(Leite and Pinho 2017)

Leite, Denise, and Isabel Pinho. 2017. *Evaluating Collaboration Networks in Higher Education Research: Drivers of Excellence*. Cham, Switzerland: Springer International Publishing. https://doi.org/10.1007/978-3-319-45225-8.

Page 6: Micro meta-level SNA includes group research. Meso meta-level SNA is organizational or institutional levels. Macro meta-level SNA includes a national, international, or global research system.

Page 7: Use more than one level to examine science politics and related programs which promote formal networks.

Page 29: “the number of authors per paper varies among disciplines. For example, biology or health science papers, reflecting the differences in the way research is done; biology research papers are done by large groups; mathematics and philosophy research is done alone or by pairs of collaborators; in phisics, currently, some papers have more than 3,000 authors.”

Pg 30: Collaboration is a source of stimulation and creative activity.

Pg 31: Funding agencies and public policies are prioritizing collaborations like research partners, interinstitutional, international, regional agreements, feedback from external colleagues, co-authorship; visiting scholars; and interagency and international research training groups.

Pg 31: people seek for new tools to evaluate public-funded research networks.

Pg 32: “The motivation to belong to the academic network is based on the expectation to enjoy a space for sharing and creation of knowledge, which is itself one of the main reasons for collaboration.”

Quoting Bourdieu and Wacuant, 1992 p 119: “Social capital is the sum of the resources, actual or virtual, that accrue to an individual of a group by virtue of possessing a durable network of more or less institutionalized relationships of mutual acquaintance and recognition.”

Pg 32-33 “The social and scientific capital of the research groups would be an intangible asset that exceeds the sim of the individual social and scientific capital of their members. Internal and external interactions would broaden this kind of capital and should promote the use and sharing of knowledge because there is a relational investment in search of gains that belonging to the group can provide (Bourdieu, 1996). Members of the network may not be aware of this purpose, but it embodies the idea of symbolic profit, resulting from trade-off f shared benefits and risks. This is a result in terms of symbolic capital, that is , a capital in cognitive basis, supported by knowledge and recognition (Bourdieu, 1996).” “ If we consider the symbolic capital increase as profit, its construction is founded on social relations built among individuals in a continuous work of maintaining link that are established more easily in networks with creative porosity. Further on, collaboration takes place in academic fields of research in which knowledge integration activities operate. From the sociological point of view, it is possible to consider that the activities would be disinterested. If a fellow student or a novice researcher shows too much interest, he/she can be seen as self-seeking and will be misunderstood by peers in the academy. Not, collaborative research networks involve managing human groups with their interests not always visible, with their illusion and power games. In network management, it is necessary to consider the tensions and seek a dynamic balance between collaboration and competition.”

P 33-34: What makes a team successful? Socio-psychological relations: “Considering that collaboration is based on exchange, the gift, and not everyone knows what everyone knows, it features a social and psychological phenomenon that polarizes relationships, symbolic or not, between the dominant type and the dominated one. The practice shows that there is a certain socializing mission in each network or in other worlds the socialization of the young, newcomers in the field, by the older, dominant, senior or terminator. In these socio-psychological processes a sense of belonging and growing trust is developed.”

Visible and invisible hierarchies in the group

Pg 34 “Successful interaction is stimulating for reciprocal exchanges.”

Pg 35 peer modeling, practice among peers

P36-37 patterns of trust:

P 37 “We are living in a collaborative research age, a period in the history of science when collaborative networks overtake local spaces and national territories and spread to the most recondite global spaces followed by invisible colleges. It seems to be easier and faster to develop new ideas through dialogue than through individual work. Collaboration departing from a single research network echoes to numerous voices all over the world. In doing so, it disseminates science and ideas, being a realistic driver of excellence for higher education.”

