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The approaches to the assessment differ significantly due to the political orientation of the relevant organisation (its mission and objectives), the institutional environment, and the nature of the subjects which are under examination (higher education institutions and their substructures, horizontal research organisations, target programmes, etc.) The national assessment of studies may lead to an institutional change, and so the evaluating institutions and teams will be able to adapt their actions and will better address the expectations of their users.

We are trying to determine to what extent the research assessment methods can stimulate the development of research assessment itself and whether they are formalised and directly influence the innovation ecosystem. This study investigates whether and how the assessment of research activity or elements thereof influence the research environment or parts of it for a particular period of time. The following research questions are posed:

- Which is the most preferred assessment system on a national level and which assessment system is universally applicable?
- What determines the differences in preference (choices) with regards to introducing the assessment system in different countries?
- Is there an intervention in the research environment as a result of the performance of a research assessment and how is that intervention made?
- Does transformation in the research environment occur as a result of the research assessment and, if yes, can we determine the sectors (fields) where the impact is the strongest?

We study the possibility for a dynamic in the research efficiency and, respectively, the possibilities for a re-programming of the national research environment. A review of the research assessment practices which use a combination of different indicators was performed, and a comparative analysis based on several European assessment systems was prepared.

In searching of excellent research evaluation system one should look everywhere, of course. This includes western (presumably as a source of good practice) and eastern European countries (as a mirroring exercise

to see how others in a similar situation coped with the challenges of transforming the higher education and research systems).

Through the ScholarNet project we institutionally tried to learn from the French (UVSQ/Paris Saclay) and the German systems (FAU Erlangen Nuremberg). In both countries (tenure) professors are mainly public servants, which is quite different from the situation in Bulgaria and other transition countries. Eastern European countries tend to favour academic inbreeding and even base their pride on this pattern (for instance the Sofia Logics School or the Bulgarian school of medieval philosophy). The German system fosters diversity by getting degrees from different universities and ending up as a tenure professor elsewhere, or at least after a considerably long period in one of your alma maters.

Austria had transformed its system of hiring professors at public universities away from the civil servants system (since 2004) and Netherlands was running its universities more or less in a “private” way. Institutionally the host institution of the authors had close cooperation with German universities such as the University of Cologne, FAU Erlangen Nuremberg, Humboldt University and others, we looked at its system, but found it institutionally distant from the Eastern Europe. The way “schools of thought” emerge in German universities is by having a relatively longer “pre-tenure career” – PhD projects take longer than in Eastern Europe and also “chairs” in universities could hire a lot of fixed-term assistants. In Bulgaria, for instance you can get a tenure position at assistant professor level just after the PhD defence and for quite long time you could have retired as an assistant professor without a PhD. The accreditation systems of universities and programs provide incentives or even require to have significantly larger share of tenured lecturers (unlimited labour contract). As a rule, you should have 70 % of all courses taught by “internal” lecturers (on unlimited contracts).

The German accreditation system, unlike most of the Eastern European countries, is organized in a decentralized way and is characterized by its two approaches to accreditation. On the one hand the accreditation of degree programmes (programme accreditation) and on the other the accreditation of the quality assurance system within a university (system accreditation), both conducted by accreditation agencies which need authorisation from the Accreditation Council (accreditation of agencies).

The Accreditation Council as a central decision-making body defines fundamental requirements for the accreditation of study programmes, the accreditation of quality assurance systems and the accreditation agencies.

In addition, it is responsible for reliable, transparent and internationally accepted criteria as a basis for all of the above accreditations

The programme and system accreditation procedures are characterised by a two-stage procedure: The assessment and preparation of an accreditation report with recommendations for resolutions and assessments in accordance with the standards laid down in the Specimen decree is organised by an agency commissioned by the higher education institution. The responsibility for the accreditation decision, however, lies with the Accreditation Council. At the request of the higher education institution, the Accreditation Council decides on the accreditation of a study programme or the internal quality management system of the higher education institution. The decision is made on the basis of the accreditation report, whereby a justified deviation from the expert recommendation is possible.

The applicable criteria for research assessment as a part of general accreditation include individual achievements in teaching, writing proposals or publications adequately recognised. Performance evaluation is not limited to merely counting the number of publications or comparing index factors.

