Nr. 720057/22.12.2025

Final Evaluation Report

PROJECT REGISTRATION CODE
ANC-EPOC-2025-0041

RESEARCH ORGANIZATION NAME
INSTITUTUL NATIONAL DE CERCETARE - DEZVOLTARE PENTRU FIZICA MATERIALELOR BUCURESTI RA

RESEARCH ORGANIZATION TYPE
B. Research Organizations - applied research/technological development/innovation (except HE)

PERIOD UNDER EVALUATION
2020-2024

DATE OF VISIT

11-12 November 2025

Criterion I. DEVELOPMENT AND INNOVATION ACTIVITY
[max. score: 50]

Indicator I.1 The capacity to attract and manage research funding
[max. score: 17]

Score obtained: 14.67

- Analyse the extent to which the research organization demonstrates its capacity to attract funds from competitively won grants/contracts obtained from national or international organizations/institutions and also to manage the available financial resources.
- The performance indicators associated with indicator I.1 are:
  – Contracts obtained/grants won by the research organization from European/international funds (number);
  – Value of contracts obtained/grants won by the research organization from international organizations/institutions (amounts);
  – Contracts obtained/grants won by the research organization from national organizations/institutions (number);
  – Value of contracts obtained/grants won by the research organization from national organizations/institutions (amounts);
  – The structure of the budget according to the specificity of the research organization over the last 5 years.
- Evaluate mainly the organization's ability to win competitively grants/contracts from national and international organizations/institutions.

COMMENT - STRENGTHS

Comments on the employment structure at the Institute. Employees with academic titles: CS III, CS II, CSI, and engineers for technology development IDT II, IDT I: In 2020, the Institute employed 120 scientists out of 223 employees. In 2024, there were 131 scientists employed out of 211 employees with higher education, which means an increase in the share of scientists in the Institute's structure. In my opinion, this is an advantage if it translates into activity. The considerable diversity of project topics indicates the high scientific flexibility of the research team. Based on the attached documents, the assessment of INCDFM's ability to obtain and manage research funding is very positive. The institute consistently demonstrates high effectiveness in competitively obtaining grants and contracts from both domestic and international sources, effectively managing significant and diverse budgets. Competitive funding is the dominant share of the annual budget in most years. The institute provides structured budget tables and multi-year trends that indicate sound financial planning and project portfolio management Between 2020 and 2024, INCDFM obtained a total of 82 contracts and grants from European and international funds with a total value of 47,333,000 lei. At the same time, the institute was extremely active on the national scene, winning 359 contracts and grants from national organizations and institutions with a total value of 249,663 thousand lei. This disproportion in the number and value of domestic and international projects indicates the institute's strong roots and recognition in the domestic research ecosystem, with a simultaneous, albeit smaller, participation in prestigious international programs. The structure of the institute's budget over the last five years reflects strategic resource management. Core funding provided a stable base, ranging from approximately 22 to 39 million lei per year, with a marked increase in 2023-2024. Funds obtained from competitive projects constituted a significant and often dominant element of the budget, reaching a total of 132,516 thousand lei in the analyzed period, with this value exceeding core funding in some years (2020, 2022). The institute's own revenues, although relatively low, showed an upward trend, especially in 2024, suggesting a growing capacity for commercialization and service provision. Other budget items, likely including investment grants or funds from other programs, were also significant, totaling nearly 17 million lei. The ability to manage these funds is confirmed by the fact that all projects and budgets were positively evaluated by the contracting authorities, with no economic or scientific penalties imposed. An analysis of the attached detailed list of research and educational projects for 2020-2024 shows not only an impressive number (186 items), but also their diversity and strategic nature. The Institute has been involved in projects under key national programs (PN-III, POC, PNCDI), as well as prestigious international initiatives such as Horizon 2020/Horizon Europe, EUROfusion, CERIC-ERIC, CERN, EEA Grants, and COST Actions. The funds attracted from international sources is 10-25% which is generally OK for Romanian institutions. There are also contracts with the involvement of the private companies. The topics of the projects include advanced materials for energy, electronics, biomedicine, and environmental protection, which demonstrates excellent alignment with national and European research priorities. In summary, INCDFM demonstrates an excellent ability to compete for funding, especially at the national level, while maintaining a significant and growing presence in international programs. The budget structure is diversified and stable, and effective financial management, as confirmed by positive assessments from supervisory institutions.

COMMENT - WEAKNESSES

There is no indication of the institution to win international projects as project coordinator, especially Horizon projects. Some projects are listed only by acronym or program name, without clear documentation that they were won competitively. The documents concentrate on academic/ research competitive grants. There is limited evidence for: - industry-funded R&D contracts, - contract research with private partners, - paid access to infrastructure. The number of the international projects won by INCDFM has a positive trend but the budget is slightly decreasing compared with the 2020 (13 Mil RON in 2020; 9.3 in 2021; 6.8 in 2022, 7.2 in 2023 and 10.8 in 2024) even if the number of projects slightly increased (11 in 2020; 15; 14, 18 and 24 in 2024). Risks: The financing structure is mostly based on domestic sources (low share of international funds - 10-25%). Position in EU projects: Small number of projects with a coordinating role. Commercialization: Low level of cooperation with industry and own revenues Limited information on success rate in competitions Missing multi-annual comparative analysis of funding trends. Lack of information on funding distribution across departments/laboratories. The evaluator cannot see whether financing is concentrated in a few teams, and if resource allocation supports institutional capacity broadly.

Indicator I.2 Organized scientific events

[max. score: 3]

Score obtained: 2.50

- Analyse the extent to which the research organization, in order to disseminate the results of scientific research, has organized, both as coordinator and in partnership with other research organizations, international and/or national scientific events (congresses, conferences, symposia, workshops) or summer schools.
- The performance indicators associated with indicator I.2 are:

  – Organized international scientific events (congresses, conferences, symposia, workshops) or summer schools;
  – Organized national scientific events (congresses, conferences, symposia, workshops) or summer schools.
- Evaluate mainly the organization of international scientific events.
- Note: In the case of international scientific events, a minimum of 20% of participants from abroad is taken into consideration.

COMMENT - STRENGTHS

The National Institute of Materials Physics (NIMP) has demonstrated a good and systematic track record in organizing international and national scientific events between 2020 and 2024, which provides a strong basis for a high rating in this area. As the main coordinator or co-organizer, the institute has successfully organized a number of prestigious conferences, workshops, and schools that have attracted a large number of participants from around the world, significantly exceeding the 20% international participation threshold, which is a key indicator for evaluation. Among the most important international events, it is worth mentioning the 36th International Conference on the Applications of the Mössbauer Effect (ICAME 2021), which attracted 295 participants from 42 countries, with only 61 attending in person and the remaining 234 online, demonstrating a strong global reach and adaptation to a hybrid format in pandemic conditions. Another flagship event was the 10th International Conference on Advanced Materials (ROCAM 2024), an anniversary conference attended by Nobel Prize winners such as Klaus von Klitzing and Gérard Mourou, as well as other prominent scientists, highlighting the prestige and attractiveness of the meetings organized by NIMP. The cyclical International Workshop of Materials Physics (IWMP), organized annually (from the 5th to the 9th edition), focused on current topics, from materials for bio-applications to magnetism and catalysis, involving researchers from Europe, Asia, and America, confirming the permanent position of these workshops in the international scientific calendar. In addition, NIMP actively co-organized events in collaboration with other entities, such as the EU COST Action OPERA Workshop "Application-oriented Material Development" and the CREMS (Conference of the Romanian Electron Microscopy Society) conference, which, although national in nature, attracted international speakers and participants. The organization of the School of Electron Microscopy summer school and thematic workshops, such as "The Future of Quantum Technologies in Romania," also demonstrates a commitment to education and knowledge transfer, both nationally and internationally. All these initiatives were supported by detailed scientific programs, publications of abstracts with ISBN, as well as the use of modern communication platforms, which increased their accessibility and the sustainability of their effects. NIMP's activities in the field of organizing scientific events are characterized by high frequency, thematic diversity, significant international participation, and the ability to attract leading experts, which fully confirms the institute's effectiveness in disseminating research results and integrating the scientific community. Thus, NIMP not only meets but significantly exceeds the requirements set for research organizations in the context of organizing scientific events, both as a coordinator and as a partner in international cooperation.

COMMENT - WEAKNESSES

There are some fluctuations in the dimensions of the conferences. The trends is rather negative which can be explained considering the increasing number of events, worldwide but additional efforts should be paid to keep the visibility higher, even at national level. Maybe, along with the classical, in person participation, a hybrid participation could increase the participation rate. The institute can choose if the online participants can be active participants or just visitors (without having the possibility to give lectures). For some events (e.g., IWMP), it was not noted whether post-conference materials, proceedings, or special issues in journals were published. Taking ICAME 2021 as an example, participants from Europe (Germany, Poland, Romania) dominated, with relatively little representation from South America, Africa, or Southeast Asia.

Indicator I.3 The capacity to develop services, technologies, products [max. score: 25]	**Score obtained: 24.50**

- Analyse, relative to the available funding and number of researchers, the extent to which the research organization has societal, economic and social impact demonstrated by the capacity to develop services, technologies, products, reflected, according to the research organization's mission, in products/technologies/ developed/posted methodologies /reports/publications/public interest studies/research services/consultancy/impact studies.

- The performance indicators associated with indicator I.3 are:
  – Products/technologies/processes/methodologies developed through research activities resulting from economic or scientific research contracts;
  – Technologies and services made available to other research centers on a contract/collaboration project basis (including posted in EERTIS - https://eertis.eu/) or Open access;
  – Reports/studies of public interest or with private beneficiaries.
- Evaluate mainly, relative to the scientific research organization's mission, the extent to which the scientific research organization demonstrates the capacity to develop services, technologies, products for public or private beneficiaries through: reports/studies/research services/consulting/software systems for editing, publishing and online consultation of scientific information/theoretical studies with social impact or in other sciences, obtained through competition, commissioned or carried out at the request of beneficiaries, or with social impact or in other sciences proven by official documents/contractual relations/requests/orders.

COMMENT - STRENGTHS

Based on the attached supplementary document (file 5.3 pdf) for INCDFM for the years 2020-2024, it can be concluded that the institute demonstrates a significant and comprehensive capacity to develop services, technologies, and products, which translates into a measurable social, economic, and scientific impact. During the period analyzed, INCDFM generated a total of 58 products, 29 technologies, 59 methods/procedures, 12 technological recipes, and 5 software programs, which demonstrates the high dynamics of its research and development activities. Some of the most relevant products (including prototypes), technologies, softwares, ... are listed and were positively appreciated at different national and international fairs (~80 distinctions being mentioned). The projects were carried out under numerous economic and scientific contracts, both domestic and international, confirming the institute's ability to compete for funding and engage in European and global cooperation. In terms of commercialization and the provision of research services, INCDFM recorded revenues of nearly 1.364 million lei from contracts with business entities, including pharmaceutical companies, research centers, and academic institutions. The services provided included , among others, advanced material analyses (XRD, XPS, SEM, microwave and magnetic measurements), the provision of specialized equipment (e.g., pyroelectric sensors, hybrid layer deposition systems), and the development of protocols and methodologies for industry and public safety, including CBRNE incident response procedures. In addition, the institute actively participated in open access to research infrastructure—288 services were provided to external beneficiaries as part of IOSIN, and services were provided to 55 foreign and 2 domestic research teams through the CERIC-ERIC consortium, which highlights the role of INCDFM as an important center supporting the scientific community. Another important dimension of socio-economic impact is the number of awards and distinctions—80 in 2020-2024—won at prestigious invention exhibitions, confirming the innovativeness and practical usefulness of the developed solutions. Awards and distinctions (2020-2024): A total of 80 awards at invention fairs (EUROINVENT, PRO INVENT, INVENTCOR). Topics of the awarded works: composite materials, sensors, solar cells, memristors, medical technologies. Key areas of application include: advanced materials (including superconductors, composite materials, thin films), sensors and biosensors for medical and environmental applications, energy technologies (solar cells, memristors, hydrogen storage materials), as well as solutions for security and defense. Revenue from research services and commercialization per RDI employee (average for 5 years): 19,752 lei/person, annual revenue per RDI employee: 3,950 lei/person/year. The average revenue from services per RDI employee over 5 years is approximately 19,800 lei. INCDFM thus effectively combines basic research with market- and society-oriented implementations, as evidenced by both contracts with companies and the implementation of strategic projects (e.g., for the aviation sector, fusion energy within EUROfusion). Although the document does not directly specify the number of researchers or the detailed budget, the quantitative and qualitative data collected clearly indicate the institute's high efficiency in generating application-oriented results and its ability to maintain lasting relationships with the socio-economic environment. Thus, INCDFM fully fulfills its mission as a research institution with significant economic and social impact, confirmed by specific performance indicators: the number of technologies and products developed, revenue from services, open access activity, and the number of awards and implementations.

COMMENT - WEAKNESSES

There are no major concern related to the capacity of the INCDFM to develop new services, technologies and products. there are events (workshops) organized - with hot topics but only national representations organized in the frame of different projects without international representations. Maybe, in the future, it would be good for such workshops to allow hybrid participation and to include foreign participation and thus to promote new international collaborations. The evidence focuses on outputs and service counts; direct exploitation metrics (revenues per technology, licensing pipeline beyond exemplar cases) are only partially detailed in tables and narratives. No clear indicator of "public interest reports" - difficult to assess the direct social impact. Low number of computer (software) programs developed after 2020.

