Policy Change in the Colombian Research Evaluation System of Research Groups: the Need for a Different Route*

Cambio de política en el Sistema de Evaluación Colombiano para la Investigación de los Grupos de Investigación: la necesidad de una ruta diferente

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ABSTRACT

This paper presents an analysis of the way policy change is taking place in the Colombian Research Evaluation System of research groups. For that purpose the Advocacy Coalition Framework is used in order to show the interaction between stakeholders that try to shape the system. Policy change is seen as a learning process in which institutions as well as communities are involved to develop the System. That while interaction between stakeholders has achieved policy adjustments, the current state of affairs demand a different approach to achieve a more participative and open mechanism for policy change.

KEYWORDS: Research Evaluation Systems (RES), policy change, Advocacy Coalition Framework (ACF), Colombian Science Technology and Innovation System, research groups.

RESUMEN

Este artículo presenta un análisis de la manera en que se lleva a cabo el cambio en las políticas del Sistema de evaluación de la investigación de grupos de investigación en Colombia. Empleando el marco conceptual llamado Advocacy Coalition Framework muestra la interacción entre los actores que tratan de dar forma al sistema. El cambio en la política es visto como un proceso de aprendizaje en el que las instituciones, así como las comunidades, están involucradas en el desarrollo del Sistema. Si bien la interacción entre los actores ha logrado ajustes de la política, la situación actual demanda un enfoque diferente para lograr un mecanismo más participativo y abierto.

PALABRAS CLAVE: Sistemas de evaluación de la investigación; cambio en las políticas; Advocacy Coalition Framework; Sistema Colombiano de Ciencia, tecnología e innovación; grupos de investigación.

Introduction

The Colombian Research Evaluation System (RES) have been active since 1991. Since then, some private and public institutions, researchers and governmental agencies have been involved in its development. Thanks to the interaction among actors it has become key in determining the number and quality of researchers, research groups, universities and in general the progress of the Colombian Science and Technology System.

Along with the development of the Colombian RES, stakeholders have gained skills and knowledge that have allowed them to be actively involved in debates about the validity, accuracy, pertinence and use of the results obtained from measurements. This has built an environment in which ideas are debated and there is always room for agreements and disagreements.

This study is aimed to show how different stakeholders express their interests and in doing so try to shape the Colombian RES. Opinions and actions can be seen in public documents. They will be used as a source to characterise discourses in order to infer shared and contrasting interests, attitudes and proposals. From that characterisation, it will be possible to analyse the way policy change is taking place, showing its main mechanism and evaluating its pertinence given the current state of affairs.

An analysis of this kind requires a framework that takes into account stakeholders, relationships between them, expression of ideas, policy adjustment and policy change. In section 2 I expose the main conceptual constructs used, taken from the Advocacy Coalition Framework (ACF).

Section 3 introduces the reader to RES in general, explaining what they are and their social implications. Section 4 focuses in the Colombian RES identifying main stakeholders, their opinions and actions (belief systems) and the way policy change is taking place. As it will be shown, policy change has been done at secondary rather than core aspects of the RES. As secondary changes don't seem to be appropriate to find solutions to structural issues, I try to find those points in which the mechanism for policy change can be improved.

Analytical framework and methodology

I use some concepts derived from the Advocacy Coalition Framework[1]. This framework addresses policy change in terms of groups of private and public actors with a shared belief system that form coalitions in order to influence policy in a certain direction. The unit of analysis used is called a policy subsystem, which is a specific domain within a more general policy system. As the framework approaches policy change, it is suitable for processes that have been developed over a decade or more (Sabatier, 1998: 99-102).

Belief systems "involve value priorities, perceptions of important causal relationships, percep-