Pg 39: a type of collaboration is peer-different. “Colleagues from different knowledge areas or interdisciplinary fields have a potential gain in fecundity. They may achieve more robust results. There are gains of power and speed from combining theories and/or methodologies. Peer-different collaboration contributes to stimulating reliability. However, scientists must understand each other since the differences among the fields must be recognized and respected by all. Trust must be built among colleagues of different fields as there is no way to critically validate results from unfamiliar methodologies.” Based on Thagard 1997

Pg 81: “ In academia, publish or perish marks the researcher because he knows that this idea directs the evaluation of research agencies and S&T funding (McGrail et al. 2006). Such evaluations acquire economic and market value. Here, we consider a special marker, the knowledge market itself, and a market for researchers who produce knowledge and provide this market with merchandise. The most central point of evaluations, in addition to the scientific and moral or ethical value, is to mark the production of the competitive and possessive individual. The etymology of the work evaluation leaves no doubt.”

Pg 89: “The work of researchers, in a research project, is structured in various formal and informal networks. Such social spaces can be designed and monitored in order to facilitate interaction, knowledge flows, and knowledge processes (Leite et al., 2012; Merton, 1973; Pinho et al., 2012; Winter et al., 2006). Scientists are immersed in different systems -Political, cultural, educational, informational, scientific-technological, and innovational. Scientists are challenged by digital convergence as multiple functions converge to multifunction devices and different platforms coexisting with the features of different electronic devices.”

“Jonathon Mote and colleagues (2007) propose using social network analysis techniques as a tool for research evaluation in order to understand how real research happens. Because Science is a social process, the evaluation of research networks is naturally a way to improve the research performance. As microsystems of research activities, research networks can be complex objects to be evaluated; despite the difficulties of such evaluation, the literature review shows few guidelines to overcome this complexity . ..”

P90: The evaluation proposal should include 1. The goal of the evaluation 2. The object of the evaluation (formal or informal networks) 3. The time period and what 4. The scale of level of analysis the network is located (micro, meso, and macro)

“Research network performance evaluation (RNPE) is a network approach that evaluates research in which researchers and other stakeholders actively engage in developing the evaluation and in all phases of its implementation in order to use results to improve learning, increase skills, and knowledge production. In this kind of evaluation, participants share knowledge and learn together to take corrective actions. This evaluation can develop leaders and build teams. We propose an RNPE process divided into five main phases: 1. Sensitization (discussion about evaluation needs and criteria); 2. Conducting the evaluation by quantitative indicators, 3. Qualitative indicators facing quantitative results 4. Results (internal) and dissemination; 5. Deliberation and planning for excellence.”

“Micro-level research network evaluation begins by 1. Sensitization is a phase in which values and interests are put on the table. The first step is related to the choice of the indicators, and they must be discussed with group members. The discussion about evaluation needs and criteria is the start-up for the process. If the member of a research network decides about 2. quantitative indicators’ evaluation, an evaluation protocol can be the result of this phase. It is a guiding document to perform a robust evaluation, in our experience.”

“Begin by identifying the research network topology, by observing the network structure that includes identification of authors as nodes/members/actors and their connections by institutions . . .”

Pg 93 Micro-level quantitative indicators for research network performance evaluation

Network actors: Network’s composition: Intragroup and extra group (collaborators department and position)

Actors groupings: Leader’s ability to congregate collaborators: actors link to leader and between members

Grant proposals #

Leadership style: leader’s brokerage role within the grant network, considering network connectivity

Collaboration intensity: Diversity of relations established within the network (average degree of the networks’ vertices)

Pg 94 “Common research inputs categories are human resources, financial resources, infrastructures, and existing knowledge. Research network outputs categories are new knowledge, articles, books publications, patents, and researchers training programs.” “In our experience, researchers have their own understandings about evaluation procedures that must be taken into account. Whatever the perception of the evaluation, we suggest that each leadership (leadership of networks and leadership of research groups) find the right time to evaluate the actions to develop and in the case of networks, review how communication and interplay are processed. There is always a margin and there is plenty of too to be better at what we do and to choose indicators of RNPE.. This will contribute to the excellence of the activities of each network.”

Pg 95: Some researchers, mainly from exact areas of sciences, have a fear of the lack of objectivity in qualitative indicators. Any indicator can be mathematized, transformed into a quantitative one, and seen through statistical procedures”

P 85-97 Participatory evaluation, dialogue, and discussion with members, the actors of collaborative networks, all should be permanent in-person. Whenever we get objective measures to deliberate, we plan for excellence. Frequent evaluative communication favors the production of knowledge, contributes to achieving a strong science performance, and at the same time it, adds to the education of new generations with the induction of self-practices and self-requirements of ethical personal behavior and of good habits in scientific practices.

