

EXPLORING INEQUALITIES IN CO-AUTHORSHIP NETWORKS AMONG ITALIAN SCHOLARS¹

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Abstract. Social capital refers to the resources individuals can access through their network of relationships to achieve their goals or navigate challenges. This study examines the structure of collaboration networks in which Italian academics are embedded. Specifically, we analyze inequalities in co-authorship networks among Italian scholars in the fields of Statistics, Management, and General and Applied Sociology. We compiled a list of scholars and their attributes as of 2022 using data from the Ministry of University and Research. By linking each scholar to their Scopus ID, we collected co-authorship data from Scopus publications covering the period from 2012 to 2022. We utilize an egocentric network approach to build personal co-authorship networks. We calculate various structural and compositional indices—such as component ratios, network density, and diversity—to categorize these personal networks and conduct network clustering to identify different network typologies. Our results reveal variations in personal networks across the four disciplines, reflecting the specific academic norms and roles associated with each field.

1. Social capital in Academia

Over the past four decades, the concept of social capital has received significant attention across various disciplines, including economics, sociology, and psychology. A variety of definitions and typologies of social capital have been proposed (see, e.g., Bhandari and Yasunobu, 2009, for a review) since the foundational work of Coleman (1988).

Despite the diversity of definitions, a common theme emerges: social capital is recognized as a resource embedded in the networks and groups to which individuals belong rather than as a personal trait or individual characteristic. Portes (1998, p.6) described social capital as “the ability of actors to secure benefits by virtue of their membership in social networks or other social structures,” emphasizing that while “economic capital is in people’s bank accounts and human capital is inside their heads, social capital resides in the structure of their relationships” (p. 7). Similarly, Lin *et al.* (2001, p. 24) defined social capital as “resources embedded in a network, accessed and

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used by actors for actions.” The concept highlights social capital’s role in maintaining and enhancing social positions through the conversion of resources into other forms of capital, such as economic or cultural capital (Bourdieu, 1986; Coleman, 1988; Durlauf *et al.*, 2005; Veenstra and Abel, 2019). We adopt Lin’s definition and regard social capital as the resources and benefits individuals gain from their social networks, which can impact success and perpetuate outcomes.

Understanding social capital is crucial for analyzing how social structures and networks can affect opportunities and inequalities in various contexts, including academic research. In the academic sector, social capital is fostered by collaborative ties between academics and other entities—including fellow scholars, industry, and institutions—and social capital resources can be converted into human capital defined as “the sum of scientific, technical and social knowledge, skills and resources embodied in a particular individual” (Bozeman and Corley, 2004, p. 601).

Numerous studies have explored how social and human capital derived from collaboration between industry and polytechnic universities facilitates the diffusion of innovations and technology transfer, which can enhance academic productivity (Al Tabbaa and Ankrah, 2019; Bikard *et al.*, 2019).

Another area of research has examined how collaboration among scholars influences performance and advancement in academic careers at the individual level. In these studies, collaboration is often measured through co-authorship—the joint publication of scientific manuscripts—which serves as a proxy and indicator of academic collaboration (Abbasi *et al.*, 2011; Abramo *et al.*, 2015, Iglıc *et al.*, 2017).

This study aligns with the latter area of research. Based on information collected from the Scopus repository and scholar characteristics provided by the Ministry of University and Research, we construct co-authorship networks of Italian scholars and describe differences in network structures that provide social capital. We focus on four academic fields (Statistics, Management, General Sociology, and Applied Sociology) and compare results both within and between these fields.

The paper is organized as follows: In Section 2, we define ego-networks and review their role in explaining social capital. In Section 3, we introduce the data, and in Section 4, we present the results. We conclude with a discussion of the findings, the limitations of the study, and directions for future research.

2. Social capital and academic networks

The reason why networks are often found interesting is tied to the relevance of networks and their characteristics—such as size and composition—for understanding individual outcomes, including well-being, health, and performance (Vacca, 2020; Amati *et al.*, 2018). Numerous studies have shown that collaboration among scientists influences productivity, evaluation, and research quality.

Research collaboration can take various forms (Katz and Martin, 1997), including informal discussions, student supervision, data sharing, project participation, and co-authorship. Among these, co-authorship is considered the most prominent and easily traceable form of collaboration, thanks to the availability of databases such as Scopus, Web of Science, OpenAlex, and Google Scholar. In collaboration networks, the entities are the authors of scientific manuscripts, and the connections between them are represented by joint publications.