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1.   The ACF has been developed mainly by Sabatier and Jenkins-Smith, who joined their conceptions of the policy process in an article in 1988. Since then the framework has been given a number of revisions and many case studies have used it. In this essay I mainly follow the 1998 Sabatier's formulation.
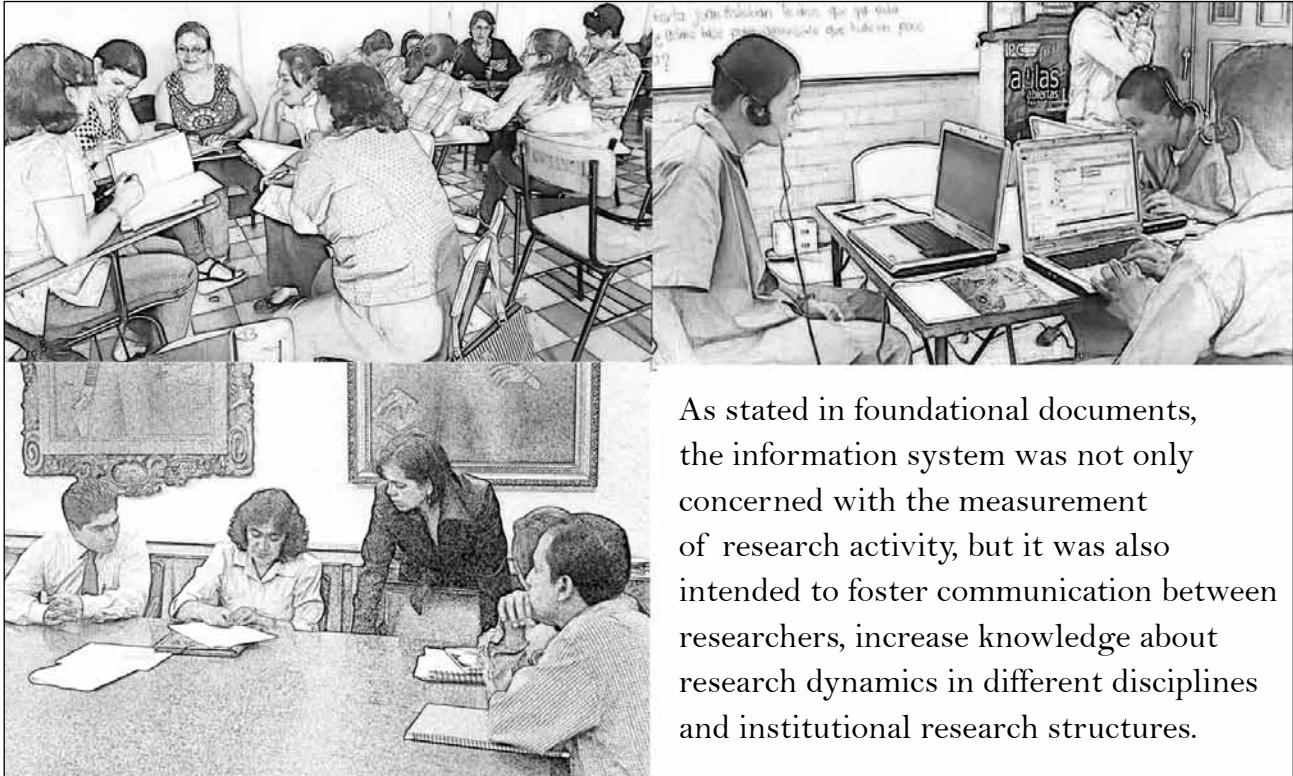
As stated in foundational documents, the information system was not only concerned with the measurement of research activity, but it was also intended to foster communication between researchers, increase knowledge about research dynamics in different disciplines and institutional research structures.

tions of world states (including the magnitude of the problem), and perceptions/assumptions concerning the efficacy of various policy instruments" (Sabatier, 1998:99). Shared beliefs can be core or secondary. Core beliefs are less likely to change than secondary, and they are supposed to be the glue of advocacy coalitions.

Advocacy coalitions are groups that have a common view of an issue (a belief system). As Sabatier highlights, it can be found more coalitions than first appears (1998:108) and its number depends on the detail at which the researcher disentangles shared beliefs. For example, if the researcher identifies groups according to their support to the idea that security is the most important policy for a country, they would find one or two coalitions. But there could be more

coalitions inside these two groups if their criteria includes means, budget, and so on.

Advocacy coalitions try to influence a particular policy subsystem, which is defined as "the group of people and/or organizations interacting regularly over periods of a decade or more to influence policy formulation and implementation within a given policy area/domain" (Sabatier,1998:111). Within these boundaries policy change is seen as "a transformation of a hegemonic belief system within a policy subsystem" (Hirschi and Widmer, 2010:542).

Policy change is likely to happen when one or more of the following conditions are met: a change in power relations of one or more coalitions, exogenous changes as socio-economic condi-

tions, public opinion and changes in other policy subsystems (Sabatier, 1998:102), internal shocks (disagreements within coalitions) and negotiated agreements (Hirshi, 2010:542).