Performance evaluation should primarily be based on qualitative standards. Assessment of the achievement of a researchers must be carried out in its entirety and based on substantive qualitative criteria. In addition to the publication of articles, books, data and software, other dimensions can be taken into account, such as involvement in teaching, academic self-administration, public relations or knowledge and technology transfer. Details of quantitative metrics such as impact factors and h-indices are not required and are not to be considered as part of the review. Accreditation focuses on curricula (assessed for quality), research is not an explicit object of this assessment, although present as a criterion.

The collaboration with the German scientific societies is of prime importance for all the countries in the focus of this research. Germany is the preferred partner for new member states. The ongoing intensive networking gives access to circulation of good practices, higher potential of the research and better performance.

The study is based on the analysis of information about research in the following European countries: Austria, Bulgaria, Lithuania, the Netherlands, Poland, Slovenia, Hungary and the Czech Republic. Different data were extracted from legal documents and from the official websites of the institutions which curate the policies and the performance of research in the country (ministries and agencies). The various public financing flows in

the countries, subject of the study, were identified. The individual criteria applied for the purpose of research assessment, and their grouping or accompanying weights, if any, were examined in detail. This analysis served as a basis for outlining the most common types of indicators used in the performance of research assessment. A preference was observed with regards to the application of different types of criteria which is due to variations both in terms of the duration of assessment procedures, and the organisational and institutional culture of the individual countries. Thanks to various analytical and research activities, all countries adopt actions aiming to exclude conditions for conflicts of interests in research evaluation processes.

Indicators characterising the condition of the national innovation ecosystems were used to study the influence of research assessment. The respective data were extracted from the reports published by Innovation Scoreboard since 2010 and Eurostat; also data provided by the European Commission with regards to the participation of Member States in the Horizon 2020 programme were used.

This was fine-tuned using the expertise of one of the authors (Albena Vutsova), a long-standing manager of the Scientific Research Fund, Head of the Science Directorate in the Ministry of Education and Science, and professor at Sofia University St. Kliment Ohridski. Within the last 15 to 20 years, almost all criteria systems for assessment of research projects and programmes on a national level were developed, and the best practices of most Member States were reported. The common approach to these activities is grounded in science-based methodology.

The methodology combined the author's own elaborations and experience gained during the performance of periodic research assessments of European structures such as the Joint Research Centre (JRC) and periodic assessments of science and innovation framework programmes of the Community with the implementation of formal methods such as interviews, surveys, and an analysis of a series of relevant documents which are necessary for the assessment.

Consultations with national and foreign experts were carried out with regards to some of the interpretations (including 10 interviews with stakeholders, such as representatives of specialised directorates at the relevant ministries and agencies, university rectors, the chairman of the Council of Rectors, deputy chairmen of the Bulgarian Academy of Sciences and the National Centre for Agrarian Science, and ad hoc assessment work groups at JRC). The analysis of the national research assessment system was evalu-

ated and verified within the COST Action 15137 European programme where part of the results were incorporated in the national research assessment report. In-depth interviews with over 50 participants who are part of the assessment process were organised. The interviews were conversation-based, the respondents also had to complete questionnaires. Thirty-five respondents were asked to provide written answers; the survey included 20 questions, of which 30 % were open-ended.

In addition, a number of documents were analysed in the work process:

- ex-ante evaluation of Operational Programme ‘Science and Education for Smart Growth’, Bulgaria⁵;
- ex-ante evaluation of the Innovations Programme, Hungary⁶;
- organisational evaluation of the Hungarian Scientific Research Fund (OTKA)⁷;
- analyses of the Horizon Policy Support Facility (PSF) of the European Commission for Bulgaria (Peer Review of the Bulgarian Research and Innovation system)⁸;
- analyses of the Horizon Policy Support Facility (PSF) of the European Commission for Hungary (Peer Review of the Hungarian Research and Innovation system)⁹;
- analyses of the Horizon Policy Support Facility (PSF) of the European Commission for Poland (Peer Review of Poland’s Higher Education and Science System)¹⁰;
- two reports on the assessment of the implementation of the most recently completed framework programmes (7 Framework Programme and Horizon 2020 – interim)¹¹;

5 <http://www.opnoir.bg/?go=page&pageId=55&lang=en>

6 https://www.fi-compass.eu/sites/default/files/publications/Ex-Ante_GAP_TOI2348_vegso_EN.pdf