In academic settings, a well-structured network can significantly influence opportunities such as research funding, impactful collaborations, career advancement (Lu *et al.*, 2021; Bellotti *et al.*, 2016), and scientific performance (De Stefano and Zaccarin, 2016). For example, an analysis of Italian physicists over a decade of grant data found that network position strongly predicted funding success (Bellotti, 2012). Notably, what mattered most for a scholar was not merely being highly connected—what Bellotti (2012, p.225) refers to as being a “big fish”—or belonging to a large, prestigious university—a “big pond” (Bellotti, 2012, p.217)—but rather occupying a brokerage position that bridges different research groups. Scholars who acted as connectors between otherwise unlinked teams secured more grant funding, highlighting that diverse and spanning connections provide greater access to resources than sheer network size or institutional prestige.

Additionally, bibliometric studies have linked network structure to research impact. Sparse ego networks—where the scholar serves as a hub between disconnected collaborators—achieved higher citation rates per publication than dense, tightly knit networks (Ortega, 2014). In these networks, the central researcher exercises more control and selectivity in collaborations, leading to greater impact.

Finally, networks can also influence scientific evaluation. A study of career advancements at Italian universities revealed that connections with members of evaluation committees are strong predictors of a candidate’s career success, while nepotism plays only a marginal role (Abramo *et al.*, 2015). In the Spanish academic context, Zinovyeva and Bagues (2015) found similar results. They demonstrated that personal and professional connections—such as PhD advisor-advisee relationships, collegial ties, or co-authorship—between candidates for full professorships and members of promotion committees significantly influenced evaluation outcomes.

All these studies illustrate how the characteristics of collaboration networks in which a scholar is embedded provide social and human capital and determine access to different resources. Based on this, we aim to identify the collaboration behavior of Italian academics and investigate differences across disciplines.

3. Data and methods

3.1. Data Collection and ego-network construction

The dataset includes information on gender, roles, academic sectors, universities, and departments. The population consists of 803 scholars in Statistics, 611 in Management, 571 in general Sociology, and 163 in Applied Sociology. Table 1 presents descriptive statistics regarding the scholars' gender, roles, and disciplinary sectors.

Table 1 - Descriptive statistics of the scholars working in academia as of 2022 by discipline.

Discipline	Statistics	Management	General Sociology	Applied Sociology
N. academics	803	611	571	163
Gender				
<i>Men</i>	53% (424)	51% (312)	51% (293)	55% (89)
Role				
<i>Researchers</i>	27% (217)	28% (169)	30% (172)	31% (50)
<i>Associates</i>	41% (332)	40% (248)	47% (269)	51% (83)
<i>Full</i>	32% (254)	32% (194)	23% (130)	18% (30)
S.S.D.				
	SECS-S/01 (60%)	SECS-P/08 (100%)	SPS/07 (49%),	SPS/09 (67%)
	SECS-S/02 (2%)		SPS/08 (40%),	SPS/10 (33%)
	SECS-S/03 (20%)		SPS/11 (6%)	
	SECS-S/04 (8%)		SPS/12 (5%)	
	SECS-S/05 (10%)			

Each scholar was linked to its Scopus ID, allowing us to retrieve all of its publications indexed in Scopus from 2012 to 2022. We excluded single-authored manuscripts, as they do not provide insights into collaboration, and also excluded publications with more than 20 authors, based on the understanding that meaningful collaboration typically involves a limited number of authors. The dataset includes a total of 28,605 published papers: 11,374 in Statistics, 10,783 in Management, 4,885 in Sociology, and 1,563 in Applied Sociology.

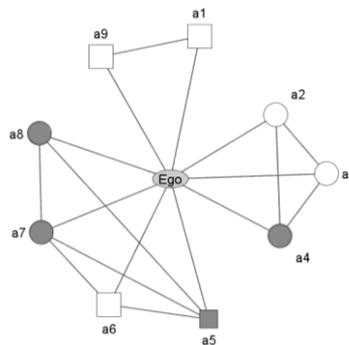
Using this data, we constructed the egocentric network of co-authorship ties for each scholar. An egocentric network is a network seen from the perspective of a focal actor, referred to as "Ego." It includes Ego and the set of alters to whom it is connected. We distinguish between an egocentric network, which reports only the ties between Ego and the alters, and a personal network, which also incorporates the relationships among the alters (Perry *et al.*, 2018).

