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PARTICIPACIÓN FUERTE COMO ESTRATEGIA PARA EL DESARROLLO DE CULTURAS CIENTÍFICAS DE EXCELENCIA EN ORGANIZACIONES DE INVESTIGACIÓN

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ABSTRACT

The national system of science, technology, knowledge, and innovation needs to promote a culture of excellence that values the multidimensionality involved in scientific activity and fosters outreach activities in society and the productive sector.

Strong Participation is an instrument for organizational development that allows systematizing, implementing, and evaluating actions to create, promote, and validate a multidimensional culture of excellence at research organizations.

This instrument contributes to creating and institutionalizing a “culture of excellence” by recognizing, using, and incorporating the different dimensions of scientific activity.

This instrument has proven to be effective in one research center of excellence; it is systematic and replicable, and it produces objective indicators to assess the research excellence culture.

THE CHALLENGE OF MULTIDIMENSIONAL EXCELLENCE IN CHILE

“Instruments that promote the multidimensional development of research activity are required to extend the idea of excellence to other relevant dimensions”

Research centers of excellence are crucial for the recently developed national policy of science, technology, knowledge, and innovation (CTCI for its acronym in Spanish). Nowadays, research excellence emphasizes productivity as defined by the WoS quantitative bibliometric system of impact factor (Bases Fondo Basal 2021, Bases Milenio 2020). However, research centers are highly complex organizational structures that should promote the professional development of various dimensions of scientific activity, such as collaborative research, advanced human capital training, technology transfer, innovation, outreach activities, engagement with the public and private productive sectors, as well

as advice on knowledge and techno-scientific skills in political, economic and social matters (Plan Nacional, 2020, pp. 5-6). Therefore, to ensure the effective and sustainable development of the country’s human and social capital, the sub-directorate of centers suggests moving towards a notion of excellence that values the **multidimensionality of scientific activity** (Plan Nacional, 2020).

Instruments that promote the multidimensional development of research activity are required to extend the idea of excellence to other relevant dimensions, such as the engagement with society and the collaboration with the public and private productive sectors. The instrument of **strong participation** (participación fuerte in Spanish) adapted by the Culture and Communication Unit of Millennium Biomedical Neuroscience Institute (BNI) at the Faculty of Medicine of Universidad de Chile exemplifies how this challenge can be approached in the local context.

STRONG PARTICIPATION TO DIVERSIFY EXCELLENCE

“Strong Participation contributes to the creation and institutionalization of a culture of excellence”

With a history of 10 years, the BNI has positioned itself as a blue-sky research center with high academic productivity and innovative initiatives to transfer conventional and unconventional technology, scientific education, and outreach programs. During its second period (2015-2020), the BNI performed an unprecedented action: to reallocate resources from the Millennium Science Initiative (Fondo Milenio in Spanish) to create a **Culture and Communications Unit** aimed at knowing in a systematic way the excellence criteria for the Center governance, in addition to implementing strategic measures to professionalize and improve its organizational structure. Given that the Center is made up of 17 laboratories and housed in a university, its objective was to develop an **institutional identity** capable of uniting the various contexts and styles of research, taking into consideration the different professions of the members and the host institution. In 2019, the BNI participated in the associative project ANID-PIA SOC180039, devoted to study the institutional conditions of knowledge production in Chile, and it performed a second unprecedented action: to analyze the BNI's research culture through a collaboration with the “Anillo” team to identify the expectations, interests, and objectives of its members. To this effect, they proposed to understand **research culture** as the set of expectations, values, rules, and rights of the scientific community (The Royal Society, 2017; Knorr Cetina, 1991). The collaborative “BNI-Anillo” alliance also made it possible to adapt the **instrument of strong participation** (Del Valle, 2009) in a systematic, replicable, and dynamic manner to accom-

pany, support, promote and strengthen the organizational structure of the Center.

The instrument of strong participation is an organizational strategy aimed at assessing, employing, and systematizing the socio-cultural complexity of research organizations. Its purpose is to promote processes of innovation and cultural change, as well as a dynamic construction of institutional identity (Del Valle, 2009). This instrument is based on creative co-participation actions among the members of the organization. These actions make it possible to recognize the members' expectations, interests, and needs; they motivate democratic forms of expression and create robust commitments between the different participants and the organization. This instrument has proven to be effective in **systematizing** community perceptions, **identifying** the normative effects of the institution, and **motivating the participation** of members in decision-making processes.