7 https://www.esf.org/fileadmin/user_upload/esf/OTKA_Evaluation-Report_final20141104.pdf

8 <https://ec.europa.eu/research-and-innovation/sites/default/files/rio/report/Full%2520report%2520-%2520Peer%2520Review%2520of%2520the%2520BG%2520RI%2520system%2520under%2520the%2520PSF.pdf>

9 <https://ec.europa.eu/research-and-innovation/sites/default/files/rio/report/H2020PSF%2520peer%2520review%2520report%2520Hungary-KI0216982ENNHU.pdf>

10 https://ec.europa.eu/research-and-innovation/sites/default/files/rio/report/PSF-Peer_review_Poland_FINAL%2520REPORT.pdf

11 <https://op.europa.eu/en/publication-detail/-/publication/7e74df87-ebb0-11e8-b690-01aa75ed71a1/language-en/format-PDF/source-80689114>; <https://op.europa.eu/en/pu>

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- evaluation of the research programme of the Joint Research Centre (JCR) – EC¹²;
- reports of the Joint Research Centre (JCR) – EC¹³;
- proceedings (collections of publications) from international research conferences dedicated to issues relating to research assessment¹⁴;
- scholarly articles dedicated to research assessment systems penned by experts in the field;
- peer review organised under the INTERREG EUROPE 2014–2020 (internal report);
- legal documents with a focus on the research system in individual countries and on strategies for smart specialisation and development of research and innovation;
- guidelines for conducting a research assessment;
- reports of the national ministries and agencies for research and innovation;
- OECD documents with a focus on analysis of the research and educational system in the countries examined;
- publications on research systems in Eurydice;
- annual reports of the ranking system for higher education institutions in Bulgaria;
- over 30 individual e-mail communications with stakeholders from different organisations and communication via ordinary means.

The expert evaluation of the team with regards to the effects of research assessment on the innovation ecosystem was validated through discussions with international experts (lecturers and researchers at the University of Lausanne, University of Porto, University of Twente, Sofia University “St. Kliment Ohridski”, Vilnius University, University of Lisbon, etc.) who study similar issues and participate in relevant EU projects. Part of the conclusions is featured in an internal summary report on the research assessment practices of Member States and EU membership candidate countries.

The study is limited to countries which have, to a certain extent, a similar demographic and socio-economic profile. On the other hand, it was taken

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12 <https://publications.jrc.ec.europa.eu/repository/handle/JRC96870>

13 <https://ideas.repec.org/p/ipt/iptwpa/jrc101136.html>

14 https://scholarlypublications.universiteitleiden.nl/search?type=dismax&f%5B0%5D=mods_relatedItem_host_titleInfo_title_ms%3ASTI%5C%202018%5C%20Conferen%5C%20Proceedings; http://informationr.net/ir/22-1/colis/colis1623.html

into account that there is a lack of standardised and fully comparable indicators and detailed data about the weight of the criteria.

There are no universal methodologies which will meet all needs and requirements with regards to the performance of a research assessment. Each methodology is defined by the objectives and functions of the specific research organisations. According to Gonda and Kakizaki (1995), the methods for assessing policies, programmes, and the quality of the research vary significantly. When the assessments relate to a large-scale programme, oriented towards a mission of the relevant organisation, it is more suitable to conduct a cost-benefit analysis. With regards to target programmes, accompanied by dissemination of results, it is recommended to conduct a more specific analysis which requires precise quantitative and qualitative data. Programmes targeted at raising awareness or public consultations require feedback from users, which is significant.

The various assessment methods have originated and been developed depending on the stages of the research and technological development of a given country. Methods evaluating the quality of research, which is measured through peer review and/or bibliometrics, are more frequently used. This approach requires quantity-oriented techniques.

Over the course of time, the assessment process has undergone transformation and has adopted the approach based on a portfolio of criteria. An in-depth assessment requires the application of both qualitative and quantitative methods which complement each other. That is why the implementation of alternative methods leads to more credible results and realistic recommendations (Hong & Boden, 2003). Hong and Boden (2003) conduct an in-depth study of the R&D assessment and comment on both the theoretical and practical aspects. They provide an overview of the various systems and types of assessment.

Kostoff (1993) differentiates the individual types of assessments with regards to quality and quantity. The following may be indicated as qualitative assessments: presence of strategic documents, positioning on an international level, etc.; quantitative assessments include bibliometrics, cost-benefit analysis, etc.