Indicator I.4 Editing and publishing the research organization's own journals or with the involvement of the organization's researchers

[max. score: 1]

Score obtained: 0.67

- Analyse the extent to which the research organization demonstrates the capacity to contribute to the process of disseminating the results of quality scientific research by editing and publishing its own journals indexed in Web of Science or other recognized international databases, and the extent to which researchers in the organization are involved in editing and publishing journals indexed in recognized international databases (Web of Science, etc.).
- The performance indicators associated with indicator I.4 are:
  – The research organization is editing and publishing its own journal indexed in Web of Science (Journal Citation Reports Q1/Q2/Q3/Q4, Emerging Sources Citation Index or, in addition, Arts & Humanities Citation Index, for humanities), SCOPUS;
  – The research organization is editing and publishing its own journal indexed in CNCS (A or B) or in another recognized IDB;
  – Persons affiliated with the evaluated research organization fulfilling the role of editor-in-chief of a journal indexed in Web of Science (Journal Citation Reports Q1/Q2/Q3/Q4, Emerging Sources Citation Index or, in addition, Arts & Humanities Citation Index, for humanities), SCOPUS;
  – Persons affiliated with the evaluated research organization fulfilling the role of editor-in-chief of a CNCS (A or B) indexed journal, for humanities.
- Evaluate mainly, relative to the available resources, the extent to which the research organization demonstrates the capacity to edit and publish its own journal indexed in recognized international databases, and also a high degree of involvement from the researchers in the organization in editing and publishing journals indexed in recognized international databases.
- Note: In the case of journals indexed by Journal Citation Reports, will be taken into consideration the impact factors (IF) or the influence scores (AIS) calculated by Web of Science. The best Q1, Q2, Q3 or Q4 ranking (between IF and AIS) of the last 5 editions published by Journal Citation Reports relative to the year of evaluation will be considered.

COMMENT - STRENGTHS

From the enclosed self-assessment report, INCDFM doesn't run its own scientific journal indexed in Web of Science, Scopus, or other recognized international databases. INCDFM shows a very high level of involvement of its researchers in editing and publishing in renowned international journals. Two researchers from the institute hold editorial positions in prestigious journals indexed in Web of Science: Dr. Mihaela BAIBARAC and Dr. Daniela PREDOI are editors at Elsevier's "Surfaces and Interfaces" (JCR2024: IF=6.3; Q1 in the categories PHYSICS, CONDENSED MATTER; PHYSICS, APPLIED; MATERIALS SCIENCE, COATINGS & FILMS) and "Materials Chemistry and Physics" (JCR2024: IF=4.7; Q2 in the category MATERIALS SCIENCE, MULTIDISCIPLINARY). In addition, the report highlights that a significant number of INCDFM researchers - 34 people - are active members of the editorial boards of 34 international and 13 national scientific journals. During the evaluation period (2020-2024), researchers from the institute were invited to edit over 30 special issues of journals. In addition, 74 INCDFM researchers acted as reviewers for prestigious journals indexed in Web of Science. This deep involvement in the editorial structures and publishing process of leading international scientific journals testifies to the recognition enjoyed by the expert knowledge of the institute's scientific staff in the global scientific community and its active contribution to maintaining high quality standards and disseminating reliable research results. Although INCDFM does not publish its own journal, its strategic and numerous involvement in editing and reviewing for recognized, indexed international journals is a significant contribution to the process of disseminating high-quality scientific research internationally, which is a key element assessed by indicator I.4. These activities, combined with a clear open access strategy (increase in the share of OA publications from ~53% in 2020 to ~67% in 2024), demonstrate the organization's strong and effective commitment to the dissemination of science.

COMMENT - WEAKNESSES

INCDFM does not have its own similar journal, which may be seen as a weakness in terms of independent dissemination of results. Also, it is no proof that researchers from INCDFM act as editors-in-chief of such journals during the period.

Indicator I.5 The capacity to train young researchers (PhD, postdoc)

[max. score: 4]

Score obtained: 4.00

- Analyse the extent to which the research organization contributes to the training of young researchers (doctoral and postdoctoral studies) in relation to preparing doctoral theses and postdoctoral fellowships in sectors/departments of the research organization, participations of researchers from the research organization as members of doctoral thesis public defence committees or doctoral thesis guidance committees, researchers working in the research organization with the quality of doctoral supervisor or POSDRU/POCU/MSCA/PNCDI/PNRR projects of postdoctoral and doctoral research won/implemented by the research organization.
- The performance indicators associated with indicator I.5 are:
  – Doctoral theses prepared or postdoctoral fellowships carried out in sectors/departments of the research organization;
  – Researchers affiliated with the research organization, who have participated as members in a doctoral thesis public defence committee or a doctoral thesis guidance committee;
  – Doctoral supervisors working in the research organization;
  – POSDRU/POCU/MSCA/ PNCDI/PNRR postdoctoral and doctoral research projects won/implemented by the research organization;
  – PhD students/postdoctoral researchers within the research organization.
- Evaluate mainly whether the research organization demonstrates that it has contributed to the training of young researchers (doctoral and postdoctoral studies) by having researchers from the evaluated research organization fulfilling the role of doctoral supervisors, the capacity to attract doctoral/postdoctoral researchers in the research organization, the capacity to prepare doctoral theses in sectors/departments of the evaluated research organization, participations of researchers from the research organization as members in doctoral thesis public defence committees and doctoral thesis guidance committees or through POSDRU/POCU/MSCA/PNCDI/PNRR postdoctoral and doctoral research projects won/implemented by the research organization.

COMMENT - STRENGTHS

The institute demonstrates significant and systematic activity in training young scientists, both at the doctoral and post-doctoral levels. Its strengths include , among others, its international reach, numerous projects, and staff commitment. Nevertheless, the institute deserves high praise for its real and measurable contribution to the education of young scientific staff. Based on the analyzed document, it is assessed that INCDFM demonstrates a very high and comprehensive commitment to training young scientists, both at the doctoral and post-doctoral scholarship levels. The institute's strength lies in the impressive scale and diversity of its activities in this area. The basic indicator is the significant number of doctoral theses prepared directly within the institute - in 2020-2024, there were 40 doctoral students employed by INCDFM, of which 11 completed their studies in 2020-2024, and 29 doctoral theses are currently being prepared. Most of these theses were conducted under the direct scientific supervision of experienced researchers from the institute, which testifies to its strong internal supervisory potential. Further evidence of the institute's attractiveness and openness is the experimental support provided to external doctoral students – 12 employees of other units.

External doctoral theses with experimental support accounted for: 12 theses (mainly in the fields of materials, chemical, and energy engineering). As many as 21 doctoral theses are being conducted thanks to short-term interns from around the world, in particular from the Maghreb, Europe, and Africa, which highlights the international scope of INCDFM's training activities. To sum up the institute's activities, the training of young researchers during the validation period involved: at least 40 internal + 12 external + 21 interns = 73 people. Post-doc: 2 (MSCA) + 20 (PCCDI) + 20 (internships) = 42 people. The institute's researchers are also very active in the external evaluation system: as members of public doctoral thesis defense committees, they participated in 27 sessions (including international ones, e.g., Morocco, Algeria, South Africa), and in advisory committees - as many as 48 sessions (including long-term ones, even until 2024+). . The latter figure is exceptionally high and indicates a deep commitment to the ongoing development of doctoral students' research projects and recognition of the scientific expertise of INCDFM staff in the academic community, including prestigious foreign universities. The institute also demonstrates its ability to acquire and implement projects funding postdoctoral research. During the period covered by the evaluation, two projects were completed or continued under the Marie Skłodowska-Curie Actions (MSCA) program, which is a strong indicator of scientific excellence and international attractiveness. In addition, 20 research projects were carried out at postdoctoral positions under the national PCCDI (PNCDI) program, which demonstrates very good integration with the national science funding system and systematic support for the careers of young doctors. In addition, the institute hosted 20 postdocs as part of short-term research internships, often funded by scholarship programs, which further expands the scope of its training activities. Post-doc projects: MSCA: 2 projects (2022–2026), PCCDI/PNCDI: 20 projects (mainly in 2018–2024),Post-doc internships: 20 internships (international, including from Tunisia, Morocco, India, Serbia, and Brazil). A weaker point that can be noted is the relatively small number of MSCA projects (2) compared to numerous national projects, which may suggest certain challenges in international competition, although the very presence of such projects is already a positive sign. To sum up the institute's work, its strengths in the education of young scientists can be highlighted, such as: A high number of doctorates supervised and completed at the institute. Active international cooperation (Morocco, Algeria, Tunisia, Serbia, India, Brazil, France). Significant participation in doctoral committees, both national and international. A well-developed post-doc internship program with numerous partner countries. Acquisition of MSCA and PCCDI projects, which demonstrates the institute's competitiveness. The involvement of many experienced scientists in the role of supervisors and mentors.

COMMENT - WEAKNESSES

No major weakness identified. One minor shortcoming can be considered the relatively low number of MSCA projects. INCDFM have to increase the transparency of results and the relatively small number of MSCA projects for a five-year period.

Criterion II. RESULTS OF RESEARCH ACTIVITY AND IMPACT AT INTERNATIONAL AND NATIONAL LEVEL

[max. score: 50]

Indicator II.1 Works of wide scope and fundamental importance; books, treatises, encyclopaedias, monographs, coordinated/published/edited studies and chapters; published articles; patents applied/exploited/obtained [max. score: 35]	Score obtained: 33.50

- Analyse the productivity of the research organization, relative to the available resources (including human resources expressed as number of researchers - full-time equivalent), respectively to the funding received by the research organization, from the perspective of the scientific output materialized, according to the specific mission of the research organization in: articles published in indexed journals (Journal Citation Reports Q1, Q2, Q3, Q4, Emerging Sources Citation Index or, in addition, Arts & Humanities Citation Index, for humanities), SCOPUS, IEEE or CNCS (A or B) indexed, for humanities, treatises/books/monographs published by researchers in the research organization as authors or editors with established international and national publishing houses, chapters in these categories of publications, patents applied/exploited/obtained.

- The performance indicators associated with indicator II.1 are:
  – Articles published in a Web of Science indexed journal (Journal Citation Reports Q1, Q2, Q3, Q4, Emerging Sources Citation Index or, in addition, Arts & Humanities Citation Index, for humanities), SCOPUS, IEEE;
  – Articles published in a journal indexed in CNSC (A or B), for humanities;
  – Treatises/books/monographs or chapters published by an established publishing house from abroad, as an author;
  – Treatises/books/monographs published by an established publishing house from abroad, as an editor/coordinator;
  – Treatises/books/monographs or chapters published by a CNCS A or B ranked publishing house or by an established publishing house in the country, as an author;
  – Treatises/books/monographs published by a CNCS A or B rated publishing house or by an established publishing house in the country, as an editor/co-coordinator;
  – Registered and published patent applications;
  – Patents applied/exploited at national or international level or exploited at international level (with EU/OECD priority);
  – Variety/breed certificates applied/exploited at national or international level or exploited at international level (with EU/OECD priority);
  – Patents obtained at international (with EU/OECD priority) or national level;
  – Intellectual property, ORDA certificates.
- Evaluate mainly a high level of productivity of the research organization in terms of scientific output, materialized, according to the specific mission of the research organization, in articles published in Web of Science indexed journals (Journal Citation Reports Q1, Q2, Q3, Q4, Emerging Sources Citation Index or, in addition, for humanities, Arts & Humanities Citation Index), SCOPUS, IEEE or, in addition, for the humanities, articles published in a CNSC (A or B) indexed journal, treatises/books/monographs published by researchers in the research organization as authors or editors in established international and national publishing houses, chapters in these categories of publications.
- Evaluate mainly patents applied/exploited in the "National Register of Invention Patents", within OSIM, Romania, international patents registered with the European Patent Office (EPO) or the World Intellectual Property Organization (WIPO) or other international patent databases.
- Note: In the case of journals indexed by Journal Citation Reports, impact factors (IF) or influence scores (AIS) calculated by Web of Science will be taken into account. The best ranking Q1, Q2, Q3 or Q4 (between IF and AIS) of the last 5 editions published by Journal Citation Reports relative to the year of the evaluation will be considered.
- In the case of articles, only those for which the author has indicated the affiliation to the evaluated research organization will be considered.

COMMENT - STRENGTHS

The evaluation of the INCDFM research institute based on the report provided for the years 2020-2024 indicates very high scientific productivity, which translates into numerous and significant research results in key areas of its mission. During this period, a total of 972 scientific articles were published in journals indexed in Web of Science, of which as many as 578 articles appeared in first quartile (Q1) journals and another 332 in Q2, accounting for a total of over 93% of all publications. 59% of publications were in Q1 (578) and 34% in Q2 (332) - a total of 93% in the top quartiles - indicating the very high quality of the research. The average impact factor (IF) for these articles was 5.15, and the total IF reached 5018.46, which proves the high quality and international reach of the research conducted. 972 articles in 5 years - an average of ~194 per year - is a high result, even for a large institute Among them are works published in renowned journals such as Angewandte Chemie, Advanced Functional Materials, ACS Nano, and Journal of Materials Chemistry A, which highlights the institute's strong position in fields such as materials science, chemistry, physics, and engineering. In addition, there have also been numerous publications in SCOPUS journals and book chapters and monographs published by renowned national and international publishers, further strengthening the institute's achievements in the dissemination of knowledge. In the field of intellectual property, the institute has applied for and obtained numerous patents at the national (OSIM) and international (EPO, USPTO) levels, which indicates its ability to transfer technology and commercialize research results. Particularly noteworthy are patents relating to, among others, superconducting materials, gas sensors, biomaterials, and nanocomposites, which are used in energy, medicine, and environmental protection. The institute's strengths are therefore: a high number of publications in high-impact journals, strong internationalization of research, clear specialization in the interdisciplinary fields of materials science and nanotechnology, as well as the ability to apply for and exploit patents.

