

Team Power Dynamics and Team Impact

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A stylized illustration on a blue background. On the left, a man in a red shirt and dark pants stands on a white road map, pointing towards the top right. A woman in a red shirt and dark pants stands next to him, looking in the same direction. On the right, another man in a red shirt and dark pants stands on a white road map, looking towards the horizon. The road maps feature blue arrows and dashed lines.

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Funding

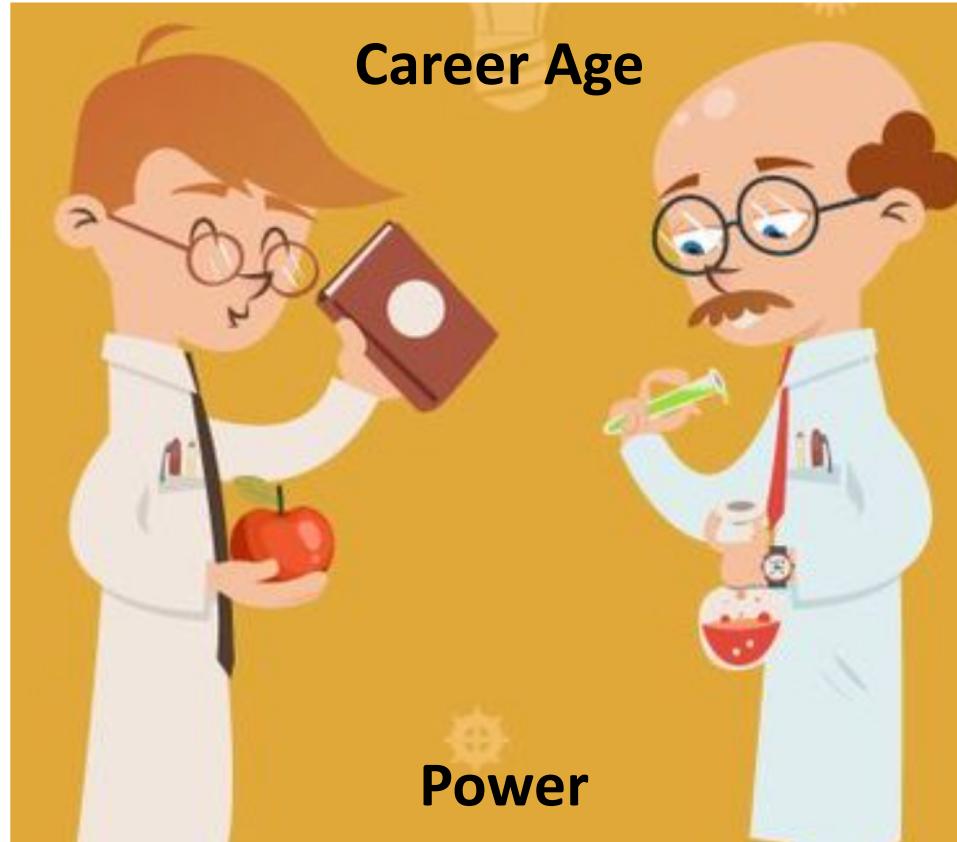
Collaborator

Productivity

Labor of Division

Tenure

Citation



D e f i n i t i o n o f T e a m P o w e r

- **What is power?**
 - Whether a team member is able to influence the thoughts/activities of others (Piercey, 2019).
 - The capacity to “set agendas, norms of discussion, rules for behavior, and the standards for thought and opinion” for low power ones (Magee & Galinsky, 2008).
 - Power can be embodied in age (Linton, 1936, p.118), job positions in corporations (Greer & Van Kleef, 2010), pay and participation in sports competition (Halevy et al., 2012, MATT, 1999), and speaking turns in group discussion (Woolley et al., 2010).
- **What is team power?**
 - Team power level: to which extent a whole team has the collective capability to exert influence in an organization (Greer et al., 2011).
 - Team power hierarchy: the vertical difference of resources between members within group (Greer et al., 2018). Flat/hierarchical

Performance of Team Power

- Companies

- the interactive effect of team power level and hierarchy (positions) (Greer and Van Kleef, 2010))
- In low team power level teams, accept hierarchy whereas in high team power level teams, conflicts