Hafkesbrink and Krause (1995) propose a technological method for assessing the economic aspect of technologies. Hong and Boden (2003) consider it an invaluable instrument in the assessment of research and development and innovation processes and believe that it could be implemented in both fundamental and applied studies.

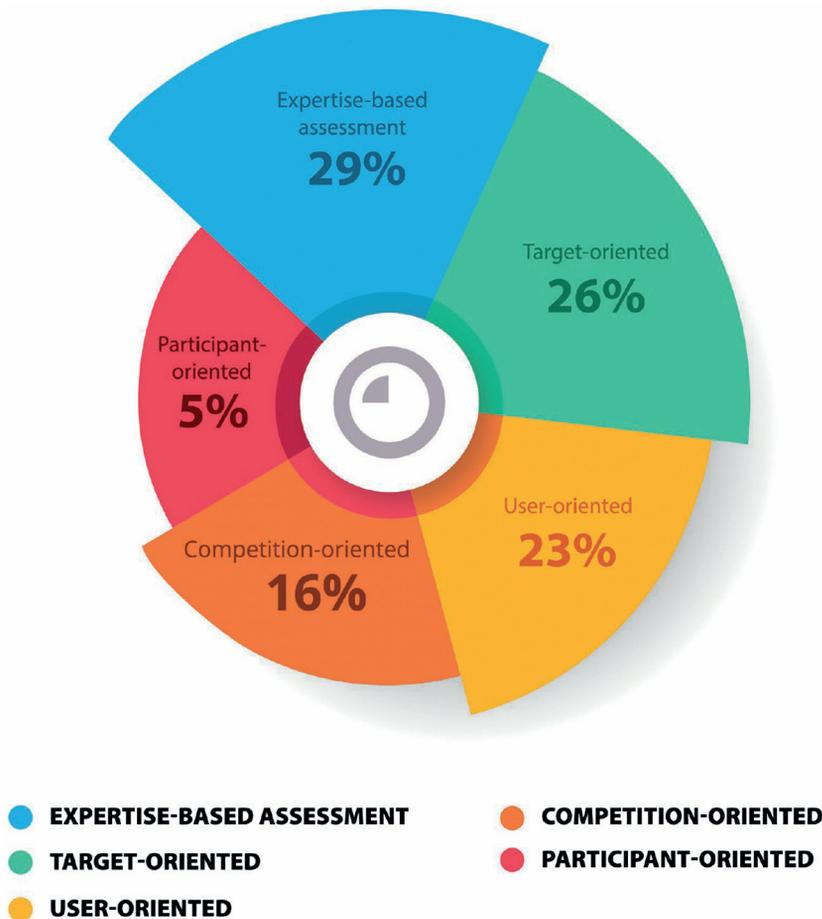
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Georghiou (1999) also suggests an alternative categorisation of the assessment methods. One such method is an assessment framework: the comparison of the situation before/after the assessment, control group, and a counterfactual and logical analysis. Interviews, statistical data, and a review of different strategic documents are also used in some of these methods.

The research assessment methodology applied in Bulgaria uses a mix of different approaches. In order to outline to what extent this methodology is relevant and provides the necessary intervention in the ecosystem, detailed interviews were conducted with Bulgarian scholars working in the academic environment (the total number of scholars is 13,410 – last update: 28/02/2022 according to data provided by the National Statistics Institute¹⁵) and with administrators involved in the implementation of this sectoral policy.

According to the respondents, the most preferred assessment method is the one based on expertise, which is considered as the most suitable method for the research system in Bulgaria. On the other hand, the systems which have very similar evaluation criteria are the target-oriented assessment and the user-oriented assessment. The former is also referred to as deconstructed assessment, which focuses on specific aspects of the subject of assessment, where a comparison based on standard indicators is recommended in order to see whether an improvement is needed and what measures have to be implemented and for how long. In the latter, the user-oriented assessment, clients form their perceptions based on the technical performance of the service, including functional, mechanical, and human qualities. The third method, the competition-oriented, received significantly lower support by the respondents. This result indirectly confirms the proposition that due to the lower share of financial support, based on direct or indirect competitive principle, there is no definitive agreement that research assessment, especially on an institutional level, should be competition-oriented.