Figure 1 illustrates the personal network of an Italian scholar with nine alters. In this representation, Italian academics and their co-authors are represented by nodes, and there is a tie between two nodes if they wrote at least one paper together. Different node shapes and colors indicate the characteristics of the alters.

We analyze the personal networks of Italian academics using compositional and structural indices, as outlined by Perry *et al.* (2018).

Compositional indices describe the characteristics of the alters and the nature of the relationships between Ego (the individual) and its alters. These indices are expressed as percentages and illustrate the distribution of alter attributes in the personal network.

Figure 1 - Example of a personal network. Italian academics and their co-authors are represented by nodes. There is a tie between two nodes if they co-authored at least one paper. Different node shapes and colors indicate the characteristics of the alters.



3.2. Network measures & Clustering

Compositional indices describe the characteristics of the alters and the nature of the relationships between Ego (the individual) and its alters. These indices are expressed as percentages and illustrate the distribution of alter attributes in the personal network.

Structural indices focus on the relationships within the network, examining how the Ego is connected to its alters as well as the connections among the alters themselves. These measures reveal the overall organization of the network, such as how interconnected the alters are, how centralized Ego is within the network, and the degree of fragmentation present.

The *ego network size* refers to the number of co-authors (alters) with whom the ego has collaborated. The *network density*, also known as the availability index, captures the proportion of actual ties among alters compared to all possible connections. This index provides insight into the level of cohesion within each network and is calculated as the ratio of the number of actual ties to the maximum possible ties, incorporating both Ego-alter and alter-alter ties:

$$density = \frac{(N. \text{ actual ties})}{(N. \text{ max of possible ties})} \quad (1)$$

The *Diversity/EI Index* evaluates how likely the ego is to collaborate with similar individuals based on specific attributes. The EI Index focuses solely on Ego-alter ties.

Let E be the number of external ties (connections between Ego and alters with different attribute values) and I the number of internal ties (connections between Ego and alters with the same attribute value).

The EI Index is computed as:

$$EI = \frac{(E - I)}{(E + I)}. \quad (2)$$

It ranges from -1 to 1: a value of 1 indicates perfect heterophily (all external ties), while -1 indicates perfect homophily (all internal ties).

We computed both compositional and structural indices for each personal network and used them as variables to identify personal network typologies among Italian academics. This analysis aims to study inequalities in ties providing social capital resources across different disciplines.

Following Amati *et al.* (2018) and Pelle and Pappadà (2021), we applied hierarchical clustering using Euclidean distance, determined group numbers via dendrogram and silhouette score, and characterized typologies through standardized mean proportions.

4. Results

The following analysis was performed on a subset of Italian scholars. We excluded from the initial population those who have published only solo-papers (Statistics: 3%, 24 individuals; Management: 12%, 81 individuals; General Sociology: 31%, 252 individuals; Applied Sociology: 26%, 59 individuals) and those having all co-authors not affiliated to an Italian university (Statistics: 8%, 68 individuals; Management: 15%, 90 individuals; General Sociology: 47%, 267 individuals; Applied Sociology: 45%, 74 individuals). We made this decision due to the lack of information on the alters. Information on gender, role, and disciplinary sectors are only available for Italian scholars given that the source is MUR.

4.1. Personal network descriptives

Table 2 summarizes the descriptive statistics about the compositional and structural indices for the personal networks of Italian scholars having at least one Italian academic co-author by discipline.

Men dominate in Statistics (55%), Management (55%), and Applied Sociology (57%), while General Sociology is more balanced (51% men). International collaboration is highest in Statistics (71% non-Italian co-authors) and Applied Sociology (62%), followed by Management (57%) and General Sociology (54%).

The analysis of academic roles uncovers two distinct patterns. Statistics and Management scholars collaborate primarily with associate and full professors (~40% each), while Sociologists work mainly with associate professors (~50%), followed by researchers and full professors (~25% each).

Table 2 - Compositional and structural indices of the personal networks of Italian scholars having at least one Italian academic co-author by discipline.

