

SCIENCE AND KNOWLEDGE: POLICIES AND DISCOURSES

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Scientific knowledge is one of the main keys for human and social development. In this context, science policies are vital for affirmation of societies at the present time and in the future. Therefore, these policies assume a public value because they are reflected in the quality of political decision-making and the living conditions of citizens (Neal, Smith & McCormick, 2008).

Manifold changing processes have been shaping the recent era, primarily linked to development of the knowledge society. Examples include the following: productive sectors are experiencing various reconfigurations; there is an exponential increase in the use of information and communication technologies; new business activities are emerging; the organisation of work as well as of working times are being changed; new social and environmental risks and problems are emerging.

In the space of a few decades, knowledge has been presented as one of the main political challenges, in view of the complexities that are emerging in all walks of life. These challenges impel the need for a constant search for resources, and management of the delicate balance between the natural and social world. In other words, knowledge has started to be considered as a cross-result of several processes that go beyond scientific research, scientists and research units. The paradigm of the coproduction signalling the intrinsic relation between science and society (Jasanoff, 1996) supports this idea, by demonstrating that in the knowledge society, the commitment to science and research is (or should be) collective.

According to this line of thought, science policy does not define an immutable or even a wholly tangible reality. It incorporates evaluative and ideological assumptions, as well as options and choices of different natures (Neal et al., 2008). It also involves diverse scales of performance: supranational, organisational, departmental, and institutional.

Some authors assign a structural and regulatory role to science policy (Neal et al., 2008), stating that it must be defined as the set of decisions and actions taken by political actors and institutions in order to plan, standardise, manage and evaluate science and research, as it is produced in a certain geographical and political context. In sum, we can define the following spheres of science policy as the principal ones, or those that are more embedded in the daily lives of institutions and researchers (Araújo, 2009, 2013b, 2014; Martins, 2012b): human resources in science, expectations and professional integration in science careers; scientific research funding (either from public or private institutions); distribution of funds and its connections with evaluation methodologies; principles and methods of evaluation in science (addressed to researchers and institutions); definition of priority areas; and the incorporation of scientific results in political decision-making. These processes concern not only the most effective and efficient ways

to achieve results, but also the fairest and most balanced methods that can warrant diversity from a gender, ethnic, regional and a scientific point of view, for instance.

From this perspective, science policy is a broad field of action that ideally considers the temporal, spatial and institutional conditions in which scientific research is being developed or may be developed (Araújo, 2013b). It is true that there are policies and plans discussed and followed at a macro-structural level (as is the case of national policies for science and their conditioning within a policy framework established at a global and European level). But the definition of science policies is based on a national, regional and institutional level, on multiple cultural, representational, evaluative and symbolic variables that significantly shape the actions of actors and institutions. Being deeply attached to culture, the questions related to science and knowledge policies are complex, and sometimes, ambiguous. They evoke various areas of intervention, as well as many guiding principles, that go beyond science and scientific research. For example, science policy has effects on education and culture and, at the same time, is dependent on them, since both are means of promoting research and innovation.

The problems faced by modern societies are increasingly complex. These are connected to the implications of the relationship between the social and the natural world, and issues of risk, insecurity and socio-environmental vulnerability. Therefore, relations between science and society have gained increasing attention. Several strategies planned to enhance citizens' scientific culture and get them involved in science decision-making are examples of some of the actions that have been implemented with that purpose.

As a matter of fact, new questions concerning science policy, innovation, and knowledge are emerging from these ambiguous contexts. This happens especially in democratic societies where science is seen as the axis of emancipation and freedom but, at the same time, receives substantial criticisms due to its perverse effects (Martins, 2012a, 2012b, 2013, 2015). From this point of view, one of the most significant questions in the debate on science policy and its regulatory frameworks argues in favour of promoting transparent and fruitful relations between science and politics, while not ignoring the fact that this relationship often engenders challenges that are susceptible to a less favourable understanding of science as a driver of the common good (Martins, 2015).