15 <https://nsi.bg/en/content/2692/researchers-age-and-sex-government-sector-and-higher-education-sector>



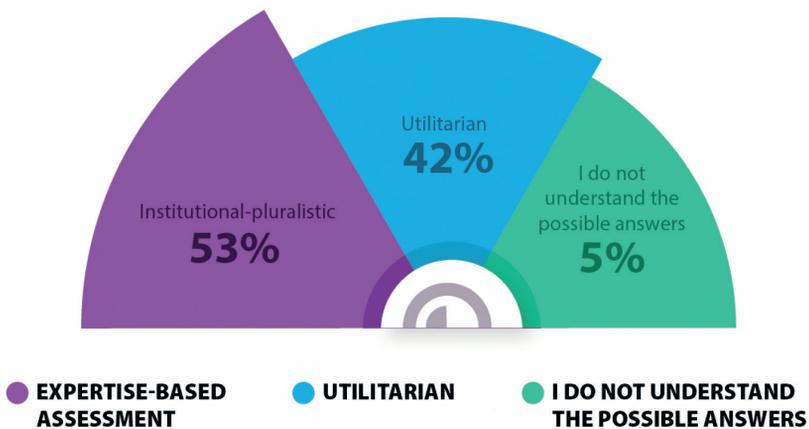
Source: Authors' own elaboration.

Figure 3.1: Preferred research assessment category in Bulgaria

The institutional-pluralistic assessment (which is focused mainly on communicating economic sustainability) gains only a slight majority of the votes; one explanation may be that for many respondents research assessment is mainly useful to the policy-making institutions and contributes primarily to re-designing the research policy. This, of course, suggests that a number of economic factors (return on investment, IPR, optimisation of market realisation) should be taken into account in order to achieve a significant change in the research policy. On the other hand, the institutional

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approach entails an adherence to formal and informal rules, procedures, norms, etc. In this context, the academia demonstrates a preference for the institutional-pluralistic assessment. Many respondents still assume the evaluation process as a possible policy adjustment, rather than as a means of assessing the effectiveness of a given research as a basis for improving the eco-innovation media. In addition, the respondents' opinion with regards to the degree of intervention in the research system through assessment shows that there is a visible intervention in the system, but it is far away from achieving a sustainable change in the innovation ecosystem. Large share of the respondents believe that the benefit of research assessment is mainly a conceptual one, which is in unison with the finding regarding its use to policy-making organisations.



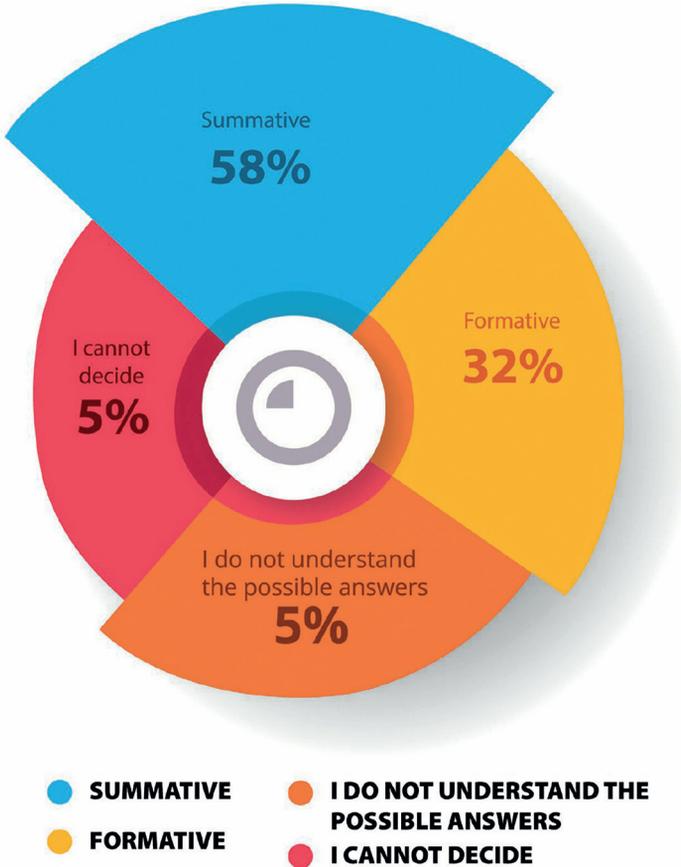
Source: Authors' own elaboration.