COMMENT - WEAKNESSES

Weaknesses include a relatively lower number of international patents compared to domestic ones and possibly limited visibility in the humanities and social sciences, which, however, is due to the institute's profile. While publication lists are extensive, WoS quartile breakdowns does not incldue also the evolution of AIS for last five JCR editions (reduces ability to fully benchmark quality vs. state-of-the-art). INCDFM does not provide sufficient information to classify some book chapters and volumes according to recognized publisher rankings. There is no breakdown international recognized publisher and national recognized publishers. Missing evidence of high-impact recognitions (cover articles, highlighted papers) in the self-evaluation report (although addressed during the site-visit) Limited information on international collaboration in publications Weaknesses also include a relatively lower number of international patents compared to domestic ones. There are no treatises/books/monographs abroad as author/editor. No patents obtained at international level. Only 3 contracts of valorization were declared but it is not clear the level of valorization of the patents (revenue from STIMPEX, Apel Laser, Bioelectronic). It is strongly recommended to publish more in collaboration with foreign researchers (and with the industry as well), certainly these researches to be jointly developed and not only with minor collaboration from the other team. Overall, it is clear that most of the papers within the lists with over 30 citations are in joint international publications.

Indicator II.2 Papers and communications presented at scientific events [max. score: 5]	**Score obtained: 4.33**

- Analyse, relative to the specificity of the organization, the extent to which the research organization's scientists disseminate the results of their own research at prestigious scientific events.
- The performance indicators associated with indicator II.2 are:
  – Papers presented at an international scientific event, published in a volume indexed in Web of Science - Conference Proceedings Citation Index (CPCI-S), Conference Proceedings Citation Index - Social Science & Humanities (CPCI-SSH), classified IEEE proceedings;
  – Papers presented at an international scientific event, published in an edited volume with ISBN (non - WoS);
  – Invited/keynote papers presented at an international scientific event;
  – Invited /keynote papers presented at a national scientific event.
- Evaluate mainly, relative to the specificity of the field, the high degree of dissemination of the organization's scientific research results through the participation of researchers in prestigious international scientific events and the publication of their presentations in Web of Science (WOS) or ISBN (non-WOS) indexed conference proceedings, and invitations as keynote speakers at national and international scientific events.
- Note: In the case of papers presented at scientific events, will be taken into consideration only those for which the author has indicated the affiliation with the research organization.

COMMENT - STRENGTHS

The institute's assessment in terms of disseminating research results at prestigious scientific events, based on document 4.2, shows both strengths and weaknesses. On a scale of 0 to 5, the institute receives 4.17 points. A strong point is the significant and growing number of invited presentations at international conferences, which testifies to the recognition of the expertise of the institute's scientists in the global community. A total of 76 prestigious presentations (plenary + keynote + invited) in 2021-2024, of which 67 are invited lectures. This is undoubtedly the strongest aspect of the institute's activity. Invited and plenary lectures are proof of the recognition and high reputation of individual scientists. This shows that NIMP experts are recognized and perceived as leaders in their narrow specializations on the international arena. This is a highest quality indicator. Between 2020 and 2024, a total of 76 such presentations were recorded, including 8 plenary, 1 keynote, and 67 invited, with a marked increase in 2024 to 24 invited and 3 plenary presentations. In addition, the institute is active in publishing papers in conference proceedings with ISBN, especially in 2024, when 10 such items were recorded, indicating a diversification of forms of disseminating research results. The vast majority of conference proceedings visible in WoS databases have 0, 1, or 2 citations. Works from 2020 and 2021 have a chance to be cited, but this is not happening. Interpretation: Despite being published in reputable journals, the presented results do not generate a significant response in the scientific literature. This may be due to the fact that they are often preliminary or niche reports, and the final results are published in the form of full articles. The papers are published in conference proceedings organized by leading scientific societies and publishers, such as IEEE, SPIE, IOP Publishing, Springer, and AIP. The institute does not participate en masse in just any conferences, but aims for specialized, recognized events in the field of materials physics and engineering. This confirms the high substantive quality of the presented results. However, a weak point is the unstable and relatively low publication rate in conference materials indexed in Web of Science, where only 27 papers were recorded in the analyzed period, with a marked decline in 2022 and 2023 (3 and 1 papers, respectively), which may suggest temporary difficulties in maintaining continuity in this prestigious dissemination channel. The low number of citations for many papers in WoS and limited activity on the national stage, where only 4 invited presentations were recorded in five years, further lower the rating. Despite these shortcomings, the institute demonstrates its ability to participate effectively in the international scientific community, especially through prestigious invitations, which, combined with a visible improvement in some indicators in 2024, allows its overall effort in disseminating results to be assessed as satisfactory, albeit with clear potential for further optimization, particularly in terms of increasing the number of publications in high-scoring conference materials and strengthening its presence in national scientific forums.

COMMENT - WEAKNESSES

There is a quite low number of plenary lectures at international events while at national level these are missing (Only 4 invited lectures at national conferences in 5 years (no plenary or keynote lectures)). While the institute is very active internationally, its visibility in the country is negligible. This may indicate weaker integration with the national scientific community or prioritization of international conferences. It is important to promote the science even at national level, not only abroad. Considering the actual public debate (and the positions of different politicians) it is strongly recommended to improve the NATIONAL VISIBILITY, not only the international visibility. We strongly recommend the management to motivate the staff to promote the results at national level, with keynotes and plenary lectures, too.

Indicator II.3 Visibility and impact of the published work

[max. score: 10]

Score obtained: 9.83

- Analyse the scientific visibility and impact of the research organization's publications through the number of citations in WOS, SCOPUS, IEEE indexed journals or, in addition, for the humanities, Arts & Humanities Citation Index, in CNCS (A or B) indexed journals and books (excluding self-citation).
- The performance indicators associated with indicator II.3 are:
  - Number of citations accumulated by the research organization during the evaluated period in the following databases:
    - Web of Science;
    - SCOPUS; IEEE;
    - in addition, for the humanities Arts & Humanities Citation Index, in CNCS (A or B) indexed journals and books.
- Evaluate mainly the identification of a significant number of citations, in the evaluated period, of papers published by the research organization in journals indexed in WOS, SCOPUS, IEEE or, in addition, for humanities, Arts & Humanities Citation Index, in journals indexed CNCS (A or B) and books, regardless of the year of publication of the cited work.
- Note: In the case of citations, only those for works published by the author affiliated with the evaluated research organization will be taken into consideration.

COMMENT - STRENGTHS

The assessment was based on the attached self-assessment report. The institute has a very strong scientific and research position, as evidenced by the impressive number of approximately 195 articles and reviews published annually in journals indexed in Web of Science, with over 90% of the papers in Q1 and Q2 quartiles, indicating the very high quality of the research conducted. Its strengths include excellent, modern research infrastructure worth over €20 million, including installations of national importance such as IOSIN, active membership in prestigious international consortia such as CERIC-ERIC, and cooperation with CERN. The institute effectively attracts funding, managing a total budget of over 300 million lei in 2020-2024, a significant part of which was competitive funding. An important asset is its intensive innovation and implementation activity, as evidenced by the filing of 147 national and 8 international patent applications and the granting of 45 national patents, as well as the development of specific products and technologies in cooperation with industry. In addition, INCDFM plays a key role in the education of young scientists, being affiliated with the Doctoral Schools of the University of Bucharest, where 12 of its scientists acted as supervisors and 19 doctorates were successfully defended. Weaknesses include a noticeable decline in the number of publications in 2023-2024, which the report links to reduced funding and the need to devote more time to preparing project proposals. The low success rate in competitions funded by European programs and the relatively small share of funds obtained from the private sector and international projects indicate areas for improvement. The limited number of technical and engineering staff directly involved in technology development and transfer also remains a challenge. An analysis of the scientific visibility and impact of the organization's publications, based on the number of citations in journals indexed in Web of Science, shows very good results. During the period covered by the evaluation (2020-2024), articles and reviews published by INCDFM in journals with an impact factor indexed in WoS accumulated a total of 7,163 citations, giving an average of approximately 7.4 citations per article. As of September 16, 2025, this number is expected to increase further to 9,184 citations, which translates into an average of approximately 9.4 citations per article. In addition, the Hirsch index (h-index) for the institute during this period is 36. These indicators testify to the significant impact and recognition of INCDFM's research in the international scientific community. In total, 5,416 INCDFM publications from 1975-2024 were cited 27,933 times in the WoS database in the 2020-2024 evaluation period alone, with 4,838 of them being articles and reviews that generated 27,731 of these citations. The report does not contain separate, detailed data on the number of citations exclusively in the Scopus or IEEE databases, but the impressive indicators from Web of Science, combined with the fact that most publications appear in highly-ranked JCR journals, suggest a proportionally high visibility in these databases as well. It should be emphasized that, in accordance with the guidelines, the assessment was based on the identification of a significant number of citations in the period under review, regardless of the year of publication of the cited work, and the data refer only to works published by authors associated with INCDFM. The number of citations collected, especially considering the relatively short five-year time window, clearly confirms the strong position and international reach of the institute's scientific impact.

COMMENT - WEAKNESSES

The visibility and impact of the institute should be improved. It is recommended to have some "leaders" - High impact researchers (well ranked researchers) which have to catalyze - attract EU projects and international collaborations. Here, the institution have to find solution to attract or to form such "leaders"/top ranked researchers. Only 27 articles in indexed conference materials (WoS) - this may be due to a preference for journals with IF, but it limits visibility in the conference environment.

Criterion III. MANAGEMENT AND INSTITUTIONAL CAPACITY

[max. score: 40]

Indicator III.1 Quality management system (certified by authorised institutions)

[max. score: 3]

Score obtained: 3.00

- Analyse whether the organization has a developed, approved and implemented an internal quality management regulation or procedure, a quality manual and other specific procedures, as well as whether the research organization has been accredited by institutions authorised in the field of quality management.
- Evaluate mainly whether the organization has a quality management regulation or procedure in place, a quality manual, a procedure for managing risks and opportunities and, in general, the existence of quality procedures for the activities carried out.
- The maximum score is awarded when the research organization provides proof of ISO 9001 accreditation from an

authorised institution.

COMMENT - STRENGTHS

The Institute holds a valid SR EN ISO 9001:2015 certificate issued by SRAC, which is a recognized member of the international IONET network. The certificate is valid until August 20, 2028, which demonstrates a long-term commitment to maintaining a quality management system. The certificate was issued by SRAC, which is a member of IONET, a network of recognized certification organizations from around the world (including AENOR, Quality Austria, NSAI, IRAM, etc.). This increases the credibility of the certificate and its international recognition. The certificate is subject to regular surveillance audits (in 2026 and 2027), which indicates continuous improvement of the system and compliance with the requirements of the standard. Comment Based on the analysis of the attached documents, the assessment of the National Institute for Research and Development of Materials Physics (INCDFM) in terms of the implemented quality management system is very positive. The institute has a formalized and certified quality management system that complies with the requirements of ISO 9001:2015. Direct evidence of this is the SRAC certificate No. RO-11879, valid until August 20, 2028, which certifies that the system was first certified in 2019 and is maintained. The certificate covers key areas of the institute's activities, including research and development, technical support, consulting, knowledge transfer, testing, and the manufacture of unique devices and small series. This is the strongest aspect, corresponding to the maximum number of points awarded for formal accreditation. In addition, the institute has implemented numerous internal regulations and procedures that constitute a detailed elaboration of the quality system. These include, among others, procedures related to the quality management system, the innovation management system, as well as specific procedures for research laboratories and infrastructure, which indicates a deep and broad implementation of quality management principles in everyday processes. A weaker point is that the presented list lacks a direct, explicit mention of a separate, formalized procedure for managing risks and opportunities, although the general framework of the ISO 9001 quality management system requires risk to be taken into account. Nevertheless, the existence of the certificate and a detailed set of internal procedures demonstrates the maturity of the system. In summary, INCDFM has not only developed, approved, and implemented internal quality management regulations and procedures, but has also obtained and maintains external accreditation from an authorized institution. Therefore, the institute's score in this area is 3/3 possible points.

COMMENT - WEAKNESSES

No evident concerns related to this issue was found.

Indicator III.2 Regulations, rules, procedures implemented by the research organization [max. score: 2]	Score obtained: 2.00

- Analyse whether the research organization has updated organizational and operational regulations and an internal regulation according to the legal provisions in force, regulations/procedures developed, approved and implemented for research activity management, employee performance evaluation, integrity, equal opportunities, etc.
- Evaluate mainly the high degree of implementation of regulations, rules and procedures and the high degree of confidence in the Internal Managerial Control System (SCIM) of the research organization.