A special mention has to be done of the role that policy-oriented learning plays in the ACF. Although not mentioned in the above paragraph, it is one of the forces that causes policy change. Policy-oriented learning refers to "relatively enduring alterations of thought or behavioural intentions which result from experience and/or new information and which are concerned with the attainment or revision of policy objectives" (Sabatier,1998:104). It is a consequence of a better understanding of the policy subsystem by stakeholders driven by cumulative knowledge. However, Sabatier argues that this learning is instrumental and usually has an effect in secondary belief changes. In order for a policy to change core beliefs an external influence or turnover in personnel is needed (Sabatier,1998:105).

By definition, the Colombian Science, Technology and Innovation system (STI) is "open, non-exclusionary, of which all the programs, strategies, science and technology activities make part, regardless of the public or private institution or the person that performs them" (República de Colombia, 1991, translation mine)[2].

Colciencias is the governmental administrative department responsible for research policy in Colombia, and one of its functions is to organise a national information system of science and

technology (see República de Colombia, 1991, section 18, number 8e and 8f).

The Colombian Research Evaluation System can be seen as a subsystem of the STI System. For the purposes of this study, only the part regarding measurement of research groups in Colombia will be taken into account. The analysis presented tries to adapt the ACF to what can be called a policy micro-system within the Colombian Research Evaluation subsystem.

An implication of this adaptation is that the analysis will be done in a group of stakeholders that share a main core belief system, i.e. that a RES can be used to accurately measure and represent scientific and technological activities in a country. While this option neglects the examination of the greater picture, it allows focusing on the internal working of an advocacy coalition while still addressing policy-oriented learning and the effects of debate and public opinion on policy adjustment.

The layout of this study follows a general to specific approach. First, I'll show the motivations to implement RES and some unintended consequences of its implementation. This is done in order to portray the general belief system of which the specific implementation in Colombia is an example. Then, I'll describe the Colombian RES in more detail as it is the subsystem in which advocacy coalitions interact. A debate on the way research groups measurement is being done will serve as a means to differentiate coalitions within the subsystem. Interactions between coalitions allow

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2. Original text: "El Sistema Nacional de Ciencia y Tecnología es un sistema abierto, no excluyente, del cual forman parte todos los programas, estrategias y actividades de ciencia y tecnología, independientemente de la institución pública o privada o de la persona que los desarrolle".

to see a policy-oriented learning process and the way negotiations between groups are being done.

Coalitions maintain different conceptions about measurement of research groups. Although opinions are usually expressed informally, some of them make their way into formal discourse. My attempt is to infer some views of the same subject through an analysis of public documents. By using this method the reader will be able to understand not only different points of view, but also the major controversies that have arisen and the adjustments that have been done.

Research Evaluation Systems

Research Evaluation Systems[3] (RES) are supposed to give the evidence needed to make informed policy decisions about research funding and steering. In order to support policy-making, more or less complex frameworks and indicators have been used. The OECD has played a major role in the diffusion and legitimation of RES by building a narrative within which RES play a key role (Godin, 2003; 2007;2009). That narrative is part of a shared belief system that can be summarised in the following sentence:

> "Knowledge in all its forms plays today a crucial role in economic processes. Intangible investment is growing much more rapidly than physical investment. Firms with more knowledge are winners on markets. Nations endowed with more knowledge are more competitive." (OECD, 1996:12)

RES in this belief system are used to produce an evaluation of the progress towards a knowledge-based economy. One of the most comprehensive exercises being carried out at the moment in the world is the UK Research Assessment Exercise (RAE). Since 1986, the UK assessment has been used to evaluate and rank higher education institutions and have evolved in complexity from being a questionnaire to include peer review and bibliometric evaluations, quality and impact in the future. Most RES being used at the moment resemble to some extent the UK's model.

RES have allowed a better representation of science as a cumulative process as well as a possibility for governmental and private organisations to steer research in desired ways and a means for political accountability (Whitley, 2007:4; Godin, 2007). Some RES have also improved competitiveness among universities, as shown by Gläser (2007:254). However, some researchers have found that RES have unintended consequences on the system being measured.

Martin and Whitley (2010), for example, found that the UK RAE has been transforming the behaviour of scientists and institutions in unintended ways. In order to be better evaluated by the framework, strategies and adaptive behaviours can be seen that don't always correspond to an increase in research capabilities of individuals or institutions.