- Sports

- NBA basketball teams (salary, playing time), hierarchy ↑ , (Halevy et al., 2012)
- baseball teams (salary), hierarchy ↓ (Bloom, 1999)
- task interdependence, rely more on collaboration, incentives (Ronay et al., 2012)

- Healthcare

- nurses and physicians have the same weight to patients' treatment and rehabilitation, hierarchy ↓ (Arslanian-Engoren, 1995; Lockhart-Wood, 2000)

- Military

- aircrews or rifle squads, a highly hierarchical setting with military leaders ↑ (Goodwin et al., 2018)

D a t a s e t s a n d M e a s u r e s

Table 1. Descriptive statistics of five disciplines

	Discipline	Year	Co-authored papers	All citations	Unique authors	Mean team power level	Mean Team Power hierarchy	Mean 2-year citations	Mean 5-year citations
DBLP	CS	1980-	3,658,127	36,286,506	3,570,450	7.45	0.30	2.40	5.09
	MAG	LIS	2020	245,371	583,014	525,779	8.09	0.27	0.67
		Physics		3,388,333	21,614,368	4,317,847	9.85	0.32	1.72
		Sociology		513,870	880,935	851,316	7.21	0.23	0.29
		Art		66,760	4,753	159,786	5.22	0.20	0.01

DBLP is selected to represent CS (Ley, 2009). Papers about Physics, Sociology, LIS, and Art are retrieved from Microsoft Academic Graph (MAG, Wang et al., 2020).

All coauthors of a paper are treated as a team.

The average career age of a team represents team power level (Greer & van Kleef, 2010).

Team power hierarchy is quantified by the Gini coefficient of career ages of all coauthors from a paper (Bunderson et al., 2016; Harrison & Klein, 2007).

Team Power Dynamics and Team Citation

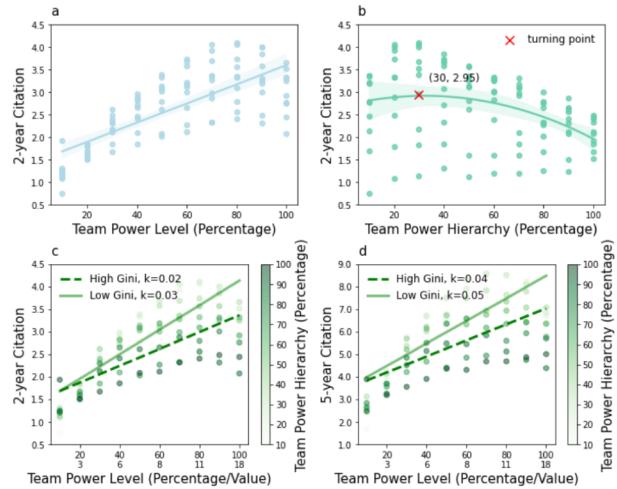


Fig 5. Team power level and team power hierarchy on team impact in CS teams. **a-b.** A fitting line was drawn based on the scatter plot of team power level and 2-year citations. Team power hierarchy has a curvilinear relationship with 2-year citations. **c-d.** The combination effect between team power level and team power hierarchy on team impact measured by 2-year and 5-year citations. The turning point for team power hierarchy is 30% for 2-year citations and 20% for 5-year citations. A gradient green color indicates that darker sides suggest higher team power hierarchy. Both percentile and corresponding value of team power level are shown in **c-d**.

Team power level has a positive correlation with team impact;

Team power hierarchy has a curvilinear relationship with team impact;

When team power level increases, teams with low team power hierarchy have higher team impact than teams with high team power hierarchy.