COMMENT - STRENGTHS

The institute was evaluated on the basis of the documents provided, including: Decision No. 02/2021 appointing the Monitoring Committee for the implementation and development of the management control system, Internal Regulations, Gender Equality Strategy and Plan for 2022-2025, Competition Rules for the position of research assistant, and Professional Evaluation Rules. Based on the attached documents, I give it a rating of 2 on a scale of 0 to 2. The analysis showed that the institute has a highly developed and detailed system of internal regulations and procedures, which are implemented to a high degree and build trust in the internal management control system (SCIM). A strong point is the comprehensiveness of the documentation, which covers not only the basic principles of operation, but also detailed procedures concerning key aspects of research and management activities. The institute has demonstrated proactivity by creating a dedicated SCIM Monitoring Committee, which demonstrates a strategic approach to management control and compliance. Its tasks, composition, and mode of operation are precisely defined in the attached regulations, which ensures transparency and repeatability of activities. Another significant strength is the development and implementation of a detailed Gender Equality Strategy and Plan for 2022-2025. This document is not merely a declaration, but contains specific objectives, metrics, a timetable, and responsible persons, which indicates a genuine commitment to promoting equality, diversity, and inclusion. In addition, the internal work regulations are extremely comprehensive and precisely regulate almost all aspects of employment, from health and safety rules, through work discipline and personal data protection, to research ethics and anti-discrimination procedures. The high degree of implementation of these regulations results from their mandatory nature and detail, which limits the scope for interpretation. The weaknesses that lower the rating are few but significant. The main one is the lack of clear information in the attached documents about a regular, cyclical process of reviewing and updating all these regulations. Although some procedures, such as the gender equality plan, have a built-in monitoring mechanism, there is no explicit mechanism for systematic revision in response to changing legal provisions or internal conditions for key documents such as internal regulations or competition rules. In addition, despite the very advanced Gender Equality Plan, the basic internal regulations, while prohibiting discrimination and harassment, could more explicitly integrate the language and specific procedures of this plan to create an even stronger, more coherent system. Specific procedures for scientific integrity and handling violations are listed in the catalog of disciplinary offenses for research staff, which is a strong point, but there is no separate, detailed whistleblowing procedure or research ethics policy that would function independently of the standard complaint and disciplinary process. In summary, the validated Institute demonstrates a very high degree of organizational maturity. Its management control system is comprehensive, well documented, and, based on the available data, effectively implemented. Trust in SCIM is high due to its institutionalization through a standing committee, transparent procedures, and a wide range of regulations. Overall, Regulations, Rules, and Procedures are well implemented within INCDFM, the most specific/important being mentioned in Annex 1.b. There are sufficient procedures implemented and these are well known by the community. Prior to their approval, the community is informed and their voices are considered.

COMMENT - WEAKNESSES

No information on regular internal audits of the control system. Limited data on the actual implementation of all provisions (e.g., whether all units comply with procedures). Insufficient mechanisms for monitoring the effectiveness of the control system (e.g., KPIs for SCIM). I suggest introducing a formalized, regular review of all key regulations, integrating anti-discrimination provisions even more closely with the gender equality plan, and considering the development of a separate, detailed policy and procedure for reporting irregularities in the area of scientific integrity. A minor shortcoming to be addressed in the next period is the documentation of implementation of the procedures (eventually by public reports).

Indicator III.3 Ethics and academic integrity in research [max. score: 5]	Score obtained: 4.00

- Analyse the existence of a code of ethics, a research ethics committee, a specific procedure for the functioning of the committee and the extent to which the committee proves its functionality in case of complaints.
- Evaluate mainly whether the research organization has a code of ethics, an ethics committee operating procedures developed, approved and implemented, the existence of an ethics and academic integrity committee and documents attesting to the functioning of the ethics committee, in case of complaints.

COMMENT - STRENGTHS

The institute demonstrates a high level of ethical maturity, but could further strengthen its ethical culture through more proactive and preventive measures. Based on an analysis of documents, the INCDFM institute demonstrates a high degree of maturity in terms of ethics and academic integrity. A strong point is the comprehensive code of ethics approved in 2016, which regulates in detail the rules of conduct, defines key concepts such as plagiarism, self-plagiarism, and conflict of interest, and specifies the list of sanctions for violations. This document is fully compliant with Romanian and EU legislation on scientific research. The institute has an Ethics Committee, established in 2016, and a Code of Ethics and Professional Conduct, which is detailed and compliant with Romanian law (including Law 206/2004 and Law 1/2011). The code precisely defines concepts such as plagiarism, self-plagiarism, data falsification, conflict of interest, and good scientific practice. It takes into account European and international standards, which demonstrates openness to global standards of research ethics. The Ethics Committee consists of five members and a secretary, whose activities are based on detailed Organizational Regulations attached to the code. An analytical committee with external experts has been appointed, which demonstrates a commitment to impartiality. The committee's operating procedures are well defined and include rules for the recruitment of its members, rules on conflicts of interest, and a transparent procedure for handling complaints, including the appointment of special analytical committees to examine reports. The procedure includes the possibility of appeal to the National Ethics Council (CNECSDTI). The functionality of the committee is confirmed by documentation, including annual activity reports for 2020-2024. The institute keeps annual reports on the activities of the ethics committee for 2020-2024. The reports are public and available on the institute's website. The documentation includes: the composition of the committee, a description of the cases, the decisions taken, and recommendations. During this period, the committee was active, considering one formal complaint in 2021 concerning an alleged breach of ethical principles during a competition for the position of director at another institution. The complaint was investigated thoroughly and transparently by a subcommittee appointed for this purpose, and the entire process, from registration to the final decision, was documented in a detailed report, which was approved by the Ethics Committee and made public. No complaints were recorded in other years, which the committee interprets in its reports as a positive indicator of a high ethical culture within the institution, although it cannot be ruled out that this may also be due to limited awareness of reporting procedures or fear of consequences. An additional advantage is the proactive involvement of the committee, which goes beyond responding to complaints to include monitoring the evolution of national and European ethical regulations, analyzing the compliance of the internal code with the guidelines of the national ethics council CNECSDTI, and issuing permits for research projects requiring ethical approval, as in the case of research using DNA samples in 2024. In 2023-2024, the committee issued ethical approval for research using DNA samples, confirming its activity in the area of research ethics. In 2020, 2022-2024, no complaints were reported, which may indicate either high ethics among employees or low awareness of or trust in the whistleblowing system. INCDFM has a comprehensive ethics system: a code, regulations, an active committee, documentation, and appeal procedures. The committee operates transparently and effectively, as evidenced by the example from 2021 and the ethical approvals issued.

COMMENT - WEAKNESSES

Weaknesses include the relatively low number of complaints considered—only one in five years—which may or may not indicate a certain passivity in detecting potential problems or incomplete awareness among employees of the procedures for reporting irregularities. In addition, the documents lack clear information on systematic, mandatory training in research ethics for all research staff, which could further strengthen the culture of scientific integrity. There is no information on proactive educational activities or ethical audits. Shortcoming: The organization did not made any updates on the Code according Law 183/2024 (during the evaluation period); this will not be considered for downgrading. Weaknesses: There's no quantified proof that integrity training is mandatory and periodic for all categories (PIs, early-career, admin, students), nor KPIs such as coverage rate (% staff trained/year), pre/post test results, or evidence of onboarding + refresher cycles. This weakens assurance that procedures translate into practice. The issue was partially addressed during site-visit. Reports do not show a Conflict of Interests register with anonymized statistics (e.g., % declarations filed, management plans issued, recusals), nor public transparency about committee members' COIs. Absent KPIs and disclosure practices, evaluators cannot verify the consistency of COI identification and mitigation across projects, reviews, and procurement procedures.

Indicator III.4 Research infrastructure related to the mission and objectives of the research organization (how the infrastructure sustains the mission of the research organization) [max. score: 10]	Score obtained: 9.67

- Analyse the extent to which the infrastructure sustains the research organization's mission and the degree of development of the research-development and innovation infrastructure relative to the activities carried out within the organization.
- Evaluate mainly whether the research infrastructure is appropriate to the research organization's mission, a high degree of its development, and the existence of an investment strategy and plan.

COMMENT - STRENGTHS

The level of infrastructure development is very high, with a total value exceeding €35 million, as confirmed by investments made in recent years through structural funds, national PNCDI programs, and international programs. The infrastructure is not only modern but also diversified, including specialized centers such as RITecC, CEUREMAVSU, and IOSIN, as well as being part of the pan-European CERIC-ERIC network, which demonstrates its integration into the European research area. The Institute's infrastructure is highly suitable for its stated mission. In the field of multifunctional materials and nanomaterials research, the presence of advanced microscopes (HRTEM, FESEM), systems for structural (XRD) and functional (PPMS, dielectric measurement systems) characterization, and synthesis installations (SPS, PLD, CVD) ideally supports this direction. In the field of advanced technologies: Lithography equipment (EBL, photolithography), clean rooms, and thin film deposition systems are crucial for work on applications in microelectronics, optoelectronics, and sensors. There is a clear and well-documented investment strategy, which is part of the institute's five-year strategic plan. This plan includes objectives for maintaining and developing infrastructure at a competitive international level, acquiring new equipment, modernizing existing resources, and expanding facilities, such as transforming the INCREST building into an incubator for innovative companies as part of the National Semiconductor Technology Platform with a budget of €10.2 million. The equipment list includes strategic investments in absolutely essential, top-of-the-line equipment, such as: Microscop electronic HRTEM JEOL JEM-ARM200F (2010) - a flagship investment in atomic resolution microscopy. Sistem complex de măsurări SQUID-PPMS, Quantum Design (2010) and the newer Sistem PPMS DynaCool (2022) - a unique infrastructure in the country for magnetic and transport research. Platforms for advanced material synthesis (MBE, comprehensive PLD systems, CVD). The Institute's strategy shows continuity of investment. The purchase of modern equipment in 2022-2024 (XRDynamic 500, new PPMS, Kerr microscope, NMR spectrometer for solids) demonstrates the updating of infrastructure and the desire to remain competitive. The strategy is realistic and linked to specific sources of funding, including national programs, EU structural funds, and international projects. Its strengths include the excellent match between the infrastructure and the research mission, its high level of technical sophistication, integration with leading European research infrastructures such as CERIC-ERIC and CERN, and a clear, long-term investment strategy based on various sources of funding. Overall, the INCDFM infrastructure is the cornerstone of its activities, enabling it to carry out its mission at the highest level, and its strategic approach to development ensures that it will remain competitive in the future.

COMMENT - WEAKNESSES

Despite the obvious strengths of the Institute's equipment, there are some concerns that a significant portion of the key equipment (approximately two-thirds) was purchased between 2005 and 2011 - this have to be considered a threat. Although it can be kept in working order and ready for use, its technological obsolescence, lower performance, higher maintenance costs, and lack of technical support from the manufacturer may pose a serious obstacle to conducting fully competitive research on the international stage. This is not a critical comment, but rather a general conclusion. In some cases, older equipment maintained in good condition may perform its role quite well. Despite the wide range, there are some gaps or underrepresented areas in the context of secondary areas of focus: Materials for extreme conditions: There is a lack of specialized pressure chambers or equipment for testing under extremely high pressures/dynamic loads. Environmental impact/carbon footprint research: The infrastructure is focused on synthesis and characterization rather than specialized life cycle assessments (LCA), emission measurements, or macro-scale environmental testing. Nuclear energy: Apart from general methods of material characterization, there is a lack of specific equipment for testing radiation damage or testing under conditions similar to those in a reactor. Another weakness, albeit not critical, is a certain dependence on external design competitions and structural funds, which may introduce an element of uncertainty into long-term investment planning. However, the institute effectively manages this risk by seeking funds from various sources and consistently investing funds from the core program. A minor shortcoming (although technically not of the institute itself, but more of the Romanian R&D system) is the dependence on external, competitive funds for the maintenance of the infrastructure, which could lead to some uncertainty.

Indicator III.5 The research organization as a member in scientific networks/associative bodies

[max. score: 5]

Score obtained: 5.00

- Analyse the capacity of the research organization to integrate into research networks and associative bodies, as evidenced by concluded agreements/protocols and other documents provided by the organization on the functionality of the partnerships, with a focus on joint submission and winning of projects, organization of joint scientific events, development of scientific publications, etc.
- Evaluate mainly whether the research organization has collaboration agreements/protocols in place, as well as whether there is documentary evidence that they are functional (submission and winning of projects in partnership, organization of scientific events in partnership, joint preparation of articles/studies/books, etc.).

COMMENT - STRENGTHS

Based on the analysis of the documents provided, I can rate INCDFM's ability to integrate with research networks and association bodies at 5 on a scale of 5. The institute demonstrates impressive and comprehensive activity in this area, which is confirmed by numerous formal and informal agreements and, above all, by the concrete, measurable results of these collaborations. A strong point is the strategic and multi-level approach to building cooperation networks. INCDFM is not only a passive member, but also an active co-creator and leader in prestigious consortia. Its founding membership in CERIC-ERIC, its active role in the CERN DRD3 collaboration, where it co-chairs the working group, and its status as a UNESCO Category II Center for the CIFRA unit testify to the international recognition and strategic importance of the institute. Formal framework agreements, such as memoranda with UNESCO, RIKEN in Japan, and the Charles Sadron Institute in France, underscore the quality and scope of the partnerships. Some of the agreements were signed before 2020, and it is unclear whether they are still actively being implemented. The functionality of these networks is well documented. Between 2020 and 2024, the institute carried out 47 international research and development projects: H2020, Horizon Europe, EEA Grants, ERANET, COST, Dubna, etc., with a total value of tens of millions of lei (nearly 13 million lei). The projects covered key areas: nuclear fusion (EUROfusion), functional materials, renewable energy, quantum technologies (RONaQCI), and biomedicine. The institute often acted as coordinator (approx. 30% of applications), which demonstrates the recognition of its role in consortia. These activities directly demonstrate the ability to effectively raise funds within these partnerships. In addition, the Institute submitted 71 project proposals in international consortia, demonstrating its proactivity in building future cooperation. The joint organization of large, prestigious international conferences, such as ROCAM 2024 with the participation of Nobel Prize winners and ICAME 2021, along with numerous workshops and summer schools, confirms the role of INCDFM as an important scientific center capable of initiating and conducting joint events. Between 2020 and 2024, the institute organized or co-organized 20 events aimed at professionals, businesses, and the general public. Activities included school visits, workshops (Laser Valley Bootcamp), events promoting women in science, technology fairs (GoTech World), and artistic and scientific projects. Intensive joint publishing activity is also a measurable indicator of the functionality of the cooperation. Bibliometric analysis shows hundreds of publications jointly with domestic partners, such as the University of Bucharest and the Polytechnic University of Bucharest, as well as foreign partners, including the CNRS in France and the CSIC in Spain. The high citation index and publications in first-quartile journals are a measure of the quality of this joint research.