Discipline	Statistics	Management	General Sociology	Applied Sociology
N. Egos	735	521	304	89
Compositional network indices				
Gender				
<i>Men</i>	55% (404)	55% (287)	51% (123)	57% (51)
Affiliation				
<i>Non-Italian scholars</i>	71% (522)	57% (297)	54% (131)	62% (55)
Role				
<i>Researcher</i>	19% (140)	19% (99)	29% (70)	27% (24)
<i>Associates</i>	40% (294)	40% (208)	44% (106)	50% (45)
<i>Full</i>	51% (301)	41% (214)	27% (65)	23% (20)
Academic sector				
	SECS-S/01 (61%)	SECS-P/08 (100%)	SPS/07 (49%)	SPS/09 (67%),
	SECS-S/02 (2%)		SPS/08 (40%)	SPS/10 (33%)
	SECS-S/03 (18%)		SPS/11 (6%)	
	SECS-S/04 (10%)		SPS/12 (5%)	
	SECS-S/05 (9%)			
Structural network indices				
Average network size	10.81	10.1	5.81	2.28
Average density	0.22	0.33	0.31	0.24
Average gender EI	-0.12	-0.09	-0.12	-0.06
Average role EI	0.33	0.31	0.53	0.35
Average S.S.D. EI	-0.45	-	-0.47	-0.72

When examining the composition of academic roles, we find variability across disciplines. Statistics and Management scholars maintain larger networks (~10 co-authors vs. 2-5 for Sociologists), while General Sociology and Management show higher density (0.30 vs. 0.23). EI indices reveal minimal gender homophily (near 0), role heterophily (positive values, highest in General Sociology at 0.53), and strong disciplinary homophily among Applied Sociologists (-0.72).

4.2. Personal network typologies

Clustering results reveal significant disciplinary variation in co-authorship patterns, reflecting differences in academic norms and collaboration (Table 3).

Table 3 - Personal network typologies by discipline.

	Group (count)	Interpretation
Statistics	1 (260)	Outside Italian academia; large network; prevalence of men; role balance; focus on SECS-S/01; S.S.D. homophily
	2 (183)	Outside Italian academia; large network; prevalence of men; role balance; focus on SECS-S/01
	3 (78)	Outside Italian academia; prevalence of women; role balance; focus on SECS-S/04
	4 (62)	Outside Italian academia; prevalence of women; prevalence of associate professors; focus on SECS-S/01
	5 (6)	Outside Italian academia; small network; prevalence of men; prevalence of associate and full professors; focus on SECS-S/02; role heterophily
	6 (99)	Outside Italian academia; large network; prevalence of men; role balance; focus on SECS-S/03; S.S.D. homophily
	7 (23)	Outside Italian academia; prevalence of women; prevalence of associate and full professors; focus on SECS-S/05
	8 (24)	Within Italian academia; dense network; prevalence of women; prevalence of associates and full professors; focus on SECS-S/01; S.S.D. homophily

Statistics (8 clusters) and Management (9 clusters) scholars exhibited larger, more structured networks, while General and Applied Sociology (5 clusters each) displayed smaller, more fragmented networks. Role-based disparities emerged, with role heterophily particularly evident among full professors in certain clusters, suggesting network structure influences career progression and visibility.

Regarding institutional affiliation, Statistics and Sociology showed greater international collaboration, whereas Management and Applied Sociology favored domestic partnerships. Gender dynamics varied considerably: Statistics and Sociology exhibited strong disciplinary closure with women-centered clusters emerging within Italian academia; Management demonstrated lower gender homophily and a pronounced domestic-international divide; Applied Sociology displayed the highest levels of male dominance, disciplinary homophily, and role heterophily.

Table 3 (cont.) - Personal network typologies by discipline.