Some studies have shed light on aspects which are relevant for planning and defining the measures concerning governmental allocation of funds to the various areas. From this perspective, the number of arguments in favour of a participative science policy (i.e. that listens to the community of scientists and non-scientists) has increased. In other words, we are discussing the relevance of the opinions of scientists (from diverse fields) for the strategic actions taken by politicians. The said actions affect central aspects of science and scientific research, such as education and introduction to science, investment in financial and human resources, symmetry in the treatment of various disciplines and financing and evaluation models¹.

¹ About all these dimensions, it is important to mention the book edited by Rodrigues and Heitor (2015). Also in Portugal, we should mention the pertinence of the work developed by *De Rerum Natura* – a blog involving academics that have been accompanying and scrutinizing the implementation of science policies in all scientific areas. Additionally, as regards communication sciences, we should mention Martins and Oliveira (2012, 2013).

This argument confirms how important it is for science policy decision making to include other actors, such as companies, associations and other organisations (stakeholders), as well as scientific advisers, impartial experts, and experts in several areas, with in-depth knowledge of the models and dynamics of science policies (Macleod et al., 2008). More recently, the role of “entrepreneurs” in science (people with deep knowledge in several areas and endowed with strategic vision) has been analysed and seen as important. The idea is that they can bring to the discussion potentially relevant societal problems, requiring study and diagnosis (Macleod, Blackstock & Haygarth, 2008, s/p). In that sense, Macleod and others agree that:

To enable robust policy making, there is a demand for an inclusive process that enables opening up the science-policy discourse to a range of expertise, value positions, and modes of thinking (Prager and Nagel 2008). This would help to ensure that scientists and decision makers are fully informed of all the scientific and societal options, including the different perspectives underpinning these suggestions. (Macleod et al., 2008, n/p)

Some theoretical perspectives have emphasised the conflictual aspects and relations of power traversing the worlds of science and scientific research (Becher & Twiler, 2001; Bourdieu, 2011). But more and more authors, not detaching themselves from these analyses of science and power, and finding support in those previous conclusions, discuss the need to operationalise this paradigm of an integrated science (or integrative science), which

(...) seeks to pose and answer the emerging questions facing society regarding the intersection of social and natural systems, by bringing together multiple sources of knowledge, and by recognizing the new social contract for science (Lubchenco 1998). (Macleod et al., 2008, n/p)

However, according to the authors mentioned above, this project faces some challenges:

Factors impeding the science-policy interaction include cultural differences, expressed in different discourses, timetables, standards for measuring excellence, and forms of accountability (de Jong 1999, Reeves et al. 2007). Therefore, integration of science and policy requires mutual understanding, communication, and the alignment of objectives. (Macleod et al., 2008, n/p)

The ability to establish and operationalise an integrated and plural science policy, is essential at a national, regional and institutional level. The social reality is dynamic. Therefore, new problems continue to emerge. They challenge the modes of governance of science and knowledge. But, globally, the aforementioned authors tend to consider the advantages of a relative structural stability of guiding principles, in the face of the necessary cyclical changes brought by electoral cycles.

We highlight three of the basic principles that are relevant for the Portuguese context.

The first relates to the valuation of the various areas of knowledge and the establishment of balanced policies that have the specificity and the contribution of each of these fields to the aforementioned common good. For reasons related to the progressive submission of politics and science to economy (Bozeman & Sarewitz, 2005, 2011; Martins, 2013, 2015) and vigorous expansion of the knowledge economy, different and paradoxical forms of appreciation of various scientific fields, including social and human sciences, proliferate at different levels.