Open access to unique research infrastructure, such as CERIC-ERIC laboratories or the national IOSIN installation, for external partners is further evidence of the institute's integration and service role in the scientific community.

COMMENT - WEAKNESSES

Shortcomings, although few, include a relatively low success rate in European competitions compared to national ones, which may indicate an area for further intensification of efforts, and the fact that, despite an extensive network of contacts, the direct presence of foreign researchers at the institute could be greater. Some of the agreements were signed before 2020, and it is unclear whether they are still actively being implemented.

Indicator III.6 Accredited or non-accredited testing, trials, analysis laboratories; Open access libraries and databases created/administered, to the extent that funding was available [max. score: 10]	**Score obtained: 9.83**

- Analyse the extent to which the research organization is equipped with laboratories for tests, trials, analysis and their accreditation status or the existence of their own libraries, Open access databases and the intensity of access, in correlation with the field in which the research organization is active and the available funds.
- Evaluate mainly whether, relative to the funds available and the field in which it operates, the research organization has laboratories for testing, trials analysis, and whether they are accredited or whether it has its own library or Open access databases and whether there is evidence that the scientific information in the library or Open access databases has been accessed.

COMMENT - STRENGTHS

Based on an analysis of the documents provided by INCDFM, I rate its research infrastructure, laboratory accreditation status, and access to library resources and databases at 9.83/10. The institute has a well-developed and diverse laboratory base, which is largely correlated with its field of activity, i.e., materials physics and materials science. A strong point is that INCDFM has specialized laboratories with confirmed accreditation and certification. A key element is the Laboratorium Investigatiilor Morfo-Structurale si Analiza Elementala (LIMSAE), accredited by the Romanian unit RENAR in accordance with the SR EN ISO/IEC 17025:2018 standard. This laboratory is competent in three main techniques: scanning electron microscopy (SEM) for microstructural analysis, X-ray diffraction (XRD) for phase analysis, and photoelectron spectroscopy (XPS) for elemental analysis. In addition, the Analysis Center for the Pharmaceutical Industry is certified for compliance with Good Manufacturing Practice (GMP) by GCL International Ltd., which authorizes it to perform tests and analyses using vibrational spectroscopy, which is extremely important in the context of testing materials for pharmaceutical applications. The institute also manages specialized cleanrooms with ISO cleanliness classes from 5 to 8, which are subject to regular requalification, as confirmed by a certificate issued by Air Test Validari. In addition, INCDFM has the necessary permits from the National Nuclear Activities Control Commission (CNCAN) to possess and use radiological installations (e.g., X-ray diffractometers, Mössbauer spectrometers) and radioactive sources, which is crucial for conducting advanced materials research using ionizing radiation. A weaker point is the issue of its own libraries and databases. INCDFM does not have a dedicated, traditional scientific library, which could be a hindrance, but the institute effectively compensates for this gap through its active membership in the ANELIS+ consortium, which provides access to electronic scientific literature resources and enables Open Access publishing. However, this is an external source. There is no information on the number of non-OA journals that can be accessed from the Institute. Importantly, there is evidence of intensive use of these resources, which is reflected in the steady increase in the percentage of the institute's publications in open access - from about 53% in 2020 to about 67% in 2024. This is in line with European Union policy and demonstrates a conscious effort to disseminate research results. In addition, INCDFM's involvement in the European PaNOSC project, which aims to implement FAIR principles in scientific data management, indicates a strategic approach to open science and strives to create a mini-Open Science Cloud (mini-EOSC) in collaboration with the CERIC-ERIC infrastructure. Given the available funds, which come mainly from national research programs and European projects, the institute has demonstrated high efficiency in investing in research infrastructure and ensuring its highest quality standards through accreditations. The lack of a dedicated library is largely compensated for by strategic partnerships and access to digital resources, which in the field of materials physics, where electronic journals and databases are the primary working tools, is a functional and modern solution. In summary, INCDFM has strong, multi-profile, and largely accredited laboratory facilities that are adequate for its research mission, and its system of access to scientific literature, although based on external consortia, is used effectively, as evidenced by its impressive publication output and the increase in the Open Access publication index. Dedicated testing/analysis laboratories documented; Open Access infrastructure (IOSIN, CERIC-ERIC) shows intense external usage in the period. INCDFM does not have a dedicated, traditional scientific library, which could be a hindrance, but the institute effectively compensates for this gap through its active membership in the ANELIS+ consortium, which provides access to electronic scientific literature resources and enables Open Access publishing.

COMMENT - WEAKNESSES

Even if there are national accreditations and the institute is well recognized at EU level, the potential is much higher than the three methods accredited by RENAR (SEM, XRD and XPS). No information on the number of laboratories in relation to the scale of activity - it is difficult to assess whether they are sufficient. There is no information on the number of non-OA journals that can be accessed from the Institute. As a minor shortcoming, the participation in national initiative regarding the access to journals/databases, as well as statistics of the usage should be made more visible.

Indicator III.7 Degree of digitalization of the research organization [max. score: 3]	**Score obtained: 2.67**

- Analyse whether, relative to the research organization's mission and in correlation with the current standards in the field, the IT infrastructure is adequate for the researchers' work, and the extent to which the research organization has an updated website with the results of the research carried out in the research organization available in an open access regime.
- Evaluate mainly whether the IT infrastructure is appropriate to the research organization's mission, the research organization has a website in Romanian and English and, in correlation with the available funds, the website is updated with research results published in an open access regime.

COMMENT - STRENGTHS

The attached documentation is missing a file named '3.8', so the assessment was made on the basis of the Institute's self-assessment file. Based on the attached self-assessment report, we rate the National Institute for Research and Development in the Field of Materials Physics (INCDFM) at 2.67 out of 3. In terms of IT infrastructure, the analysis of the report indicates that it is highly adequate for the Institute's mission as a modern research organization and correlates with current standards in this field. INCDFM has an efficient IT network based on redundant Internet connections from two providers, advanced switches, firewalls, and servers hosting cloud services, e-mail, DNS, and WWW servers. An external audit conducted in 2023 confirmed the overall absence of serious security threats, proper software licensing, and connection redundancy, while identifying areas for improvement, such as the need to implement a next-generation firewall and tighten password policies, which recommendations have already been implemented. A key element of the computing infrastructure is the INCDFM + CIFRA HPC cluster, used for advanced simulations in nuclear physics, atomic physics, and molecular dynamics, which directly supports the institute's strategic research directions. As for its website, the institute has an up-to-date, multilingual (Romanian and English) site at https://infim.ro/, which is regularly updated with information on projects, events, and research results. Access to specialized scientific literature is provided through the ANELIS+ consortium. In correlation with the available financial resources, the institute shows a significant commitment to open access to research results. The website includes a dedicated section with the Register of Research Results, published annually in

Open Access mode. In addition, INCDFM is systematically increasing the percentage of articles published in OA journals, from around 53% in 2020 to around 67% in 2024, which is in line with European Union requirements. The list of the institute's publications on the website clearly marks articles available in OA. These activities, combined with involvement in initiatives such as PaNOSC and the implementation of FAIR principles in data management within CERIC-ERIC, demonstrate a mature and strategic approach to open science, appropriate to the institute's mission and contemporary standards of scientific communication.

COMMENT - WEAKNESSES

Based on the assessment, the weak points of the IT infrastructure are: Lack of dedicated funding for Open Access libraries and databases; the Institute does not yet have a fully developed institutional OA platform. The need to partially replace older access points is an ongoing process of Wi-Fi infrastructure modernization. It is not clear how many processes are digitalized and how easy is for the staff to get the delegation, reimbursement, ... just digitally, without needing to use printed documents. The digitalization should be implemented even if, there will be reticent people not happy to do it.

Indicator III.8 Innovation Management System

[max. score: 2]

Score obtained: 1.33

- Analyse whether the organization has an approved and implemented innovation management regulation/procedure and whether it has organized its own technology transfer centre.
- The maximum score is awarded when the research organization provides evidence of accreditation/certification of the innovation management system by an authorised institution and the establishment/operation of a technology transfer centre.

COMMENT - STRENGTHS

Assessment of the INCDFM institute in terms of innovation management and technology transfer: Based on the analysis of the attached documents, the assessment of the Institute for Research and Development in Materials Physics (INCDFM) in terms of innovation management and technology transfer is 1.33 out of 2points. The institute's strength lies in its certified innovation management system compliant with the SR 13572:2016 standard, as confirmed by a certificate issued by the accredited body CIT-IRECSON, valid until 2027. This system is supported by documented procedures, such as a framework procedure for determining the value of research results, a procedure for recognizing results in accounting records, and a guide for implementing the innovation management system. In addition, the institute has established and maintains an active Technology Application and Transfer Unit, which actively coordinates cooperation with industry, as evidenced by the implementation of projects in cooperation with companies, the conclusion of research agreements with the private sector, and the commercialization of patents through rights sale agreements. The INCDFM organizational structure clearly includes an "APPLICATIONS AND TECHNOLOGY TRANSFER UNIT". The unit's activities have enabled, as confirmed in the documentation: the conclusion of 55 research agreements with the private sector. Implementation of POC-G, PED, PTE, and SOL projects aimed at direct technology transfer to companies (e.g., SC Apel Laser SRL, SC STIMPEX SA, SC Bioelectronic SRL). Effective commercialization of patents through rights sale agreements. Active participation in the DRIFMAT cluster. Planning to create a spin-off business incubator. The institute has an innovation management system. A certified innovation management system (SMIn) compliant with the SR 13572:2016 standard, valid until 2027. Controlling procedures: implementation and documentation of a number of detailed internal procedures for innovation management, including: the procedure for determining the value of R&D results, the procedure for recognizing R&D results in accounting records, guidelines for implementing SMIn at the level of research institutes, work on developing standards for the creation of spin-offs. In addition, 32 employees of INCDFM have undergone training in technology transfer, innovation management, and intellectual property.

COMMENT - WEAKNESSES

The Technology transfer office exist but they have to improve their support to transfer the results to the economy. Unfortunately the national eco-system is underdeveloped, unfortunately it is not enough to wait companies to come to the R&D units and even if the R&D unit is making steps toward the industry, it is difficult to develop strong, long term collaborations but, TTO should try to do it, more aggressively, at national and maybe international level. A weaker aspect is the fact that some elements of the system, such as standards for creating spin-offs or marketing strategy, are still under development, which indicates an area requiring further improvement. Nevertheless, the institute demonstrates a high level of maturity in innovation management thanks to a combination of a certified system, a specialized organizational unit, and measurable technology transfer results, which justifies a high rating.

Criterion IV. PERFORMANCE AND SOCIO-ECONOMIC IMPACT

[max. score: 25]

Indicator IV.1 The extent to which the activity responds to public interests of national or local importance

[max. score: 5]

Score obtained: 4.33

- Analyse, relative to the research-development field, and the available funding and human resources, the organization's capacity to coordinate or participate in the development of studies, sectoral projects, research projects of local or national impact; research services for or in partnership with commercial entities.
- Evaluate mainly the coordination of or participation in the development of complex works with national and local economic/social impact.

COMMENT - STRENGTHS

From the review of the attached document, one can rate the INCDFM institute on its ability to coordinate and participate in research and projects of national and local importance, as well as provide research services to commercial entities. The institute's strength lies in its impressive and diversified portfolio of research, development, and innovation projects carried out between 2020 and 2024, with a significant total financial value, which demonstrates its high capacity to obtain funding from various sources, including national programs such as PN-III, European programs such as EUROfusion and Horizon Europe, and direct contracts. These projects cover key areas of strategic national and local importance, such as energy (including nuclear fusion, photovoltaics, hydrogen storage), security (CBRNE systems, including a simulator for emergency response forces), health (biosensors, nanomaterials for cancer therapy, medical devices), and advanced materials and technologies (smart windows, memristors, composites). This diversity and connection to national priorities and global challenges demonstrate the institute's excellent ability to engage in comprehensive, multidisciplinary work with significant economic and social impact. A second strength is its documented and systematic collaboration with the business community, as evidenced by its research services table, which shows steady revenue growth from 2020 to 2024, reaching a total income of over 1.36 million lei. The institute has provided specialized services such as advanced material analysis (XRD, XPS, SEM, microwave measurements, magnetic characterization) for renowned pharmaceutical companies (Zentiva), electronics manufacturers (EOS Electronic Systems, Control Data Systems), automotive companies (Renault), and smaller innovative companies (Swarm Europe). Importantly, the offer included not only analytical services, but also the commercialization of new products (e.g., pyroelectric plates, sensors, memristors) and the transfer of rights to patents and research installations, which indicates maturity in technology transfer and a real impact on the innovation of enterprises. The third strength is the wide-ranging and systematic dissemination and educational activities, such as the Inna School, Summer School, and Researchers' Night, which engage students, teachers, and the general public, promoting science and building human capital at the local level. A weaker point is a certain disproportion between the scale of advanced research projects and the relatively low, albeit growing, commercialization of its own breakthrough product solutions. Despite clear successes in services, the number of new products or technologies implemented is lower than the potential generated by the projects. Furthermore, although cooperation with industry is evident, in the largest-scale strategic projects (e.g., EUROfusion, CBRNE simulator), the institute more often acts as a contractor or specialist partner than as the coordinator of the entire consortium, which could strengthen its leading position in the innovation ecosystem. Given the field of research (advanced materials, physics, nanotechnologies) and the available resources (high project funding, specialized infrastructure), I rate the institute's ability to coordinate and participate in the development of research and sectoral projects as very high. The institute is consistently involved in work of key importance for energy security, public health, and the country's technological development, effectively combining basic research with industrial applications and actively transferring knowledge to the economy. On a scale of 0 to 5, I rate the institute at 4. This rating reflects excellent results in fundraising, implementation of high-profile projects, and cooperation with enterprises, while there is room for improvement in terms of increasing the scale of commercialization of its own flagship technologies and aspirations to play a coordinating role in the largest cross-sectoral national initiatives.