In research organizations, the use of Strong Participation contributes to the creation and institutionalization of a “culture of excellence” through the recognition, employment, and incorporation of the different dimensions of scientific activity. To support the adaptation of the instrument to the BNI, a series of meetings was held between the Culture and Communication Unit and the “Anillo” team. Information was obtained from key informants, semi-structured interviews, and participant observations done by the “Anillo” team during 2019 and 2020.

AN INSTRUMENT FOR RESEARCH EXCELLENCE CULTURES

The **adaptation** proposes to systematize Strong Participation according to **3 stages** and **9 total activities with specific procedures and results** to ensure the management, implementation, and evaluation of actions that promote and accompany cultures of excellence (FIGURE 1). By using this process, the BNI defined and approved a new institutional framework, composed of

10 institutional values and objectives, 27 actions to promote and accompany a culture of excellence, and, finally, a management method to ensure the adequate performance of the actions and their subsequent evaluation. Of a total of 220 people of the BNI community, 130 participated in this process, which is equivalent to 59% of its members.

Stage 1

Knowledge of perceptions



Activity 1
Knowing the working and personal experience, and feelings of the members

Stage 2

Systematization of data and actions



Activity 2
Classifying the data



Activity 3
Prioritizing classified information



Activity 4
Building an action mapping from the prioritized dimensions
construir un mapa de acciones



Activity 5
Adjusting the proposed actions to the organizational structure of the institution

Stage 3

Construction of the culture of excellence proposal



Activity 6
Designing a matrix for decision making



Activity 7
Establishing a management system



Activity 8
Approving the proposal made by the Board of Directors



Activity 9
Validating the proposal through a public presentation

Figure 1 | Diagram of the instrument by stages and activities

First stage

“Knowledge of perceptions”

It consists of relevant data production, focused on the internal culture of the organization. One activity is involved.

First activity

Knowing the experience, impression and feelings of the members.

Volunteers from the Center are called to participate in focus groups separated by job role to answer a relevant and focused questionnaire. In the case of the BNI, the Culture and Communication Unit, together

with the Board of Directors and the “Anillo” team, created four questions that included: 1) professional expectations and goals for being part of the Center; 2) benefits offered for being part of the Center; 3) personal appreciation of the Center and 4) opinion regarding the strengths and weaknesses of the Center. The activity produced multiple qualitative data.

Second stage

“Data systematization and actions”

It consists of analyzing the data obtained in the previous stage and designing actions to strengthen the various dimensions of the scientific endeavor. Four activities are involved.

Second activity

Classifying the data.

To carry out this activity, a Likert scale was used to categorize and classify community feelings as follows: 1) very positive; 2) positive; 3) very negative; 4) negative.

Third activity

Prioritizing classified information.

Volunteers on behalf of each organizational level are called to participate with the exception of the Board of Directors. The people included in the multi-job-role group must have two years of service and the intention to continue working in the institution. Its objective is to define five dimensions of research activity that must be worked on and promoted in the organization by imagining a desired future of excellence. The dimensions are determined from the information obtained in the second activity. In the case of the BNI, the dimensions included: 1) members’ rights and duties; 2) scientific career; 3) labor rights; 4) enabling leadership; and 5) participation.

Fourth activity

Building an action mapping from the prioritized dimensions (FIGURE 2).

An action mapping is a tool to create, propose or highlight actions. Its objective is to motivate, involve and guide the community in developing measures that will promote the prioritized dimensions. With this purpose, community members are asked to identify two actions already implemented in each dimension and propose two new actions to strengthen them. In the case of the BNI, 82 established actions were identified, and 116 new actions were proposed.

Fifth activity

Adjusting the proposed actions to the organizational structure of the institution.

Together with members of the Board of Directors, the multi-job-role group evaluated the consistency of the proposed actions with the mission of the Center and their implementation feasibility. The objective is to select actions that represent the interests of the institution and the needs of its members. In the case of the BNI, 27 actions were selected.