Figure 3.2: Preferred alternative assessment

The study shows that the assessment of individual aspects of the research system in Bulgaria applies the summative type of assessment (one which summarises the results achieved so far and indicates the shortcomings). This is natural in the context of the set of assessment criteria, which appear to be not very well synchronised in specific cases. However, there is an ambition to reflect the specificities of the system in a more efficient way.

The type of assessment approach to be employed (summative or formative) largely depends on the subject of evaluation. For individual items (for example, project, researcher, period), it is more suitable to implement

the formative type of assessment (which takes the longest as it is conducted during the entire process and provides information about the work efficiency), while for group subjects (including teams, systems, and organisations) it is more appropriate to implement the summative type of assessment.



Source: Authors' own elaboration.

Figure 3.3: Type of assessment with regards to individual aspects of the research system

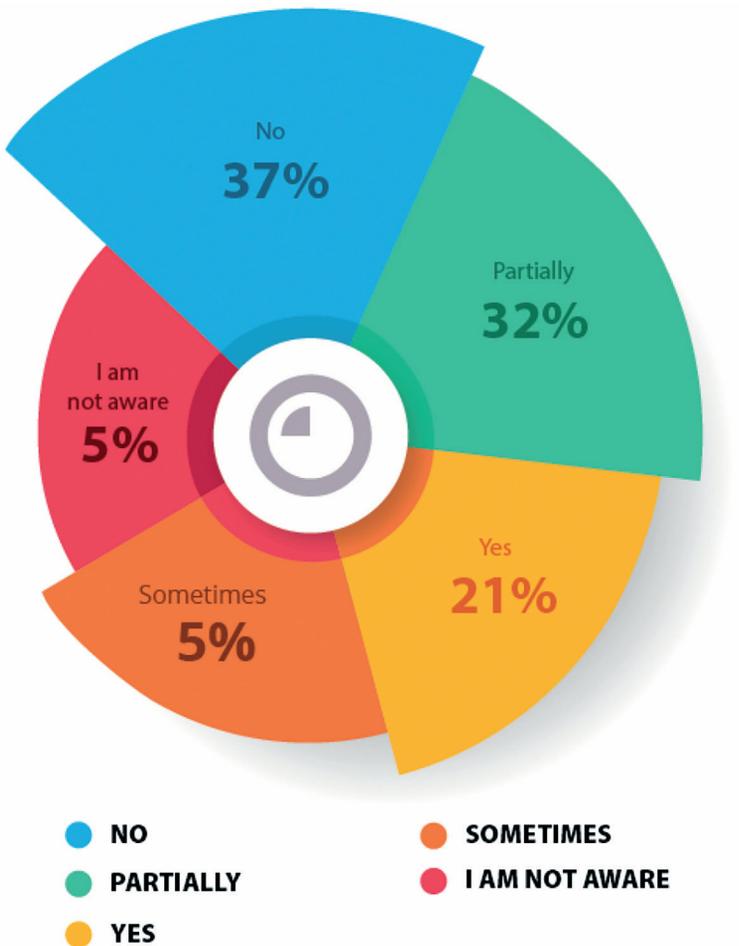
The study also analyses the extent to which the inclusion of stakeholders in the process of research assessment or the initiation of this process influences the impact and transformation of the entire innovation ecosystem.

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The results confirm that the stakeholders' views are considered; we therefore conclude that research assessment will have an effect on the entire ecosystem or individual system elements. The level of impact will depend on the institutional weight of the respective stakeholders.

An interesting result from the study concerns the implementation of the principles of responsive assessment (that is, the ratio between a set of values, which a given research activity would propose, and a set of expectations and criteria, which different participants have for this activity). Respondents believe that this principle is generally not implemented, and wherever it is implemented, this is done on rare occasions and/or partially.

This finding is surprising, considering the overall perception of education and science as a public good; prosperity, apparently, this public good fails to meet society's expectations. In terms of valorisation, respondents reported that some studies produce value both for academia and for society, yet a big part of this value is not quantifiable; at the same time the action itself is subject to a lot of responsibilities (collegial/professional).



Source: Authors' own elaboration.

Figure 3.4: Implementation of a set of values, expectations, and criteria

The next chapter presents and compares different approaches to research assessment in the European countries listed above in order to find an answer to the research questions posed. Particular attention is paid to the types of criteria applied in research assessment and their comparison.

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