COMMENT - WEAKNESSES

Limited cooperation with industry: Contracts with the private sector account for only about 1–2% of the total budget, and there is no clear strategy for spin-offs and large-scale commercialization. The Institute should find solution to strengthen this collaboration with the industry Lack of stable institutional funding: High dependence on competitive national programs, lack of funds for long-term infrastructure investments without external projects. There is a clear need for an institutional funding for all NIRDs, particularly for NIMP.

Indicator IV.2 The capacity to develop national and international collaborations
[max. score: 10]

Score obtained: 9.83

- Analyse the capacity of the research organization to develop national and international collaborations that have as main outcomes the joint use of components of the research infrastructure, providing access to researchers from other research organizations to different components of its own infrastructure (including IOSIN); provide support services for other research organizations or researchers from outside the organization, co-opting partner organizations or researchers from other organizations in initiated projects.
- Evaluate mainly the evidence of a high degree of joint use of infrastructure with other research organizations, providing access to components of the research infrastructure for researchers from other research organizations, providing services to other research organizations or researchers from other research organizations, as well as attracting researchers or research organizations in inter- and trans-disciplinary research projects.

COMMENT - STRENGTHS

Based on the detailed report on INCDFM's activities for 2020–2024 in the field of national and international cooperation, a comprehensive assessment of the institute can be made (6.2 file). The document presents numerous tables summarizing various forms of cooperation, including CERIC-ERIC research fellowships, international cooperation projects, use of IOSIN infrastructure by external users, scientific mobility, research services, and student theses and internships. The institute's strengths are clearly evident in several key areas. First, the institute has an impressive international reach, collaborating with renowned research institutions from around the world, including Europe, North America, Asia, and Africa. The list of IOSIN infrastructure users includes institutions such as Elettra Sincrotrone Trieste, Paul Scherrer Institut, Diamond Light Source, and the University of Cambridge, which testifies to the high attractiveness and recognition of INCDFM's research capabilities. Secondly, the institute actively participates in large international projects, including Horizon 2020/Horizon Europe, M-ERA.NET, and others, often acting as a coordinator, which indicates its leading position in research consortia. Thirdly, the diversity of forms of cooperation is noteworthy – from short study visits and long-term research fellowships to the joint use of advanced infrastructure. Of particular importance is the provision of access to IOSIN infrastructure to numerous external users, both domestic and foreign, which confirms the institute's commitment to the joint use of research resources. In addition, the institute effectively engages young scientists through internship programs, theses, and mobility, which contributes to the exchange of knowledge and the development of future scientific staff. However, the analysis also reveals some weaknesses. Although international cooperation is extensive, there may be some imbalance in participation between different regions of the world, with potentially less representation from some areas, such as Latin America and parts of Asia. Furthermore, despite numerous cooperation projects, the document does not always precisely define the specific, measurable results of these collaborations, such as joint publications, patents, or implementations, which makes it difficult to fully assess their scientific or application impact. It can also be noted that, although the institute provides access to infrastructure, the degree of integration of external partners in multidisciplinary research projects may need to be further deepened, especially in the context of transdisciplinarity combining the exact sciences with the social sciences or humanities. Below is a detailed justification: Shared use of research infrastructure elements with other organizations: Membership in CERIC-ERIC: INCDFM is a founding member of this prestigious European infrastructure consortium. Within this framework, the institute makes advanced infrastructure, such as high-resolution electron microscopy (HR-TEM) and electron paramagnetic resonance spectroscopy (EPR), available to external users on an Open Access basis. Between 2020 and 2024, 52 projects from 9 countries were served, corresponding to over 1,500 hours of equipment operation. CoSMoS cluster at the ELETTRA synchrotron: Operating its own research cluster on the SuperESCA beamline in Italy provides unique access to world-class infrastructure for collaborators from around the world. Providing researchers from other organizations with access to various elements of our own infrastructure: Diverse access channels: Access is provided through multiple channels: Research projects: Joint national and international projects (e.g., within CERIC, CERN, Horizon projects). Research services: Provision of research services on behalf of external entities (list of 288 IOSIN services and 57 by CERIC-ERIC). Internships and research visits: Organization of internships for doctoral students, post-docs, and experienced researchers (82 internships in the period in question). CIFRA computing clusters: Sharing computing power with external teams. Involvement of partner organizations or researchers from other organizations in initiated projects: Extensive cooperation portfolio: The Institute has 9 formal agreements and 82 informal cooperation agreements. It actively participates in networks (DRIFMAT, CLARA, MHTC) and consortia (CERIC-ERIC, CERN DRD3). High percentage of international publications: Over 50% of publications are co-authored with foreign partners, which directly demonstrates the effective involvement of researchers from other organizations. Coordination and cooperation in projects: INCDFM acts as both a coordinator (e.g., in PCCDI projects) and a partner in numerous national (359 in 2020-2024) and international (82 in 2020-2024) projects. Cooperation with business: Active involvement of SMEs and large enterprises (e.g., SC Apel Laser, SC STIMPEX, SWARM) in application projects (POC-G, PED) and conclusion of research and service contracts with them (55 agreements). In summary, INCDFM demonstrates a very high capacity to develop national and international cooperation, effectively utilizing its research infrastructure and engaging in numerous partnerships. Its strengths include broad international reach, active participation in prestigious research programs, and a variety of forms of cooperation. Areas for potential improvement include more balanced cooperation with different regions of the world, better documentation of specific cooperation results, and further strengthening of the transdisciplinary component in projects. Taking all these factors into account, I rate the institute at 9.5 on a scale of 0 to 10. This high rating reflects the INCDFM's significant achievements in building and maintaining fruitful scientific cooperation, while also indicating room for further development and improvement.

COMMENT - WEAKNESSES

The data contained in the documentation indicate a relatively low success rate in competitions financed by European programs, which may suggest that, despite the activity, the potential for cooperation in this area is not being fully exploited. The strategy for the coming years clearly indicates the need to intensify efforts to attract researchers from abroad, which suggests that the current level, although significant, may still be insufficient in the context of the institute's ambitions. High degree of shared infrastructure use (IOSIN/CERIC), many formal agreements, and documented joint projects/events; substantial external user access demonstrates openness and networking. Although international cooperation is extensive, there may be some imbalance in participation between different regions of the world, with potentially less representation from some areas, such as Latin America and parts of Asia.

Indicator IV.3 The contribution to national and international experimental development and innovation
[max. score: 10]

Score obtained: 8.33

- Analyse the works identified by the research organization as being of reference for science in terms of the contributions made by the research organization through these works, and the evidence of recognition of their impact by the national and international scientific community; analyse the results of applied research and patents identified by the research organization as having economic impact.
- Evaluate mainly the publication of reference works in the respective field, e.g. handbooks; books in the most prestigious publishing houses; results highlighted, e.g. on the cover of prestigious journals, organization of activities to disseminate results of scientific work through large-scale events/studies/reports with proven prestige in the national and international scientific community; experimental development works/patents for or in partnership with the economic environment.

COMMENT - STRENGTHS

The evaluation of the INCDFM institute was done based on the attached document under section 6.3, concerning its contribution to experimental development and innovation. The analysis covers reference publications, patents, and implementation activities. The institute demonstrates significant scientific productivity, as evidenced by a list of 124 articles published between 2020 and 2024 in high-impact journals (IF ≥ 7). Among them, 35 articles have at least 30 citations, indicating a significant impact on the scientific community. Particularly noteworthy are the papers published in prestigious journals such as "Progress in Particle and Nuclear Physics" (IF 17.9, 214 citations), "Energy Storage Materials" (IF 20.8, 97 citations), and Advanced Functional Materials (IF 19.9, 42 citations). A review article on the phenomenology of quantum gravity, published in Progress in Particle and Nuclear Physics, is an example of a reference work that synthesizes current knowledge and sets new directions for research. The high number of citations and participation in international collaborations confirm the scientific community's recognition of these achievements. In addition, work on functional materials such as fuel cells, catalysts, and chemical sensors has direct practical applications. In terms of innovation and cooperation with industry, the institute has registered seven international patents (EPO/USPTO) and five patents in cooperation with SWARM, demonstrating its ability to commercialize research results. Moreover 5 papers belonging to INCDFM are listed as cover pages in important journals. INCDFM ranks fifth nationally in the Nature Index, reflecting its performance in publishing scientific articles in internationally recognized journals. The patents concern: water splitting using titanium oxides, memristor devices, and resistive memory elements, which are used in energy and information technologies. Cooperation with SWARM has resulted in patents for programmable memory elements, which indicates the practical application of research in high-tech industries. At the national level, the institute has implemented three patents, including those related to surface treatment methods and measuring devices, in cooperation with companies such as SC STIMPEX SA and SC Apel Laser SRL. Impact analysis: Direct economic impact: This patent was sold (assigned) to SC Apel Laser SRL. This is tangible proof that the institute's research leads to the creation of products and services on the market. The impact is local/economic, but very concrete and measurable.Nature of the innovation: The measuring device for lasers is an example of applied experimental development that directly responds to the needs of industry (laser companies). The institute's strengths include: high-quality publications, confirmed by citation indices and international cooperation; effectiveness in obtaining patents with commercial potential; and a real impact on the economy through implementation. Notable prototypes and implementations (e.g., devices for laser metrology, memristor arrays, microwave antennas, EDI-neutralization systems); large patent pipeline with granted titles; repeated recognition at fairs/exhibitions

COMMENT - WEAKNESSES

Although the number of articles in high IF journals is impressive, only a few papers exceed 100 citations, indicating a need to further strengthen their impact. Some articles in high-impact journals have a low number of citations (e.g., 0–5 citations), which may indicate a limited direct impact on the scientific community. It is not clear how many of the papers considered reference papers were coordinated by the authors of INCDFM and in how many they just contributed. The documentation presented does not include any monographs, textbooks, or books published by prestigious publishers, which could strengthen the institute's position as a center of knowledge. Despite several international applications, there is no information about their large-scale commercialization outside of cooperation with SWARM. Wider evidence of industrial uptake/licensing (beyond prototypes and pilot customers) is only partly detailed. The number of licensed patents is rather low. No handbooks in prestigious journals. Is no clear how many reference papers are having as main authors from the institute. Some articles in high-impact journals have a low number of citations (e.g., 0-5 citations), which may indicate a limited direct impact on the scientific community. The documentation presented does not include any monographs, textbooks, or books published by prestigious publishers, which could strengthen the institute's position as a center of knowledge.

Criterion V. HUMAN RESOURCES

[max. score: 15]

Indicator V.1 Staff structure by scientific grade and the share of PhD supervisors, and career development opportunities

[max. score: 10]

Score obtained: 9.50

- Analyse the career development opportunities offered by the research organization to its members, the structure of the scientific research staff by scientific grade, the number and share of PhDs, PhD supervisors, the quality of the research team as a whole and the extent to which it is appropriate for the mission and activities carried out by the research organization.
- Evaluate mainly the career development opportunities offered to researchers within the research organization, a balanced structure of total staff and research staff by scientific grade, a high number and share of PhD supervisors.

COMMENT - STRENGTHS

Based on the analysis of the documents provided, the assessment of the National Institute of Materials Physics (INCDFM) in terms of staff structure, career development, and research team quality is generally very positive, with several clear strengths and few areas requiring attention. The institute's overall rating in this respect is 9,5 out of 10. The institute's strength lies in its highly educated and experienced research staff. Of the 297 employees, as many as 160 hold a PhD, which is an impressive 54% of the total staff and an indicator of high scientific competence. The structure of academic degrees is balanced, with representation at all career levels: from research assistants (ACS - 47 people) through CS III (51 people) and CS II (31 people) researchers to senior CS I (48 people) researchers. This age and position pyramid ensures both continuity of knowledge and the possibility of mentoring support for younger employees by experienced researchers. The presence of 12 active doctoral supervisors affiliated with the Doctoral Schools of the University of Bucharest testifies to the recognized potential for educating new generations of scientists and the institute's important role in the academic ecosystem. The quality of the entire research team is undoubtedly high and fully adequate to the institute's mission, as confirmed by numerous publications in high-impact journals, participation in prestigious international projects (CERN, CERIC-ERIC), and patent activity. When it comes to career development opportunities, INCDFM offers them in a systematic and multidirectional manner. The institute has implemented a human resources development policy in line with the European Charter for Researchers and the Code of Conduct for the Recruitment of Researchers, as evidenced by the "HR Excellence in Research" certificate awarded in 2025. Recruitment is conducted in a competitive and transparent manner. Employees have numerous opportunities for development through participation in short-term internships, summer schools, working visits, and training courses, as evidenced by a table with 56 entries for the years 2020-2024. The institute invests in young scientists by offering them employment on doctoral and postdoctoral projects and encouraging international mobility. There is also a well-established system of internal regulations and professional evaluation procedures that ensures transparent promotion paths. Balanced age and staff structure. The institute employs 297 people, including 202 researchers (68% of the total staff). There is a wide range of ages: 29 people aged 20–35 (10%), 87 people aged 36–45 (29%), 69 people aged 46–55 (23%), 57 people aged 56–65 (19%), 7 people over 65 (2%). Although the age structure is generally balanced, the 56-65+ age group (57+7 people, 19% +2%) is noteworthy, as in a few years' time, some of the experienced staff may retire, hence the importance of consistent recruitment and mentoring activities. The structure shows a balance between experienced and younger researchers. Despite the high overall number of PhDs, the percentage of supervisors (12 out of 160 PhDs) could be higher in order to further strengthen internal educational potential. In summary, INCDFM has a strong, highly qualified, and well-structured research team that is well suited to its mission. The career development system is well organized, supported by European standards and a rich offer of mobility and training opportunities. The main areas for further improvement focus on increasing the number of engineering and technical staff and further strengthening the internal supervisory capacity, which is crucial for the long-term autonomy and staff reproduction of the institute.