The implementation of an integrative vision of science involves understanding the desired and attributed place of “applied science” and “basic science” as a knowledge management strategy, taking into account the path traced for the development of society. The bond that each scientific field can establish with the market of science and knowledge should also be seen that way. This exercise also requires us to detach ourselves from questions of “impact”, from questions of the “value” of each scientific area, insofar as the aim is to promote the common good, as previously mentioned. This view is supported by several scholars, including Bozeman and Sarewitz (2005, p.119) who sustain the following idea:

We argue that pervasive use of market valuation, market-failure assumptions, and economic metaphors shapes (sic) the structure of science policy in undesirable ways. In particular, reliance on economic reasoning tends to shift the discourse about science policy away from political questions of “why?” and “to what end?” to economic questions of “how much?” (Bozeman & Sarewitz, 2005, p.119)

The observation of this guiding principle is mirrored, albeit in a disturbingly timid manner, in the policies of the Community Framework for Support to Research - Europe 2020 - as well as in national policies regarding evaluation processes in science. In this regard, the book by Featherman and Vinovskis (2001) on the contributions of the social sciences to public policy, even though limited to the US, is an excellent source of information for further analysis on the socio-economic value of the different scientific areas, with a particular focus on the social sciences.

The second principle that we want to highlight relates to territorial development and planning. The knowledge economy perspective has been focused on the analysis of the determinants of success of certain geographical areas, seeking to identify the reasons why some territories are more or less attractive, concentrate more or less equipment and resources and attract more or less investment. The panorama of science (and, incidentally, of technology and innovation) is not solely determined by local and regional actors. Thus, public policies, in this respect, play a pivotal role, especially in the management of scientific, technical and human resources mobilised in the knowledge economy.

This situation means we need to acknowledge the influence of other variables that affect social and economic development through science. In this sense, for example, there are some relevant questions to address. One is related to the crucial problem of science and territory relationships and its diversities. At this regards it becomes pertinent

that science policy can be oriented in favour of a balanced policy that takes into account regional disparities.

While putting all these ideas together, which flow from the principles that indicate the pertinence of an integrated science, it is important to specify the relevance of temporal orientation of science policies. Therefore, it is important that political actors may have the capacity to be adapted and prepared to perform management at various scales while, simultaneously, assuring cohesion and diversity (Macleod et al., 2008).

As it is possible to observe, the field of science policy is broad and complex. This issue of the *Lusophone Journal of Cultural Studies* seeks to gather articles that allow us to elucidate some of the most effervescent realities in science and research, including analyses that involve diverse areas: from the Social Sciences and Humanities to other technology-related areas. The current issue is organised into four different sections.

The first section is called “Evaluation of science and higher education: questions within the Lusophone world”. The section encompasses three articles which deal with the evaluation of research and higher education, principally at the post-graduate level. On one hand, the authors analyse the complexity of working contexts, especially in countries where scientific and technological policies are marked by controversies. On the other side, authors also approach some specificities and mutations in higher education, underscoring the interest of reflexivity inside the action contexts. Overall, the analysis made in these texts show the need for scientists from the several scientific areas to develop, perhaps in different ways, reflexive processes about their practices as scientists and agents of social and cultural transformation. The specificity of social sciences and humanities is one of main links between these three texts.

Juremir Machado da Silva is the author of the first article, which deals with the ambiguities and contradictions he believes to exist regarding the evaluation of graduate programmes in Brazil. In his presentation, the author clarifies some of the implicit and invisible mechanisms that constitute the processes and evaluation methodologies applied in that country. The author delineates the way such tools become performative - triggering a set of behaviours on researchers and institutions, which end up working with a dose of thoughtlessness and somewhat in disagreement with the situation prevailing in Brazil and other Portuguese-speaking countries. Crossing a range of criteria that brings to his paper evaluation elements used in other contexts, especially English language contexts, the author deconstructs the way science written in Portuguese is underrated, especially due to the excessive and inappropriate use of assessment criteria, such as the publication in journals written in English. A relevant element discussed by the author relates to the concept of internationalisation, which seems to be overestimated and even misused among the Brazilian scientific community. Silva says the use of this concept is somewhat reckless. Therefore, this essential element of research and production in science becomes less understandable in Portuguese-speaking contexts since it is operationalised by the use of dominant indicators in the English-speaking world. This situation may cause all the local scientific production of countries that do not have English as their native language to be undervalued. Thus, the author is proposing a debate about the

nationality of science itself and the importance of discussing issues of discrimination, hierarchy, and segregation in science.