	Group (count)	Interpretation
Management	1 (104)	Within Italian academia; large network; prevalence of men; prevalence of associates and full professors
	2 (34)	Outside Italian academia; prevalence of women; prevalence of full professors; gender homophily; role heterophily
	3 (61)	Outside Italian academia; prevalence of men; prevalence of full professors; gender homophily
	4 (41)	Within Italian academia; dense network; prevalence of men; prevalence of associate and full professors
	5 (114)	Outside Italian academia; large network; prevalence of women; prevalence of associate; associate and full professors
	6 (87)	Outside Italian academia; prevalence of women; prevalence of researchers
	7 (24)	Outside Italian academia; prevalence of women; prevalence of associate professors; role homophily
	8 (25)	Outside Italian academia; prevalence of men; role balance
	9 (31)	Outside Italian academia; dense network; prevalence of men; prevalence of full professors; gender and role heterophily
General Sociology	1 (10)	Outside Italian academia; gender balance; prevalence of associate and full professors; focus on SPS-12; S.S.D. homophily
	2 (21)	Outside Italian academia; dense network; prevalence of men; prevalence associate professors and researchers; focus on SPS-11; role heterophily
	3 (114)	Outside Italian academia; large network; prevalence of women; prevalence of associate professors and researchers; focus on SPS-07; role heterophily
	4 (64)	Outside Italian academia; prevalence of men; focus on SPS/09; role and S.S.D. heterophily
	5 (95)	Large and dense network; prevalence of women; prevalence of associate professors; focus on SPS-08; role heterophily; S.S.D. homophily
Applied Sociology	1 (18)	Outside Italian academia; prevalence of men; prevalence of full professors; focus on SPS/09; role heterophily
	2 (28)	Large and dense network; prevalence of men; prevalence of associate professors; focus on SPS-09; S.S.D. homophily
	3 (19)	Large and dense network; prevalence of men; prevalence of associate professors; focus on SPS-10; gender and S.S.D. homophily
	4 (13)	Outside Italian academia; prevalence of men; focus on SPS/09; and S.S.D. heterophily
	5 (11)	Outside Italian academia; prevalence of women; prevalence of researchers; focus on SPS-09; role heterophily; S.S.D. homophily

5. Conclusions

This paper investigated personal network structures and composition among scholars in Statistics, Management, General Sociology, and Applied Sociology using hierarchical clustering, with results validated through k-means.

Our findings reveal discipline-specific network structures that influence academic social and human capital. Disparities in social capital—reflected in variations in gender, academic roles, disciplinary sectors, university affiliations, network density, diversity, and size—translate into inequalities in human capital, affecting productivity, research quality, and career advancement of Italian academics. Women's smaller or less international networks may reflect structural barriers and gendered gatekeeping practices in academia (Van den Brink and Benschop, 2012), as informal networks and mentoring opportunities are often less accessible to women, affecting visibility and collaboration opportunities (Bozeman and Gaughan, 2011). Role-based differences, particularly the greater brokerage position of full professors compared to researchers, reflect the hierarchical organization of academic careers in Italy, where seniority strongly influences access to resources and collaborations (Musselin, 2013). Disciplinary variations—larger networks in Statistics compared to more fragmented ones in Sociology—may stem from different "academic tribes and territories" (Becher and Trowler, 2001), as quantitative disciplines privilege multi-authored journal articles, while interpretive fields often value books and small, cohesive collaboration groups (Kyvik, 2003).

This study has important limitations. We used co-authorship as a collaboration proxy, though other cooperation forms exist. Scopus-based data systematically favors bibliometric fields and underrepresents social sciences where monographs and edited volumes are central (Hammarfelt, 2016), making cross-disciplinary comparisons reflect publishing norms alongside collaboration strategies. We constructed networks using binary ties, disregarding collaboration strength indicated by co-authored paper counts. Future work will analyze weighted networks and examine how network typologies impact academic performance.