COMMENT - WEAKNESSES

Weaknesses include the relatively small number of technological development engineers (IDT - 8 people) and technical staff, which may constitute a certain limitation in the intensification of implementation work and technology transfer, which is identified as a weakness in the institute's SWOT analysis. The SWOT analysis identified low effectiveness in competitions financed by European programs as a weakness. The report lacks a 5-year breakdown by scientific rank × age bands, plus turnover/retention, external vs. internal hires, % international recruits. Without these, evaluators cannot judge succession planning or the medium-term sustainability of senior expertise. Also, there is no detayled narrative on the career development opportunities offered by the institute. The issue was partially addressed during site-visit. Weaknesses also include the relatively small number of technological development engineers (IDT - 8 people) and technical staff, which may constitute a certain limitation in the intensification of implementation work and technology transfer, which is identified as a weakness in the institute's SWOT analysis

Indicator V.2 Members in the editorial board of a national/international journal (rated by Web of Science, SCOPUS) or in the editorial board of an established international publishing house; members in an international think tank/expert group at European/global level; members (fellow, senior) of an international scientific society [max. score: 1]	**Score obtained: 1.00**

- Analyse how the researchers from the research organization, through their results and their prestige, contribute to increasing the visibility of the research organization, of the Romanian scientific research in the respective applied field, at international and European level.
- For the period under evaluation, evaluate mainly the presence of the researchers from the research organization in the editorial boards of prestigious national and international journals, in the editorial boards of established international publishing houses, in international think tanks/expert groups at European/global level, their membership (fellow, senior) in prestigious international scientific societies in the field.

COMMENT - STRENGTHS

From the attached documents, the INCDFM's rating for international and European visibility and the prestige of its researchers is 1 out of 1. The main strengths are the very broad and active presence of INCDFM researchers in the editorial boards of prestigious international journals and their involvement in international scientific societies and expert groups, which significantly increases the recognition of both the institute and Romanian science on the international stage. The institute's scientists hold various responsible editorial positions in renowned publishing houses such as Elsevier Nature Portfolio, Royal Society of Chemistry, and MDPI, including roles as chief editors, section editors, and members of scientific and advisory boards. These are high-impact journals in disciplines that are key to materials physics. This activity is not limited to membership in editorial boards, but also includes initiatives to organize and edit special issues devoted to narrow and innovative topics, which indicates recognition of their expertise and ability to shape research directions in their field. In addition, the impressive number of 74 INCDFM scientists acting as reviewers for journals from the Web of Science database testifies to the widespread recognition of their competence by the international scientific community. The second pillar of visibility is active membership and involvement in prestigious international scientific societies and expert groups. INCDFM researchers are members of organizations such as the European Physical Society, the European Microscopy Society, the American Chemical Society, and the Materials Research Society. Particularly important from the point of view of prestige is their involvement in large international research consortia such as CERN, where they co-chair a working group within the DRD3 collaboration, and CERIC-ERIC, where they are a founding member. This is not just passive membership, but active participation in management structures and working groups, which directly contributes to raising the profile of Romanian science in key European and global research initiatives. Their work is recognized and utilized in the most important experiments in high-energy physics and dark matter research. A weaker point is their relatively less visible presence in international strategic and political think tanks, where their influence on shaping research agendas could be even greater. Its constant presence in elite decision-making and editorial bodies provides INCDFM with access to the latest knowledge, a network of contacts, and the opportunity to influence research priorities, which translates into the quality and international reach of the research conducted at the institute. INCDFM researchers contribute significantly to promoting Romania's scientific achievements internationally. Their involvement in editorial boards, reviews, and international scientific societies not only raises the institute's prestige but also integrates Romanian science with the main research trends in Europe and worldwide. Further support for the development of researchers' careers (e.g., by applying for editorial positions in top journals, participating in global initiatives) could further strengthen their position.

COMMENT - WEAKNESSES

Low representation in top-tier journals: No members on the editorial boards of journals such as Nature, Science, Advanced Materials (except for reviewer roles), Limited number of Editor-in-Chief positions in journals with high Impact Factors. Focus on MDPI-type publishers: Although MDPI is a recognized publisher, an excessive focus on this publisher may suggest less diversification and less influence in the most elite journals. Lack of clear representation in global strategic think tanks: Participation in expert groups is noticeable, but mainly in the European context, with less representation at the global level (e.g., UN, OECD, global scientific initiatives). Small number of members in the role of "fellow" or "senior" in scientific societies: Most memberships are ordinary memberships, which may indicate a shortcoming and further steps have to be assumed by the board (as well as researchers) to be more active and recognized in these societies. Another minor shortcoming, it can be noted the lack of clear representation in global strategic think tanks.

Indicator V.3 Members in the management/scientific board of an international organization or association in the field [max. score: 1]	**Score obtained: 0.83**

- Analyse how the research organization and the Romanian scientific research benefit from increased visibility and prestige through the representatives of the research organization in the management/scientific board of prestigious international organizations/associations.
- For the period under evaluation, evaluate mainly the presence of researchers from the research organization in the management/scientific board of prestigious international organizations/associations.

COMMENT - STRENGTHS

Based on the analysis of the attached documents, INCDFM's involvement in the boards and scientific committees of prestigious international organizations is rated 8.3/10. The institute's strength lies in the significant and strategic presence of its scientists in key international bodies, which directly translates into increased visibility and prestige for both the organization itself and Romanian scientific research on the international stage. Above all, this involvement is active and influential, rather than merely symbolic. INCDFM scientists hold positions such as president (Ovidiu CRISAN at OURS), board member (Victor Eugen KUNCSER at IBAME), member of the Board of Directors (Ionuț Marius ENCULESCU at CERIC-ERIC), and work package leader (Ioana PINTILIE in the CERN DRD3 collaboration). These positions allow them to participate directly in shaping the research agendas, scientific priorities, and strategies of these organizations.

For Romanian science, this means putting the country on the map of key decisions in fields such as materials physics, synchrotron research, and high-energy physics. For the institute itself, it is a mechanism that ensures priority access to state-of-the-art research infrastructures, such as the CERIC-ERIC synchrotron or CERN centers, and facilitates direct contacts and the creation of project consortia with leading research groups from Europe and around the world. This activity also serves as a channel for the transfer of knowledge and best management practices to INCDFM, which raises the standards of the research carried out. The weaker aspect, which prevents the highest rating from being awarded, is the relatively small number of scientists involved in the highest decision-making structures compared to the total number of research staff at the institute, as well as the fact that some of the involvement (e.g., in COST management committees) is of a substitute nature. Nevertheless, the overall picture is very positive. The presence in these elite bodies is tangible proof of the recognition of the scientific competence of INCDFM staff by the global scientific community. This allows the institute to position itself not as a passive recipient of international trends, but as an active co-creator of them. This involvement is a catalyst for further development, attracting talent, securing research funding, and strengthening Romania's position as a valuable partner in the European and global research and development space.

COMMENT - WEAKNESSES

Lack of leadership positions in major global organizations - Despite its presence in important structures, there is a lack of membership in the scientific councils of leading global institutions (e.g., ESA, CERN Council, IEEE, etc.). It is strongly recommended the staff to be involved in more research organization, to assume leadership positions, etc. The involvement as president/director in such boards could be more important. Small number of members participating in the work of organizations outside the institute in relation to the institute's potential - Only 8 people are mentioned in the document, which may suggest that few scientists from the institute are involved in such important roles. Substitute memberships - Some people serve as "substitute members," which may limit their actual influence on decisions. Lack of uniform, long-term cooperation strategies - Memberships appear to be scattered and based on individual initiatives rather than on a coherent vision of the institute.

Indicator V.4 Members/experts in joint committees/working groups of public authorities at national level [max. score: 1]	**Score obtained: 1.00**

- Analyse how the research organization, through its researchers, has been involved during the period under evaluation in solving current societal problems.
- For the period under evaluation, mainly evaluate the presence of researchers from the research organization as members or experts in joint working groups/committees set up by public authorities at national level for the substantiation and preparation of draft legislation, strategies and policies, action plans, policy papers, etc.

COMMENT - STRENGTHS

Based on the attached documents, the assessment of INCDFM's involvement in solving current social problems and the participation of its researchers in advisory and working bodies at the national level in 2020-2024 is high. The institute's strength lies in its active and documented participation in key projects of social, strategic, and legislative importance. An example is its involvement in the development of a strategy for the development of national quantum communication capabilities (QTSTRAT) in collaboration with Babeș-Bolyai University, which is of long-term importance for security and modern technologies. The institute has also participated in projects with a direct impact on public safety, such as the development of an integrated rapid response system for CBRNE incidents and a simulator for training emergency services in asymmetric threat conditions. In the area of education and social integration, the STEM project implemented by CIFRA in cooperation with UNESCO is important, aiming to implement modern methods of teaching science subjects in schools, which responds to the problem of low technical and digital competences among young people. In addition, INCDFM has been involved in outreach initiatives such as Researchers' Night and School Differently, which raise public awareness of science and technology. In terms of participation in advisory and working bodies, INCDFM researchers have been active in committees such as CCCDI, the National Council for Scientific Research (CNCS), Programul Român de Cercetare de Excelență (PRCP), and social dialogue committees at MCID. Dr. Ionuț Marius Enculescu and Dr. Lucian Pintilie participated in the drafting of key legal acts, including Laws No. 25/2023 and 183/2025 and Government Regulations No. 138/2024, 1568/2024, and 1569/2024. Dr. Pintilie also coordinated the panel for the evaluation of research infrastructures within the smart specialization "Eco-nanotechnologies and advanced materials." These activities show that the institute not only conducts scientific research but also directly influences the shaping of public policies and the country's development strategies. A weakness is the relatively small number of formally listed long-term mandates in national decision-making bodies and the lack of a clear indicator of systematic involvement in legislative processes beyond selected projects. Nevertheless, thanks to specific examples of cooperation with public administration and influence on strategic documents, the assessment is positive, albeit with a recommendation to strengthen institutional representation in permanent expert committees. INCDFM is an institution with high scientific potential and strong commitment to socio-economic development. Its strengths include international publications, infrastructure, cooperation with industry, and participation in public policy-making.

COMMENT - WEAKNESSES

Its weaknesses mainly concern international funding and technical staff. Further strengthening of its position will require greater internationalization and commercialization of research results.

Indicator V.5 Members of a doctoral school; members (fellow, senior) of a national scientific society; members in the scientific/editorial board of a prestigious national journal

[max. score: 1]

Score obtained: 0.83

- Analyse the degree to which the research organization, through its researchers, is recognized in the academic environment and in society for its ability to contribute to the coordination and quality enhancement of the training of doctoral students, to the development of knowledge in the specific research field, to the maintenance of high quality standards and respect for ethics and academic integrity in the specific research field.
- For the period under evaluation, mainly evaluate the membership of researchers from the research organization in doctoral schools as coordinators/mentors, their presence as members in national scientific societies in the specific research field, in scientific/editorial boards of prestigious journals, etc.

COMMENT - STRENGTHS

Based on the attached documents (7.5. pdf file), the assessment of the involvement of the National Institute for Research and Development in Materials Physics (INCDFM) in the national scientific community, the coordination of doctoral education, and the development of knowledge in the field of materials research and physics is very high. During the period covered by the assessment, the institute demonstrated significant achievements in integration with academic and scientific structures, which translated into its recognition both in the academic community and in the broader social context. In terms of coordinating and improving the quality of doctoral education, INCDFM plays an active role through its affiliation with the Doctoral School of the Faculty of Physics at the University of Bucharest, where 12 researchers from the institute served as doctoral supervisors. Between 2020 and 2024, they have successfully supervised 19 doctoral theses, with another 33 in progress, demonstrating their systematic commitment to the development of young researchers. In addition, INCDFM scientists participated in 27 doctoral examination committees and 48 advisory committees, which highlights their contribution to ensuring high quality standards in the doctoral education process. In terms of advancing knowledge in its field, the institute boasts an impressive number of approximately 195 articles published annually in journals indexed in Web of Science, with over 90% of these works appearing in Q1 and Q2 quartile journals, indicating their high quality and importance for scientific progress. High standards of ethics and scientific integrity are maintained at INCDFM thanks to the activities of the Ethics Committee, which considered only a few complaints during the period in question, demonstrating the high ethical culture at the institute. In terms of membership in national scientific societies, 27 INCDFM scientists are active members of organizations such as the Romanian Physical Society, the Romanian Electron Microscopy Society, and the Romanian Catalysis Society, and some of them hold leadership positions in these societies, such as vice-president or secretary-general, which proves the recognition of their competence and authority in the community. In addition, seven researchers from the institute sit on the scientific or editorial boards of prestigious national journals, which allows them to influence the maintenance of high publication standards and the development of the discipline. The strengths of INCDFM's activities in this area are therefore its close integration with the higher education system, fruitful cooperation with the University of Bucharest, significant contribution to the education of doctoral students, high quality of scientific publications, activity in national scientific societies, and compliance with ethical standards. Weaknesses include the relatively low number of publications in conference proceedings indexed in WoS, which may be due to a preference for publications in journals with an impact factor, and the fact that, despite membership in national societies, there is a lack of clear information about similarly intensive involvement in prestigious international societies, which could increase the institute's international reach. The overall rating of the institute on a scale of 0.5, which reflects very good results in all analyzed aspects, while indicating areas with potential for further development, especially in the context of internationalizing scientific activity and increasing visibility on the global stage.