Action mapping: THE BNI WE ALL WANT

1 and 2: established actions (activity, impact, person in charge must be identified)
3 and 4: non-established actions (activities, impact, responsible team must be described. Answers must be justified)

A. Rights and duties of the BNI citizen

<p>1. Activity: Seminars, Pizza Talks, Open councils. Impact: Feedback among peers/ Consolidation of community. Responsible team: BNI team.</p>	<p>3. Why: Strengthen the collaboration between work teams. Activity: Enhancement of technical skills. Impact: Improve research performance. Responsible team: REDECA.</p>
<p>2. Activity: Seminars, Pizza Talks, Open councils. Impact: Strengthen the community. Responsible team: BNI team.</p>	<p>4. Why: People belonging to BNI are not obliged to participate. Activity: Participation in dissemination in a consistent manner. Impact: Socialization of scientific knowledge Responsible team: Principal investigator and Communication Unit.</p>

Figure 2 | Matrix for decision-making

Section of the action mapping with one of the prioritized dimensions "Rights and duties of the BNI citizen", along with the actions identified and proposed by group No.4 of the BNI members.

Third stage

"Construction of the excellence culture proposal"

It consists of the systematization and evaluation of the institutional framework and its concrete and replicable actions. Three activities are involved.



Sixth activity

Designing a matrix for decision-making.

The matrix is a tool to systematize actions according to relevant and specific organizational parameters. Given that the main objective of the BNI was to define its institutional identity, this tool was used to define these organizational parameters and associate them with actions in an inductive manner. With this purpose, the multi-job-role group and members of the Board of Directors defined the institutional values, objectives, and, finally, the dimension of the scientific endeavor they are strengthening, accompanying, and promoting (FIGURE 3) for all 27 actions. Based on specific objectives and actions, a set of 10 institutional values and objectives were determined in this activity.

Seventh activity

Establishing a management system.

This system establishes a procedure for the implementation of each action. The objective is to manage the actions and monitor their execution over time. With this purpose, the multi-job-role group, together with members of the Board of Directors, appointed for each action a person in charge, an execution period, a verification indicator, and a standard. In the BNI, 14 short-term actions, 8 medium-term actions, and 5 long-term actions were established together with the person in charge and compliance indicators.



N°	Institutional Value/ Objective	Specific Objective	Action	Dimension
1	Clarity of rules and roles Foster a culture of well-being and respect Be a reference in the national and international scientific community	Planning of the scientific career Define a scientific career policy at BNI	Defining the scientific career projection at BNI	Scientific career
2	Leadership training Sense of belonging Transparency Foster a culture of well-being and respect	Identify the needs and potentialities at each organization level Audit the internal processes of BNI Promote dialogue between the different organization levels and the Board of Directors Advise the Board of Directors on various matters related to the welfare of the organization levels	Council made up of different organization levels	Participation

Figure 3 | Matrix for decision-making

Two examples of the matrix, row 1 and 2, are developed by the multi-job-role group.



Eighth activity

Approving the proposal made by the Board of Directors.

The multi-job-role group requests the Board of Directors to evaluate the recommended actions based on the matrix's parameters and approve, reject or modify when required, each aspect of the matrix. As a result, a final proposal called "Institucional Framework BNI 2020-2021" is obtained (FIGURE 4).

Ninth activity

Validating the proposal through a public presentation.

This presentation informs the community of the process results, the proposal, and the following steps. The objective is to create motivation, commitment, and participation and strengthen the feeling of belonging and institutional identity. In the case of the BNI, the director of the Culture and Communication Unit and the Institute director were in charge of the public presentation.

"Adapting the instrument of strong participation allows comprehensive, strategic, systematic, and dynamic management in scientific organizations"

Adapting the instrument of strong participation allows comprehensive, strategic, systematic, and dynamic management in scientific organizations. Its design in stages facilitates the creation and management of symmetrical relationships between the Board of Directors and the community, by systematically translating the expectations, needs, and desires of the members into concrete and measurable actions that diversify the research excellence culture of the institution. Six months after the approval of the new institutional framework and actions, the Center has implemented 11 out of the 14 short-term actions, 4 out of the eight medium-term actions, and 0 out of the five long-term actions.