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References

- ABBASI A., ALTMANN J., HOSSAIN L. 2011. Identifying the effects of co-authorship networks on the performance of scholars: A correlation and regression analysis of performance measures and social network analysis measures. *Journal of informetrics*, Vol. 5, No. 4, pp. 594-607.
- ABRAMO G., D'ANGELO C. A., ROSATI F. 2015. The determinants of academic career advancement: Evidence from Italy. *Science and Public Policy*, Vol. 42, No. 6, 761-774.
- AL-TABBAA O., ANKTAH S 2019. Engineered' university-industry collaboration: A social capital perspective. *European Management Review*, Vol. 16, No. 3, pp. 543-565.
- AMATI V., MEGGIOLARO S., RIVELLINI G., ZACCARIN S. 2018. Social relations and life satisfaction: the role of friends. *Genus*, Vol. 74, No. 7, pp. 1-18.
- BECHER T., TROWLER P. 2001. *Academic tribes and territories: Intellectual enquiry and the culture of disciplines*. Buckingham: Open University Press/McGraw-Hill.
- BELLOTTI E. 2012. Getting funded. Multi-level network of physicists in Italy. *Social Networks*, Vol. 34, No. 2, pp. 215-229.
- BELLOTTI E., KRONEGGER L., GUADALUPI L. 2016. The evolution of research collaboration within and across disciplines in Italian Academia. *Scientometrics*, Vol. 109, pp. 783-811.
- BHANDARI H., YASUNOBU K. 2009. What is social capital? A comprehensive review of the concept. *Asian Journal of Social Science*, Vol. 37. No. 3, pp. 480-510.
- BIKARDM M., MURRAY F., GANS J.S. 2015. Exploring trade-offs in the organization of scientific work: Collaboration and scientific reward. *Management science*, Vol. 61, No. 7, pp. 1473-1495.
- BOURDIEU P. 1986. The forms of capital. In: RICHARDSON J. (Ed.) *Handbook of theory and research for the sociology of education*. New York: Greenwood Press, pp. 241-58.
- BOZEMAN B., CORLEY E. 2004. Scientists' collaboration strategies: implications for scientific and technical human capital. *Research policy*, Vol. 33, No. 4, pp. 599-616.
- BOZEMAN B., GAUGHAN M. 2011. How do men and women differ in research collaborations? *Research Policy*, Vol. 40, No. 10, pp. 1393-1402.
- COLEMAN J. S. 1988. Social capital in the creation of human capital. *American Journal of Sociology*, Vol. 94, pp. 95-120.
- DE STEFANO D., ZACCARIN S. 2016. Co-authorship networks and scientific performance: An empirical analysis using the generalized extreme value distribution. *Journal of Applied Statistics*, Vol. 43, No. 1, pp.262-279.
- DURLAUF S., FAFCHAMPS M. 2005. Social capital. In AGHION P. and S. DURLAUF S. (Eds.) *Handbook of economic growth*, Amsterdam: Elsevier, pp. 1639-1699.

- HAMMARFELT B. 2016. Beyond coverage: Toward a bibliometrics for the humanities. In OCHSNER M., HUG S. E., DANIEL H. D. (Eds.), *Research Assessment in the Humanities*, Springer, pp. 115-131
- KATZ J.S., MARTIN B.R. 1997. What is research collaboration?. *Research policy*, Vol. 26, No. 1, pp. 1-18.
- KYVIK S. 2003. Changing trends in publishing behaviour among university faculty, 1980–2000. *Scientometrics*, Vol. 58, No. 1, pp. 35-48.
- IGLIČ H., DOREIAN P., KRONEGGER L., FERLIGOJ A. (2017) With whom do researchers collaborate and why?. *Scientometrics*, Vol. 112, pp. 153-174.
- LIN N., FU Y., HSUNG R. 2001. The position generator: a measurement instrument for social capital. In LIN N., COOK K. and BURT R. (Eds.), *Social capital: theory and research*, New York: Aldine de Gruyter, pp. 57–81
- LU W., REN Y., HUANG Y., BU Y., ZHANG Y. 2021. Scientific collaboration and career stages: An ego-centric perspective. *Journal of Informetrics*, Vol. 15, No. 4, 101207.
- MUSSELIN C. 2013. How peer review empowers the academic profession and university managers. *Research Policy*, Vol. 42, No. 5, pp. 1165-1173.
- ORTEGA J.L. 2014. Influence of co-authorship networks in the research impact: Ego network analyses from Microsoft Academic Search. *Journal of Informetrics*, Vol. 8, No. 3, pp. 728-737.
- PELLE E., PAPPADÀ R. 2021. A clustering procedure for mixed-type data to explore ego network typologies: an application to elderly people living alone in Italy. *Statistical Methods & Applications*, Vol. 30, No. 5, pp.1507-1533.
- PERRY B.L., PESCOLIDO B.A., BORGATTI, S.P. 2018. *Egocentric network analysis: Foundations, methods, and models*. Cambridge university press.
- PORTES A. 1998. Social capital: Its origins and applications in modern sociology. *Annual Review of Sociology*, Vol. 24, pp. 1–24.
- VAN DEN BRINK M., BENSCHOP Y. 2012. Slaying the seven-headed dragon: The quest for gender change in academia. *Gender, Work & Organization*, Vol. 19, No. 1, pp. 71-92.
- VEENSTRA G., ABEL T. 2019. Capital interplays and social inequalities in health. *Scandinavian Journal of Public Health*, Vol. 47, No. 6, pp. 631-634.
- ZINOVYEVAN., BAGUES M. 2015. The role of connections in academic promotions. *American Economic Journal: Applied Economics*, Vol. 7, No.2, pp. 264-292.

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