Whitley (2007) has portrayed the consequences of having RES in different countries. The more

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3.   I follow the definition of RES proposed by Whitley (2007:6): "Research evaluation systems (heceforth RES) are organised sets of procedures for assessing the merits of research undertaken in publicly-funded organisations that are implemented on a regular basis, usually by state or state-delegated agencies."

likely effects of RES on a science system are: RES make researchers aware of competition with others; evaluation criteria for quality in one field tend to be imposed; researchers tend to adapt to mainstream, rather than to innovative approaches; Organisations tend to invest less in risky projects, inhibiting the development of new fields; RES strengthen the formation of elites that concentrate the majority of resources, like people and funds (Whitley, 2007:11-12).

Weingart and Maasen (2007) have highlighted the issue that rankings are conforming an elite of enterprising universities. Gläser and Laudel (2007) have analysed the effects of carrying scientometric evaluations to allocate funds. All these studies raise questions about the relationship between policy and RES, and to what extent can measurements be done without political biases that can affect results and interpretation directly or indirectly.

Addressing of the problem, concluding in certain way that scientometrics -one of the main tools of RES- should be independent of politics but serve as a guide can be found in De Solla, 1965; Glanzel and Schoepflin, 1994; Méndez, 1994; Miquel, 1994; Gläser and Laudel, 1997;Weingart, 2005.

On the other hand, van Raan (1994; 2004) and Barré (2010) address the issue in a different way. The former sees scientometrics and RES as applied research that can be exploited as a business ethically as long as the concepts and methods are not misused by "non-experts" in the field. The later thinks that indicators are "debatable devices" that allow collective learning. The debatable nature of indicators makes them socially robust and a key instrument for policy makers.

The Colombian RES is one of such debatable devices. Policies towards the conceptualisation and implementation of RES in a country create an environment in which governmental agencies, private research institutions, universities, researchers, media and experts interchange opinions, interests and appraisals and start actions to modify policies. The outcome of such interaction is a network of interests that sometimes shape the direction of research policy. The next section shows this interaction among actors analysing discourses held by some them which are representative and are expressed in formal communications in Colombia.

The Colombian Research Evaluation System of research groups

The Colombian RES have been active since 1991. At the beginning it was related with the idea that an information system could be developed. As stated in foundational documents, the information system was not only concerned with the measurement of research activity, but it was also intended to foster communication between researchers, increase knowledge about research dynamics in different disciplines and institutional research structures, give public access to information about research, create an environment in which researchers could interact between them (Charum, 1999), and increase the visibility of science produced in Spanish language (interview with Margarita Garrido, as cited in Chavarro, Orozco, Ruiz y Villaveces, 2007).

Although conceptual expectations of the information system were high, in practice its main use has been related with the measurement and classifica-

tion of research groups[4]. The Colombian RES can be considered strong and competitive according to the classification proposed by Whitley (2007) and Gläser (2007)[5]. Although it's not being used directly for the allocation of public funds, it has become an important reference for comparisons based on research quality in Colombia.

Advocacy coalitions

In order to identify shared views of the measurement of research groups I'll present a brief description of the main actors involved in the subsystem, and some facts (where documentation is available) that can help to understand their belief systems about the Colombian RES.

• Colciencias

Colciencias is the governmental agency in charge of research policy in Colombia. Colciencias has done many efforts to develop the necessary infrastructure for a RES. First, a definition of research groups had to be constructed. A research group is defined as a

> "set of people who meet [sic] to conduct research on a given subject , formulate one or more problems of interest, draw a strategic plan for long or medium term to work on it and produce some results of knowledge about the issue in question. A group exists as long as it produces tangible and

verifiable outcomes as a result of projects and other research activities conveniently expressed in a plan of action (projects)" (Colciencias, 2006a:3, translation mine).

Second, a technological artefact had to be developed in the form of a software. This software implemented the concept of research group by translating it into a digital form that has to be filled by researchers. That translation has its own story and the details will not be addressed here. Third, an index to measure groups in terms of outputs was designed and implemented. This index consists of a set of components that try to synthesize three dimensions of the activity of a research group: production of knowledge, formation of new researchers and knowledge dissemination. The last development of the index called Scienticol is formally expressed as a weighted sum of factors:

Scienticol = 5*NC + 3.5*NCA + F + 0.5 * D

Where NC stands for new knowledge and is composed by the weighted sum of articles, patents, books, chapters, spin-offs, norms; NCA stands for new knowledge type A, which includes the same type of products in the NC, but just counts those records that fulfil the metadata to be considered of quality (In research papers, for example, those articles that are published in journals with a high impact factor); F stands for formation, and is composed by theses and courses derived from a

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4. For a detailed review of the social construction of the concept research group and the ICTs used for its representation from 1991 to 2006 see CHAVARRO, OROZCO, RUIZ and VILLAVECES, 2007.

