much less effective** than the rest.

### Intervention:

- Focus personalized coaching efforts on collaborative issues unique to each of the low performers.

# 4: Eliminating organizational silos

## ... by building cross-divisional ties

EXHIBIT 2. Collaboration Across Merged Divisions within a Conglomerate

	Div. 1	Div. 2	Div. 3	Div. 4	Div. 5	Div. 6	Div. 7	Div. 8
Division 1	33%							
Division 2	5%	76%						
Division 3	11%	18%	45%					
Division 4	2%	11%	21%	38%				
Division 5	6%	7%	12%	6%	75%			
Division 6	7%	2%	13%	7%	2%	76%		
Division 7	1%	3%	16%	6%	8%	2%	36%	
Division 8	10%	2%	9%	6%	3%	10%	0%	90%

Source: Cross, Borgatti & Parker (2002), California Management Review

### Problem:

- A **Fortune 500 conglomerate** had grown by acquisition, but analysis of collaboration among the top 126 executives revealed that **some divisions were much less integrated than others.**

### Intervention:

- Identify and target network connections that hold most strategic relevance for the firm, and track changes to these ties over time to assess the impact of interventions.

# 5: Enhancing career paths

## ... through better performance management processes



Source: Cross, Martin & Weiss (2014), McKinsey Quarterly

### Problem:

- A **global consulting firm** mapped the networks of about 80 partners, and found **two types of collaboration that were very valuable for the firm but not recognized at all in its performance management processes**, which focused on individual revenue production:
  - Collaborating to win clients
  - Collaborating to serve clients

### Intervention:

- Revise performance evaluation systems to recognize contributions of partners who help others to win new clients or serve current clients



---

# CONCLUSIONS

---



How can we improve  
collaboration inside  
organizations?

# Analyzing Collaboration

? How can we describe collaboration patterns between employees?

? How can we map these collaboration patterns?

? How can we evaluate these collaboration patterns?

? How can we improve these collaboration patterns?



Answer:  
by using the  
tools &  
techniques of  
**Organizational  
Network  
Analysis**

---

# People Analytics: Collaboration

1. Introduction
2. Describing Collaboration Networks
3. Mapping Collaboration Networks
4. Evaluating Collaboration Networks
5. Intervening in Collaboration Networks