COMMENT - WEAKNESSES

INCDFM is an institution with an established position in the Romanian and international scientific community, actively contributing to the development of scientific staff, maintaining ethical and quality standards, and integration with academic structures. Further development should focus on increasing international visibility and attracting foreign talent. To sum up, the following weaknesses are highlighted: The lack of its own doctoral school (Limitation imposed by national regulations) and limited interest of some researchers able to take the habilitation but not "sufficiently motivated" to do this step; Limited number of highly prestigious journals in its editorial portfolio; Small number of foreign researchers in the institute's permanent team.

Indicator V.6 Awards/distinctions/titles

[max. score: 1]

Score obtained: 0.67

- Analyse the extent to which the research organization's prestigious results and researchers have been recognized in the period under evaluation by established national and international forums, state institutions and authorities, international and national scientific societies, universities, following selection processes, etc.
- Evaluate mainly the recognition of researchers' results and their professional prestige by national and international established forums, through awards/distinctions/titles, namely: award of the Romanian Academy; award/distinction granted by state institutions/authorities; award (distinction) of a national scientific society obtained through a selection process; award (distinction) of an international scientific society obtained through a selection process; Doctor Honoris Causa title awarded by a university, etc.
- Note: Awards for research results (PRECISI) will not be considered.

COMMENT - STRENGTHS

The prestigious achievements of the INCDFM research organization and the recognition of its scientists in 2020-2024 are very high. During this period, the institute and its employees have been recognized by numerous renowned national and international forums, which testifies to their significant scientific position and prestige. A strong point is the winning of 10 Romanian Academy awards, which is an elite recognition of the quality of scientific research. These awards covered various fields, from magnetic materials, catalysts, and nanofibers to materials for energy and sustainable development, and their awarding through a competitive selection process highlights the objective value of the achievements. Another strong point is the international recognition of individual scientists: three young researchers were invited to the prestigious Lindau Nobel Laureate Meetings, which is a recognition of their potential by the global scientific community. In addition, the STEM project implemented by the CIFRA unit won an award in the UNESCO competition, which highlights the institute's commitment to education and the promotion of science on the international stage. At the national level, the institute received the Bucharest University Senate Award in the field of exact sciences and the title of Employer of the Year, which indicates the academic community's recognition of its achievements and role in training personnel. It is also worth noting that the Minister of MCID awarded the "Gândit în România" prize, which is a form of state recognition for innovative solutions. Furthermore, Romania's status as the "Country of Honor" at the BESSY user meeting, with a guest lecture by Dr. Teodorescu, testifies to the institute's international reputation among users of large research infrastructures. A weaker, albeit insignificant, aspect is the relatively smaller number of awards directly from international scientific societies compared to national ones, which may suggest an area for further intensification of promotional activities on the global stage. Nevertheless, the total number and diversity of awards, including national and international academic awards and participation in elite events, places INCDFM at the forefront of research institutions in the region. The overall rating on a scale of 0–1 is 1, which reflects the very high recognition of the achievements and prestige of the institute's researchers, confirmed by reliable and competitive forums, both national and international.

COMMENT - WEAKNESSES

The international recognition is not evidentiated properly. There are no awards granted by Universities (such as DHC), academies, similar R&D institutions, Societies from EU or other countries. Also, the lack of leading roles in national scientific societies should be mentioned here.

Criterion VI. STRATEGIC DEVELOPMENT PLAN FOR THE EVALUATED PERIOD AND FOR THE NEXT 5 YEARS

[max. score: 20]

Indicator VI.1 The quality and feasibility of the proposed strategic objectives relative to the research organization's mission and the field in which it operates

[max. score: 10]

Score obtained: 9.50

- Analyse: the feasibility of the strategic objectives and the extent to which the proposed strategic directions support the achievement of these objectives, in line with the research organization's mission; the quality of the institutional strategic plan for the evaluated period and for the following 5 years; the quality of the SWOT analysis of the research organization relative to the environment in which it operates; the extent to which the organization's research directions are aligned with those specific to the national and European research, development and innovation space and to the field in which the research organization operates, and the extent to which the human resources policy is in line with the requirements of the European Charter for Researchers, the Code of Conduct for the Recruitment of Researchers, and the commitment to the Human Resources Strategy for Researchers - HRS4R.
- Evaluate mainly whether the presented objectives are feasible, appropriate and the proposed strategic directions of development support their implementation relative to the research organization's mission, there is a realistic Institutional Strategic Plan and appropriate for the research organization's mission, and there is a high degree of correlation of the specific research directions of the research organization with the specific directions of the national and European research, development and innovation space.
- Evaluate mainly the alignment of the organization's human resources strategy with the requirements of the European Charter for Researchers, the Code of Conduct for the Recruitment of Researchers and the commitment to the Human Resources Strategy for Researchers (HRS4R).

COMMENT - STRENGTHS

Based on the attached self-assessment report of the National Institute of Materials Physics (INCDFM), I give it a score of 9.5/10. The analysis of the feasibility of the strategic objectives and their compliance with the institute's mission is very positive. The strategic objectives presented are realistic and well-embedded in the institute's mission, which focuses on basic and applied research in condensed matter physics and materials science. Objectives such as consolidating the position of the elite research center, strengthening participation in international programs, transforming RITecC into a national innovation center, and developing cooperation with the private sector are appropriate and supported by detailed strategic directions. The strategic plan for the next five years is of high quality, based on an in-depth SWOT analysis that reliably identifies the institute's key strengths, such as qualified staff, modern infrastructure, and strong publications, but also weaknesses, including a low success rate in European competitions, limited participation in experimental development, and a low level of internationalization of staff. The analysis also takes into account opportunities, such as trends in the circular economy and the demand for advanced materials, and threats, such as unstable public funding and the risk of brain drain. There is a very high degree of correlation between INCDFM's research directions and national and European strategic directions, including the National Strategy for Research, Innovation and Smart Specialization (SNCISI), the National Plan, and the EU agenda on advanced materials. The institute's human resources policy is fully compliant with the requirements of the European Charter for Researchers and the Code of Conduct for Recruitment, as confirmed by the HR Excellence in Research certificate. The institute implements the HRS4R strategy, focusing on stabilizing young staff, attracting researchers from the diaspora, increasing mobility, and professional development. Its strengths include strong scientific leadership, excellent infrastructure, impressive publication and patent records, and an established position in international networks such as CERIC-ERIC and CERN.

COMMENT - WEAKNESSES

Concerns include relatively low levels of European grant funding, challenges in commercializing research results and fully internationalizing staff, and dependence on unstable national funding. Despite these challenges, the institute has a realistic, ambitious, and well-founded strategic plan that should enable further development and strengthening of its position. Strategy insufficiently connected to emerging scientific and technological trends The plan refers to high-level research themes but lacks: -explicit alignment with upcoming EU frameworks (Horizon Europe Strategic Plan 2025-2027, Chips Joint Undertaking, Quantum Flagship 2.0), -clear mapping toward national strategies (PNCDI IV, intelligent specialization), -structured monitoring of international scientific foresight. This raises concerns about future-proofing and strategic adaptability. There is no reference to the International Advisory Board. After F2F discussions during the site-visit, it was establish that the action plan contains references to the International Advisory Board The strategic plan lacks clearly defined KPIs (Key Performance Indicators) for all operational objectives in the Action Plan, which would make it difficult to measure their implementation in a standardized manner in the future. The strategic plan lacks clearly defined KPIs (Key Performance Indicators) for all operational objectives in the Action Plan, which would make it difficult to measure their implementation in a standardized manner in the future.

Indicator VI.2 The extent to which the scientific and institutional objectives are correlated with relevant trends in the organization's scientific field and societal needs

[max. score: 10]

Score obtained: 9.33

- Analyse the extent to which the research organization provides an appropriate framework to keep researchers up-to-date with the latest developments in the field, conducive to innovation and technology transfer; the extent to which the scientific and institutional objectives of the research organization are in line with the relevant trends in the scientific field in which it operates and with the real needs of society.
- Evaluate mainly the support for innovation and technology transfer; the initiative to set up an international scientific advisory board of the research organization; a high degree of correlation regarding the scientific and institutional objectives with relevant national and international trends in the organization's scientific field and societal needs.

COMMENT - STRENGTHS

Based on the attached self-assessment report, the National Institute of Materials Physics (INCDFM) can be highly rated in terms of providing a framework for tracking the latest scientific advances and supporting innovation and technology transfer. The institute demonstrates strong integration with international research networks such as CERIC-ERIC, CERN, and cooperation with synchrotron centers, which ensures constant access to the latest knowledge, research techniques, and infrastructure. It also operates within the Horizon Europe and COST programs, which promotes the exchange of know-how and participation in groundbreaking projects. The organization of prestigious conferences, such as ROCAM with the participation of Nobel Prize winners, and research internships for young researchers further strengthens this platform. In the field of innovation and technology transfer, INCDFM has implemented a certified innovation management system (SR 13572:2016), actively files national and international patents, and carries out projects in cooperation with companies, which has resulted in product implementations, e.g., folic acid detectors and measurement systems for companies. Another strength is open access to research infrastructure through the EERTIS and IOSIN platforms, which facilitates cooperation with the socio-economic environment. In terms of scientific and institutional goals, they are clearly aligned with national and European priorities, such as the National Research and Innovation Plan, smart specialization strategies, and EU initiatives on advanced materials and green energy. The institute is involved in key areas: materials for energy, electronics, health, and the environment, which directly respond to social and economic challenges. The strategic plan for 2025–2030 clearly defines research directions linked to global trends, such as materials for quantum technologies, renewable energy, and artificial intelligence. Overall, INCDFM demonstrates a high correlation between its objectives and social needs and scientific trends, as evidenced by projects focused on solutions for security, medicine, and clean energy. The institute's rating on a scale of 0–10 is 8. The institute has strong foundations in terms of international cooperation, infrastructure, and strategic focus, but needs to strengthen its commercialization mechanisms, increase the involvement of foreign scientists, and establish an international advisory body to increase the competitiveness and impact of innovation.

COMMENT - WEAKNESSES

However, a weakness is the lack of an explicitly mentioned international scientific council, which could increase the strategic dimension and critical assessment of research directions. Furthermore, despite numerous patents and cooperation with companies, the scale of commercialization and spin-offs seems limited, and the share of private sector funding in the budget remains relatively low. Furthermore, despite numerous patents and cooperation with companies, the scale of commercialization and spin-offs seems limited, and the share of private sector funding in the budget remains relatively low. KPIs for technology transfer (e.g., licenses/year, spin-offs/year) should be more explicitly quantified.

Criterion VII. CONCLUSIONS/RECOMMENDATIONS

VII.1 Conclusions/recommendations

- General conclusions and/or recommendations

Based on a comprehensive evaluation, the National Institute of Materials Physics (NIMP/INCDFM) is confirmed as a flagship, elite research organization in Romania with a strong international standing. The institute demonstrates excellent, sustained performance in securing competitive funding, boasting high-quality scientific output, and maintaining robust, certified management systems (ISO 9001, SMIn). Key Strengths: Scientific Excellence: High volume and quality of publications, with the majority in Q1/Q2 journals and a strong citation index, demonstrating real scientific impact. Very good Infrastructure: Possesses modern research infrastructure valued over €35 million, including facilities of national importance (IOSIN) and deep integration with pan-European infrastructures like CERIC-ERIC. Strong Human Resources: Features a balanced and skilled research team of 200+ scientists, with a good balance between senior and young staff and active roles in doctoral training and international scientific bodies. Robust Project Portfolio: Maintains a large portfolio of national and international projects, forming the dominant share of its budget. Identified Challenges and Recommendations: Despite its strengths, several limitations prevent the institute from fully capitalizing on its potential. Diversify Funding and Strengthen Technology Transfer: The institute is overly dependent on national funding (e.g., the "Nucleu" program), with a low success rate in European competitions and modest private-sector income. Technology transfer and commercialization are underdeveloped relative to the scientific portfolio. Recommendation: Launch aggressive, strategic efforts to increase participation and coordination in EU framework programs (Horizon Europe). Formalize and empower the Technology Transfer Office to actively pursue licensing, spin-offs, and industrial contracts. Define and monitor clear Key Performance Indicators (KPIs) for commercial impact. Boost Internationalization and Societal Impact: International attractiveness is relatively low, with a small percentage of foreign scientists. Societal recognition and the number of international awards could be enhanced. Recommendation: Develop a comprehensive internationalization strategy to attract talented scientists from abroad and the diaspora. Systematically record and publicly disseminate high-impact achievements and socio-economic case studies via the website and social media to increase visibility. Strengthen Engineering and Technical Capacity: A critical shortage of engineers and technicians limits the capacity for experimental development, prototyping, and scaling up research for industrial implementation. Recommendation: Prioritize the targeted recruitment and development of R&D engineers and technical staff to bridge the gap between research and application. Enhance Strategic Foresight and Infrastructure Planning: The strategic plan, while strong, requires future-proofing against evolving frameworks. The aging research infrastructure demands a plan for maintenance and renewal. Recommendation: Update the strategic plan with explicit links to forthcoming EU and national priorities (e.g., Chips JU, green transition). Secure resources for the ongoing maintenance and strategic modernization of key infrastructure. Assume Greater Leadership Roles: Researchers should be encouraged and supported to move from membership to leadership positions in international and national boards and scientific bodies, national and international projects, etc.. In summary, NIMP is an institution with a strong potential and solid foundations. Its future development and full impact depend on its ability to overcome challenges related to funding diversification, strengthening technology transfer, and consolidating its human and technical capacity for implementation.

Total Score: 186,65

Evaluator 1 (Rapporteur): FICAI ANTON

Signature: _

Evaluator 2 : FIERASCU RADU CLAUDIU

Signature: ___

Evaluator 3 : EKIELSKI ADAM

Signature: __