Pg 96 Qualitative indicators: motivation, interest and competition, communication, cohesion, cooperation or collaboration, interaction, incentives, research themes, time, co-authorship policy, co-authorship workshare, leadership and knowledge management.

Leite and Pinho (2017) explore the dynamics of interpersonal relationships within academic research teams, emphasizing the crucial role of feeling connected among team members for both personal fulfillment and team resilience. They assert that the desire to join an academic network stems from the anticipation of engaging in a collaborative space for knowledge sharing and creation, which underpins the essence of academic collaboration (p. 32). Furthermore, they introduce the concept of social and scientific capital within research groups as an invaluable asset that surpasses the sum of its parts. This capital, enriched through internal and external interactions, fosters knowledge use and sharing, rooted in relational investments aimed at achieving collective benefits (pp. 32-33).

The success of a team, according to Leite and Pinho, hinges on socio-psychological relations that foster a sense of belonging and trust, essential elements in a network where collaborative efforts coexist with competitive undercurrents (pp. 33-34). They highlight the significance of socio-psychological processes in socializing newcomers, thereby integrating them into the network through mentorship and peer modeling (p. 34). This integration process is pivotal in building a collaborative research culture where trust patterns and reciprocal exchanges thrive, ultimately contributing to the dissemination of science and ideas on a global scale (pp. 36-37, 39).

In light of Leite and Pinho's findings, prioritizing team member integration becomes fundamental in fostering an environment conducive to successful interdisciplinary collaboration. This involves creating networks where individuals feel valued and connected, thereby enhancing the collective scientific and social capital. Such networks not only facilitate knowledge sharing and creation but also ensure that collaborations are resilient and productive, capable of transcending disciplinary boundaries for robust and innovative outcomes. This thesis aims to examine the extent to which the Grand Challenges initiative at Boise State promotes such interdisciplinary integration, seeking to understand the pre-existing culture of collaboration and how it has evolved with the initiative's investments (Leite & Pinho, 2017).

By focusing on the integration of team members from diverse disciplines, this research contributes to a deeper understanding of how interdisciplinary collaboration can be effectively nurtured, aligning with Boise State's strategic goals of fostering innovative and inclusive research environments.

Leite and Pinho (2017) delve into the multifaceted concept of scientific productivity, outlining it as a measurable outcome that encompasses both the inputs and outputs of research activities. They identify common inputs into the research process, including human and financial resources, infrastructures, and the body of existing knowledge. The outputs, on the other hand, range from the generation of new knowledge to tangible products like articles, book publications, patents, and training programs for researchers (p. 94). Importantly, Leite and Pinho emphasize that researchers hold diverse perspectives on evaluation procedures, suggesting that leadership within research networks and groups should periodically assess their actions, communication, and interaction dynamics to continually improve and choose appropriate indicators of research network productivity and excellence (RNPE).

They also address concerns related to the evaluation of scientific productivity, noting that some researchers, particularly in the exact sciences, worry about the perceived lack of objectivity in qualitative indicators. However, they argue that any indicator can be quantified and analyzed statistically to ensure objectivity (p. 95). The authors advocate for participatory evaluation, emphasizing the importance of dialogue and discussion among network members to foster a culture of continual assessment and improvement. Such evaluative communication is seen as crucial for enhancing knowledge production, achieving strong scientific performance, and contributing to the education of new generations of researchers with a focus on ethical conduct and good scientific practices (pp. 85-97).

Drawing on Leite and Pinho's insights, examining professional networks through joint publications, grant proposals, committee involvement, conference participation, and university business becomes a practical approach to measuring scientific productivity within the context of the LOVE chapter. By evaluating these aspects of collaboration, we can gain a clearer understanding of the productivity and effectiveness of research networks. This approach aligns with the notion that scientific productivity is not just about the outputs but also involves a critical examination of how these outputs are achieved through collaborative efforts, and how they contribute to the broader scientific community and society as a whole.