Paulo Serra is the author of the second article based on an empirical analysis of a sample of Communication Sciences journals from Portugal, Brazil, and Spain. Following an argumentative line to some extent close to that used by Juremir Machado Silva, Paulo Serra demonstrates the frailty in the citations networks that characterise the state of the art in those countries. The author encourages the reader to deliberate on how the scientific community of these nations reacts to the trend of valuing scientific work produced and published in English. According to Serra, this trend promotes the quoting of authors who write in Anglophone foreign journals, with support from Anglophone publishers. This situation causes a reinforcement of the “paradigm based on the publication in English, mostly English or American journals indexed in databases such as Web of Science (Thomson Reuters) and Scopus (Elsevier) that clearly favour empirical and quantitative studies.”

João Teixeira Lopes focuses on university teaching practices, advocating the relevance of social scientists, teachers and practice actors to exercise a kind of permanent reflexivity, from the perspective of a plural sociological view. Lopes makes such remarks while intersecting multiple and complementary levels of observation: social singularities; classroom; institutions; and educational and social space policies. He gives examples from everyday life in universities and mobilises an ethnographic approach from within, drawing attention to the need to understand the educational context, namely the classroom. This author’s approach focuses on cultural dispositions that show themselves through the habitus. It is a relevant approach since it deals with volatile and dynamic social contexts in which the social subjects move, generating problems and difficulties that cannot be dealt with in traditional intervention methodologies.

The second section is named “Science and scientific research: questions of culture, career and collaboration”. The articles follow the line of argumentation about those type of processes apparently less considered and less valued by formal rhetoric. Addressing objects and contexts, these texts show a set of variables, some objective and others of a subjective and implicit nature which are the basis of the culturally-grounded dispositions to work in science.

Heloisa Perista, Pedro Perista, and Dominique Vinck are the authors of the paper that addresses the career situation of PhD graduates in Social Sciences and Humanities in Portugal. The authors analyse four key moments in the trajectory of PhD holders: the situation before development of their thesis, the advancement of their work, the first job, and the latest situation in which they see themselves. Making use of questionnaires and interviews applied to the aforementioned PhD holders, the authors give an account of the diverse expectations these individuals have before starting their PhD studies, as well as the paths they undertake over time. The authors also show the difficulties and challenges faced by doctorate holders in the Social Sciences and Humanities, regarding access to workplaces inside and outside the academia and the research carried out in higher education institutions. One of the main conclusions that we considered to be

extremely relevant to the problematisation of science policies in Portugal refers to the fact that it is an academic degree with a high level of career insecurity and instability. It is possible to observe, for instance, that several doctorate holders in this area seek employment strategies that comprise abandonment of their investigation.

Marla Parker and Barry Bozeman, in their paper, address the veracity of sexual and racial discrimination in science and academia in the areas of science, technology, engineering, and mathematics, which are known as STEM. From an accurate analysis of existing studies, the authors highlight the need to consider the effect that the variables of “gender” and “ethnicity” produce on the context of scientific careers. They believe these variables coproduce situations of inequality that block access and, in particular, the possibility to remain in research careers and science. They also believe that such variables are strongly decisive in relation to ethnic minorities and women and therefore with a particularly marked effect on women from certain ethnic minorities. These authors present a reflexive paper, documenting the key features of the areas of STEM that are still laden with stereotypes and prejudices about those who participate in science. Authors also warn us about the implicit processes and somehow invisible discrimination that still take place in science (STEM). Therefore, they accentuate the need for science and technology policies to incorporate thoughts and actions directly linked to these inequalities.