5. Strong RES are "transparent, public, and have significant consequences for funding." (GLÄSER, 2007:250). Regarding competitive RES, "when information about university research performance is publicly available, transparent and comparative, universities are in a competitive situation because they depend on public opinion, students' choices, and government funding, all of which may be affected by this information" (GLÄSER, 2007:254).

group's research projects. D stands for dissemination, and includes consultancy, technical services, text books, conferences. The detailed explanation of the calculation will not be addressed here (see Colciencias, 2008), but from this general definition it can be seen that the index regards production of knowledge as the more valued activity of a research group.

fourth, the involvement of people and institutions (as they are responsible for feeding the system with data) had to be promoted. At first the inclusion of a software as a replacement for peer-review evaluation was the source of a controversy, but nowadays the discussion is being focused more on measurement issues (see Chavarro, Orozco, Ruiz and Villaveces, 2007).

According to the measurement that is generally done annually, since 2005 Colciencias is classifying research groups in a hierarchical way. The most recent classification is A1, A, B and C and is based in the Scienticol index being A1 the groups with more validated production in terms of quantity and quality. The categories are defined by thresholds, and the implied expected output is a pyramid in which there are more groups at the base (C) and less groups at the top (A1).

On government side the number of research groups and their quality has been seen as an indicator of administrative performance. This can be seen in some reports presented by the institution to the government. For example, in a document called Balance de gobierno 2002-2010 (Colciencias, 2010) it is said that "in the present

3,746 recognized groups exist in Colombia, while in 2002 there were just 544; This represents an increment of 588% " (translation mine, emphasis added). In a governmental web page[6] it can be seen that the number of research groups is one of the indicators to assess Colciencias.

This is related to the fact that the measurement of research groups in Colombia in political terms is driven by an effort to tell a coherent story about development much in the way of the OECD. Colciencias has been trying to build time series to show the progress in the number of research groups, but as changes in the classifications have been done it is difficult to give a linear picture as will be shown in the next example.

In 2006 the sixth call for group measurement was held. The results of June 2006 showed an increment in research groups, and the measurement produced the following results:

Percentage of research groups in each category after measurement*
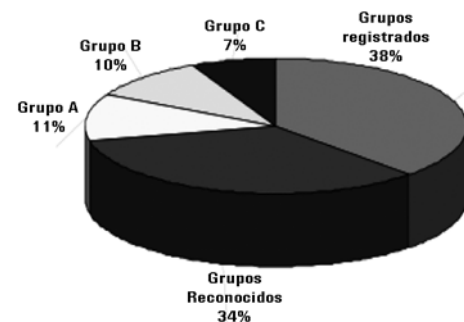
Source: Colciencias, 2006b.
*A= high quality research groups, B=medium quality research groups, C=low quality research groups, reconocidos= groups that didn't reach the minimum threshold for being categorised, registrados=records of research groups in the database not classified because they don't meet the conditions to be considered research groups, mainly publications.

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6. SIGOB: http://www.sigob.gov.co/ind/indicadores.aspx?m=678, last visited 28th of december 2010.

Colciencias proceeded to show time series as in the past, evidencing progress in terms of research groups. Here is a chart that portrays a time series of the number of research groups in categories A, B and C since 1991. The Y axis is the number of research groups and the X axis the year.

Evolution of research groups measured since 1991 (translation mine)
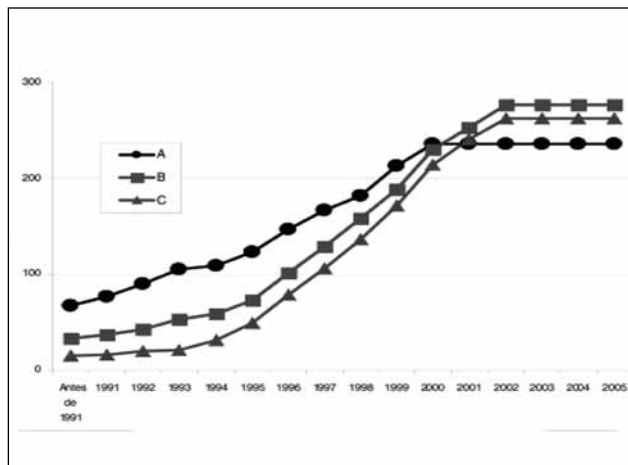
Source: Colciencias (2006, p.8)