ORGANIZATIONAL STRUCTURE FOR MULTIDIMENSIONAL EXCELLENCE

Research Centers of excellence have contributed to positioning Chile in fourth place in the region in terms

of scientific productivity (SCIMAGO 2021). Parallel to that, the mission of these organizations is also to en-

2020-2021 BNI Institutional Framework

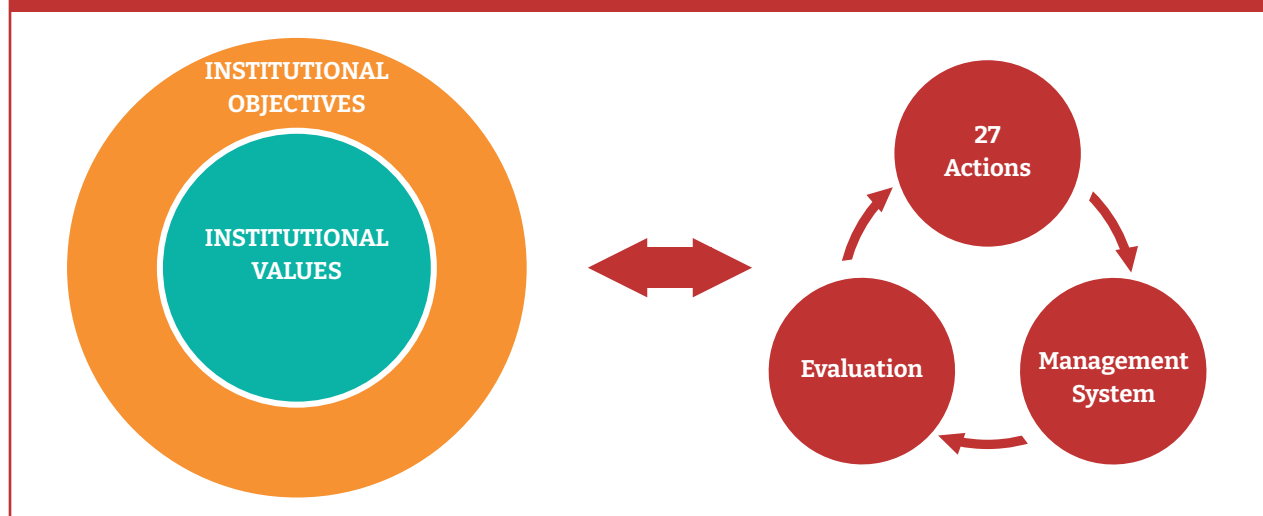


Figure 4 | Diagram of the results obtained at BNI

“it is critical to validate and professionalize the design of an autonomous and democratic organizational structure.”

sure standards of excellence in the other dimensions of research activity (training, outreach, services, and technology transfers). To achieve their mission, it is critical to **validate** and **professionalize** the design of an autonomous and democratic organizational structure, for it allows the construction of strategic actions that accompany and promote a culture of excellence. In the BNI, this was possible thanks to the design and implementation of a Culture and Communication Unit.

We have observed that investing in the organization of a research culture of excellence by using Strong Participation provides three advantages for the research center's management.

First, this **instrument** is sensitive to the needs and capacities of community members and leads to a robust engagement with the local reality. Second, it encourages the diversification of the notion of excellence since it validates, strengthens, and adds value to dimensions that are not traditionally considered but are undoubtedly relevant to research activity.

Finally, it allows the actions to be used as an objective **indicator** of the “institutional commitment” to accompany, support, and evaluate the research excellence culture of the centers, which contributes to producing sustainable knowledge ecosystems.

“This instrument encourages the diversification of the notion of excellence since it validates, strengthens, and adds value to dimensions that are not traditionally considered.”

RECOMMENDATIONS

From the adaptation process of the strong participation instrument, the following general recommendations are presented, which are aimed at professionalizing, systematizing, and strengthening the organizational structure of the centers of excellence, an aspect that today appears as one of its fundamental pillars (Bases Fondo Basal 2021, Bases Milenio 2020).

- Foster a research culture of excellence that values the **multidimensionality** involved in scientific activity and encourages outreach activities in society and the productive sector.
 - Promote the design of **research and organizational management areas**, devoted to validating and professionalizing the work related to the organization of centers.
 - Promote the **integration of expert knowledge and mixed methods** (qualitative and quantitative) tools, which allow organizational structures to be built from a multidisciplinary approach connected to local contexts and sensitive to the opportunities offered by community members.
 - Implement the **strong participation** instrument applied to research organizations to promote the development of research cultures of excellence.
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