Sofia Bento, Marta Balcony, Audrey Richard-Ferroudji and Nicolas Faysse are the authors of the paper on the relationship between stakeholders and the project coordinators approved in the context of a broader European programme, the Circle ERA NET. This programme is devoted to coordinating policies in the particular context of climate changes. Supporting their conclusions in a theoretical discussion punctuated by the attention given to the problems of climate change, but also addressing the definition of policies for research in this field, the authors trigger an analysis of the importance of participation by stakeholder (scientists and non-scientists) in the decision-making process that deals with science policies. Regarding this matter, the authors develop a focused approach on the involvement of various stakeholders in developing policies on climate change, suggesting some major challenges in the fields of science and technology studies, concerning the quality of participation of various stakeholders, including scientists. The article is a relevant contribution to a better understanding of the broader problem of public participation in science policy.

Carlos Fiolhais, a physicist, in close alignment with some social sciences and humanities authors, including the theoretical and epistemological Weberian framework, develops a reflection on the importance and relevance of the link between art and science. The author sustains his position on the work of other authors, especially from the second half of twentieth century. These have highlighted the intersection between the vision of art (in particular, Poetry), and the vision of Science (fundamentally positivist) that would result in a deeper knowledge and understanding of the world, thus establishing a “third culture”, more complete and adjusted in face of the increasing complexity of reality. In our view, it is a reflection that brings to the context of the social sciences and humanities the need for a better transmission of the contributions of these areas to the

understanding of the forms of discovery, innovation and implementation of the results obtained by STEM - science, technology, engineering and mathematics.

In the section “Varia” we have included two papers. Paulo Ferreira da Cunha addresses Education not only as a constitutional right but also as a natural right that arises from the nature of things and the vital need for personal improvement. The author draws attention to the necessity of an enabling environment, as well as of mediators who can make such right effective. The author focuses his article on several aspects of the context of this “condition”, as says Ortega, this singular right that demands actions from both State and cultural agents, but also (and mainly) from the citizens who are subjects - and not objects - of Education. In this sense, Cunha states his intention to reflect on the right to Education and its protagonists, as well as their difficulties in a democratic context.

Isa Trigo’s essay proposes a reconstruction of the path of elementary education teachers training programmes offered by the State University of Bahia since the 1990s. This university offers three major programmes: the Intensive Graduate Programme (Network UNEB 2000), the State Programme of Teacher Training (PROESP) and, since 2010, the National Training Plan for Basic Education Teachers, also called Paulo Freire Platform (PARFOR). The latter is treated in this essay in greater detail. Analysing the difficulties and shortcomings that characterised this University’s struggle with multiple requirements related to interiority and difficulty to benefit from expansive federal policies, the author deconstructs some of the processes through which that institution has developed coping mechanisms. The State University of Bahia managed, against all obstacles, to develop teacher’s qualification courses through participatory methodologies, under Paulo Freire’s platform.

In the section of “Book reviews” we gather a set of critical reviews that address, more or less implicitly, some of the dimensions of science policy, as we have defined it in the introduction.

Rita Ribeiro presents a critical review of Kracauer’s book named “Os empregados”, first published in 1930. Rita Ribeiro sustains that the reflections made by the author on that historical moment are presently strongly relevant to understanding social worlds.

Fábio Ribeiro makes a critical review of Kriegbaum book, signalling the relationships between media and science (1970). Fábio Ribeiro argues that this book is still a seminal work that is strongly relevant for understanding and comprehending media as actors with a pertinent role in promoting scientific culture.

Madalena Oliveira writes about the book edited by Rodrigues and Heitor (2015). This book includes several articles dealing with the evolution of Portuguese scientific system. The book addresses questions of great relevance, for careers in science, research findings, and evaluation criteria.

Francisco Calado Abrunhosa writes about a text by Sodr  (2013), focusing on what he calls a “new system of intelligibility”. Following critical reflection about the increasing power of technology in society, several relevant considerations are provided concerning the emergence of this new system of intelligibility.

The *Lusophone Journal of Cultural Studies* includes in this issue a section devoted to policy recommendations, including a letter by Moisés de Lemos Martins to the current

Minister for Science and Technology. In this letter, the director of the Communication and Society Research Centre (CECS) outlines the measures that he considers to be appropriate in order to accomplish the concrete exercise of a science policy in Portugal, also identifying what are, in his view, major errors in the discourses of institutional practices of science policy in Portugal.

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