The graphic trace results of measurements done since 1991. It can be seen that in that year there were more research groups in the category A, less groups in the category B and fewer in the category C. All the lines augment at a different pace until the point where they almost merge in 2001. After that year a radical change can be seen, being B the most populated category, C the second one and A the third. The number of groups in each category remains constant until 2005 and if the results of 2006 were added, a radical change could be seen again, C being the less populated category and A the most.

The graphic is confusing because of the lack of explanation of the elements that allow interpretation[7]. In some of the years shown above there have been different criteria to measure groups and even the categories A, B and C were not used. All these went unnoticed by Colciencias, but soon researchers started questioning the results, as will be shown in subsection 4.1.5.

* **The Colombian Observatory of Science and Technology (OCyT)**

The OCyT is a non-profit private institution that is funded by a board in which many private and public universities take part, as well as governmental agencies (including Colciencias). Its main activity is to give quantitative and qualitative representations of science, technology and innovation in the country. It also gives support to policy formulation and evaluation and has developed research projects on policy analysis and social studies of science and techonology. Regularly the OCyT publishes a quantitative report analysing expenditure on STI, research capabilities, scholarships, bibliographic production, among others.

One of the key statistics that the OCyT produce is the number of research groups in Colombia. For this purpose it has developed its own concept of research group, while using the same data as Colciencias. While the definition of a research group is taken from Colciencias, The OCyT classifies research groups into two categories, active and inactive. Active groups are those who can give evidence of scientific outputs (mainly

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7.   GLÄSER and LAUDEL (1997) have called it lack of "modalities", following latour and wolgar's (1986) concept.

research papers, books, chapters and patents) in the last two years prior to the moment in which the measurement is taking place (OCyT, 2006:19). Because of this classification, the number of research groups given by the OCyT differs from the one given by Colciencias.

• **Universities**

Statistics about the number and quality of research groups produced by Colciencias has become very important for universities. Although it's clear from the definition of research groups that they are autonomous units, a kind of synecdoche has transferred the aggregated results of research groups to the institutions they belong to. Namely universities use it as a means to attract students (advertisements in web pages and newspapers, for example) and to compare themselves with other universities (books, reports, news).

• **Scientometricians**

Scientometricians in Colombia constitute a small community of researchers with academic interests in quantitative representations of science and technology. Usually they are part of a university or a research center, and some of them participate actively in international publications.

Scientometricians have been using the database of research groups not only to check the progress of research in Colombia but also to question the current way of measuring and sometimes propose different approaches.

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Two main topics have been addressed in publications. The first has to do with the possibility to pass from a production-based to a productivity-based RES that takes into account the differences between disciplines. The second is the deeper analysis of the classification results being achieved by the current Index, applying a more international perspective.

In respect to the first topic, non-parametric efficiency frontier techniques have been proposed as an alternative to the homogenisation of disciplines (social sciences being measured the same way and compared to basic sciences) and to the problem derived from the difficult decision on the weighting factors for types of outputs (how many points for an article, book, etc) (Restrepo and Villegas, 2007; Ruiz, Bonilla, Chavarro, Orozco, Zarama and Polanco, 2010).

Regarding the second topic, it has been shown that many research groups in the top category of the classification don't comply with

international quality standards. For example, it was found that there are groups in the top category with no international articles, which raise doubts about their visibility; the average production per researcher in 36 out of 135 groups was less than an article in 6 years; 25 groups had most of their production published in journals of their own institution, and 56 had more than 70% of their books published in editorials of their own institution, which is an indicator of endogamy (Chavarro, Orozco and Villaveces, 2010). The question posed is what is being understood as a top research group of scientific quality according to the current measurement exercise.

• Researchers

Researchers are the people being measured by the RES. As now the Colombian RES has almost 20 years of development, they have gained knowledge and are becoming actively involved in the discussions.