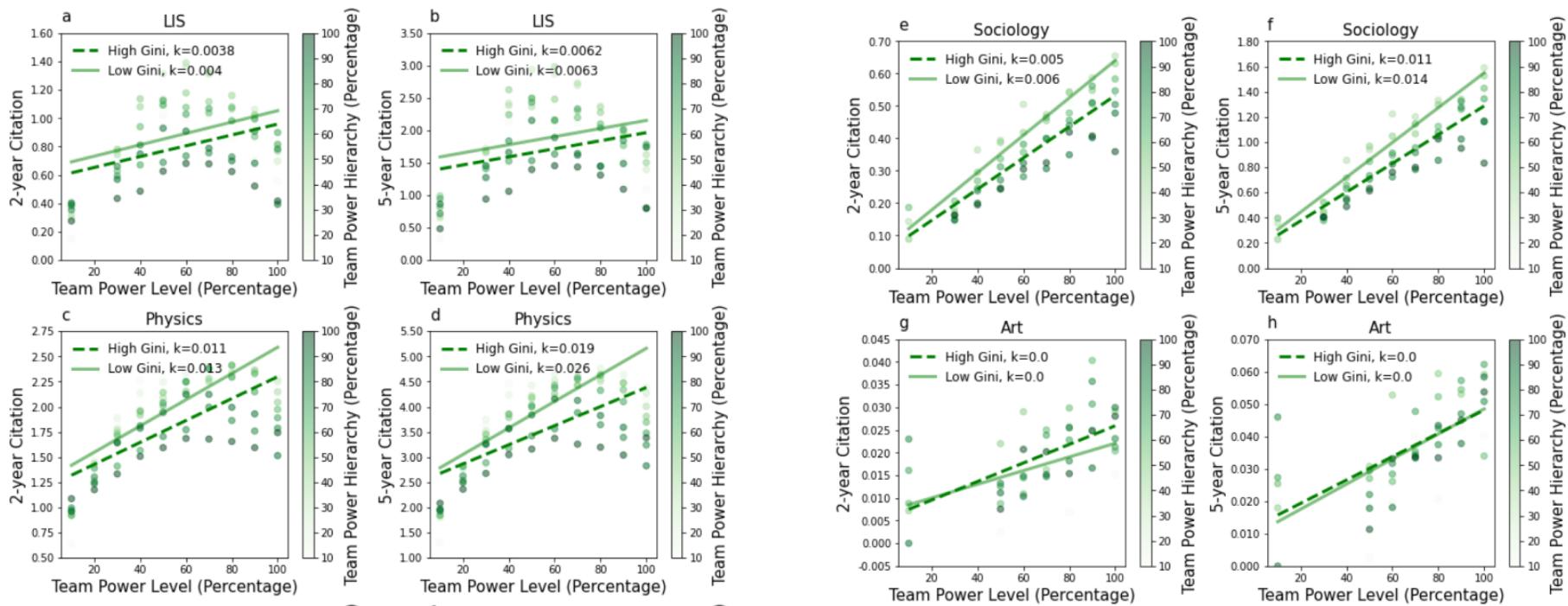
Team Power Dynamics and Team Citation

Table 2: Multivariable Regression for Team Power Dynamics and Team Impact in CS

	CS	
	2-Year	5-Year
Team Power Level	0.02*** (0.00)	0.03*** (0.00)
(Mean)		
Team Power Hierarchy	1.79*** (0.14)	2.42*** (0.02)
(Gini)		
Team Power Hierarchy ²	-2.96*** (0.03)	-3.85*** (0.04)
Team Power Level ×	-0.05*** (0.00)	-0.08*** (0.00)
Team Power Hierarchy		
Team Power level ×	0.05*** (0.00)	0.08*** (0.00)
Team Power Hierarchy ²		
Team Size	0.03*** (0.00)	0.03*** (0.00)
N of Countries	0.06*** (0.00)	0.08*** (0.00)
Academia/Industry/Combined		
Industry	0.13*** (0.00)	0.16*** (0.00)
Combined	0.18*** (0.00)	0.23*** (0.00)
Male/Female/Equal		
Female	-0.04*** (0.00)	-0.04*** (0.00)
Equal	-0.03*** (0.00)	-0.03*** (0.00)
N of Papers for the Most	0.001*** (0.00)	0.002*** (0.00)
Productive Author		
Year fixed effect	Yes	
R ²	0.12	0.16
N	3,658,127	