In 2006, for example, the results of the measurement were questioned. The criteria for categorisation were analysed (Duitama 2006). One of the most salient inconvenient which became popular at the moment was the fact that the categorisation was producing an inverted pyramid

shape that did not fit with the perceptions of researchers, i.e. that there must be less A research groups than C:

> "From the results of the call for measurement 2006, see Table 5, we have taken a number of universities representative of the system. Note that 47.52% of the groups that were presented to the measurement were classified as A, 31.13% were classified in category B and 21.35% were classified as C. This means that the intended ranking produced an inverted pyramid on this measure."[8] (Duitama, 2006:6), translation mine, emphasis added)

Duitama's opinion about the inverted pyramid is representative of public opinion. Criticisms have appeared here and there, in universities and even in cultural magazines. Some texts that appeared later confirm this:

> "Regarding research groups, for which Colciencias has a hierarchy similar to that of the magazines, the situation is a bad joke. In the case of social sciences and humanities, for example, the ranking was until recently an inverted pyramid: most of the groups were in the highest levels of quality."[9] (Arango, 2009)

Exaggerations abound, like this one that appeared in a university's magazine, that calls the situation even a phenomenon:

> "In other words, this situation that occurred with the 2006 Call has been viewed as the phenomenon of the inverted pyramid, in which the upper ca-

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8. Original text: "De los resultados de la convocatoria de medición 2006, véase tabla 5, hemos tomado un buen número de universidades representativas del sistema. Obsérvese que el 47.52% de los grupos que se presentaron a la medición fueron clasificados como A, el 31.13% fueron clasificados en categoría B y el 21.35% se clasificaron como C. Lo anterior significa que la pretendida jerarquización arrojo una pirámide invertida en esta medición."

9. Original text: "En los grupos de investigación, para los cuales Colciencias tiene una jerarquía similar a la de las revistas, la situación es un mal chiste. En el caso de las ciencias sociales y humanas, por ejemplo, el escalafón era hasta hace poco una pirámide invertida: la mayoría de los grupos estaba en los niveles más altos de calidad."

tegory had most of the groups – over 800, which is false in the world of science."[10] (Controversias, 2009:6, translation mine)

The important issue to be highlighted here is not the accuracy of the above opinions, but the fact that users are involved in the discussion about the RES and are using media to express their concerns. Colciencias have been receptive and has modified the measurement model many times. The next section will show that, however, the strategy adopted is not allowing to promote participation in an open system.

Policy change

One possible representation of the subsystem, according to interests proximity could be the following:
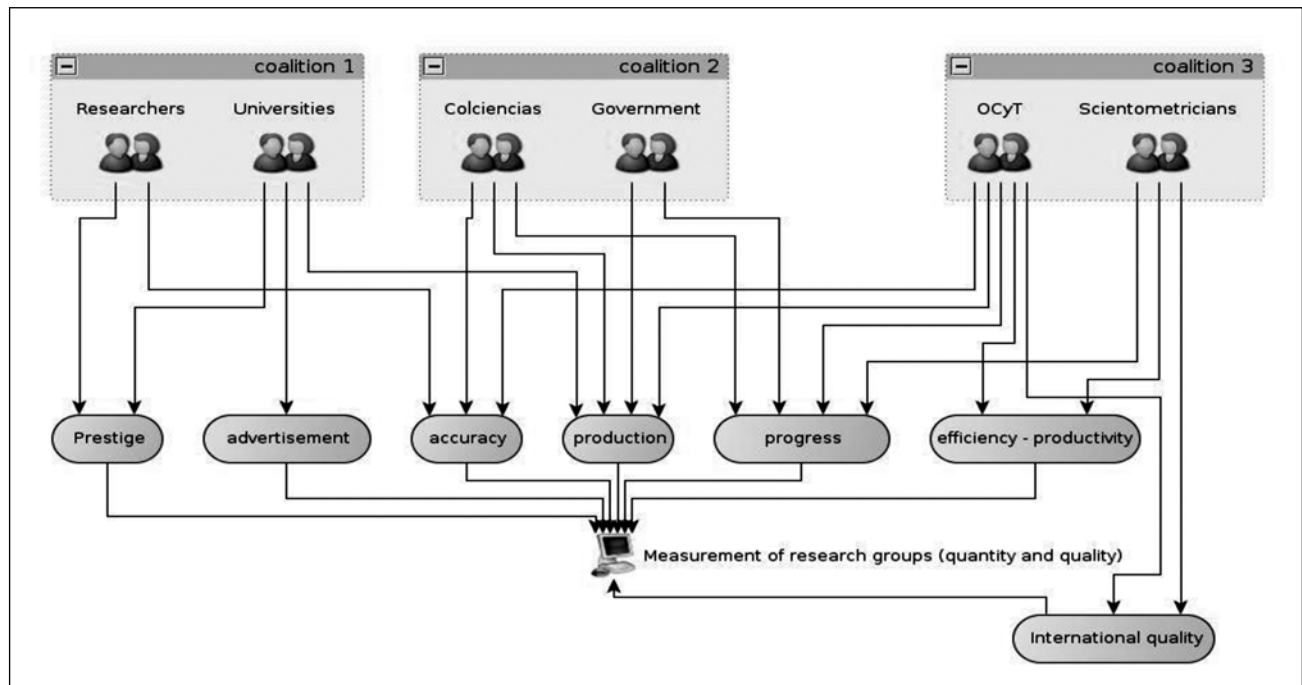
Other representations are possible as well, but the key point here is to highlight that there are shared interests that make difficult to separate coalitions. As discussed before, the core belief system is shared and the debates about measurement confirm the interest of different groups in the development of the RES.