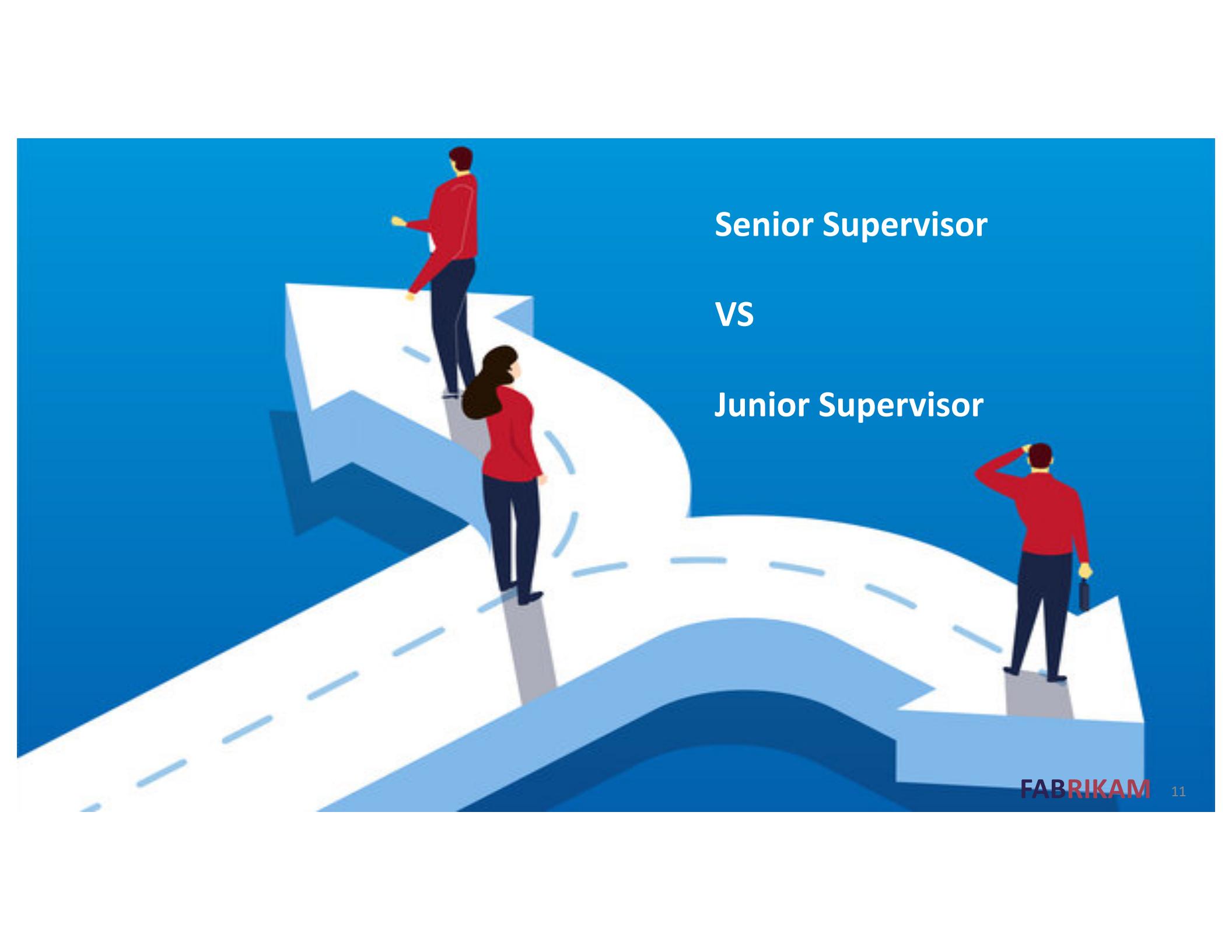
Note. * P < 0.05; ** P < 0.01; *** P < 0.001; 2-year means 2-year citation, 5-year means 5-year citation

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Discussion of Flat Teams

- **adapting to unpredicted and creative tasks**
 - the egalitarian teams enable more people to participate in making decisions (Duncan, 1973), aggregate the wisdom across individuals (Surowiecki, 2002), and increase the heterogeneity of opinions (Gruenfeld & Tiedens, 2010)
- **creating a psychologically satisfaction**
 - Flat structure can increase levels of motivation for the whole group rather than the minority. In the hierarchical structure, the inequality might make low-ranking members feel unfair but they lack the ability to change their status and thus become less motivated (Magee & Galinsky, 2008). It is crucial to retain and motivate new researchers in science.
- **supporting coordination**
 - Equal turn-taking communication in the flat structure can achieve better team performance (Woolley et al., 2010)



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