However, as has been seen, discourses and actions most of the times make a clear separation between evaluators and evaluated, and although it is useful to state different positions about the same object, it is also necessary to implement spaces in which discussions drive to better solutions and agreements.

10. Original text: "En otras palabras, esta situación, que se produjo con la Convocatoria 2006, ha sido visualizada como el fenómeno de la pirámide invertida, en la que la categoría superior tenía la mayoría de los grupos –más de 800–, lo que constituye un hecho incorrecto en el mundo de la ciencia."

Until now, controversies have been resolved by means of experts gathered by Colciencias. For example, in a document that explains changes to the Scienticol index (Colciencias, 2008) 14 references to experts are found, without telling the reader who the experts were, what questions did they answer, etc. Although experts have been able to adjust the most salient parts of disagreements, core adjustments and change need to be addressed in a different way.

Openness and creation of spaces in which actors involved can participate and shape policy are needed. The elements that usually are necessary for policy change are present, and it's up to the scientific community and governmental institutions to foster mechanisms to facilitate change based on policy-oriented learning.

There is a need not only to continue fixing the measurement model, but also to summarise the lessons learned, compare the experiences of past calls, give more voice to the community concerned, open discussion rather than closing it, provide the means for discussion, ask again basic questions like why we are doing measurement and what other options we can provide to enhance the information system in order to give more value to users.

Conclusion

In this paper policy change in the Colombian RES was analysed using the ACF framework. ACF is suitable for addressing complex subsystems. Concepts like belief system, policy subsystem, advocacy coalition, policy-oriented learning and internal shock proved to be useful to analyse what

The decision to use the framework for the specific topic of research groups' measurement has the consequence that some external influences like socio-economic and cultural changes and contrasting general core beliefs cannot be seen. However, still public opinion and internal shocks (disagreements within a coalition) can be examined, which allows the researcher to present the policy process in terms of belief systems that are in dialogue.

can be called a policy micro-system: The Colombian RES of research groups.

The decision to use the framework for the specific topic of research groups' measurement has the consequence that some external influences like socio-economic and cultural changes and contrasting general core beliefs cannot be seen. However, still public opinion and internal shocks (disagreements within a coalition) can be examined, which allows the researcher to present the policy process in terms of belief systems that are in dialogue.

The Colombian RES can be seen as a "debatable device" that is developed and modified by the interaction between different stakeholders. Colciencias, researchers, the OCyT, scientometricians and universities were identified as key stakeholders which interests can be seen in public documents.

Discourses served to characterise stakeholders interests, opinions and actions, and that characterisation was used to identify interactions and the kind of debates being held within the RES of research groups. Then the mechanism used to make policy change within the subsystem was described, and it was proposed that the current way of solving disagreement does not allow to change structural belief systems. However, the necessary elements to start a policy change in terms of a revision of core beliefs and policy objectives are given.

More than continue fixing the measurement model by relying on experts, what is needed is to foster openness and participation and create spaces in which discussions can guide to concrete actions. At this time, stakeholders have accumulated knowledge that can be used to build collectively, rather than continuing to see the development of the RES from one side.

Although how to foster participation and openness was not addressed in this paper, it is an issue that deserves attention by researchers concerned with the Colombian RES. Once the community realises that building collectively can be a gaining for all sides those studies and activities will be carried in order to sum efforts towards integration.

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