

Selection of research proposals through peer review at the São Paulo Research Foundation (FAPESP)¹

Abstract

FAPESP (São Paulo Research Foundation) is a public foundation, funded by the taxpayer in the State of São Paulo, Brazil, with the mission to support research projects in higher education and research institutions, in all fields of knowledge. São Paulo has a population of 41 million and generates 35% of Brazil's GNP. The constitution of the State establishes that 1% of all state taxes belong to the foundation and the government transfers these funds on a monthly basis. The stability of the funding source and the autonomy of the Foundation allow for an efficient management of the resources that has had a sizable impact: while São Paulo has 22% of the Brazilian population and 30% of the scientists with a Ph.D in the country, the State responds for 50% of the country's scientific articles published in international journals.

The Foundation works closely with the scientific community: all of the about 18,000 research proposals received annually are peer reviewed with the help of area panels composed of active researchers. The average time between receiving a proposal and informing the scientist of the decision in 2010 was 78 days.

This article describes FAPESP's peer reviewing system, covering information about reviewing time, project cost, cost of the reviewing process, conflict of interest policy and success rates.

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Introduction

At the beginning of the 20th Century, science in Brazil was a craft, carried out by lone researchers who had the means to study abroad and to set up their own labs. Higher education institutions were scarce, focusing on areas such as law, medicine and arts, and scientific research was rare. As happened in Europe and the US, it was only after the Second World War that government took up an active role as a science funder. CNPq, Brazil's federal council for scientific and technological research was established in 1951. The idea of a research funding agency in São Paulo was sketched out in 1942 and was foreseen in the 1947 State Constitution, although FAPESP was only formally established in 1960, with activities beginning in 1962.

When its activities began, the government granted the Foundation a US\$ 2.7 million endowment and a budget of 0.5% of the State's total tax revenue. The 1989 State Constitution raised the amount to 1% of the State's ordinary income, handed over monthly to the Foundation. Over time, the funds were managed with care and converted into profitable assets. This guarantees one of FAPESP's legal requirements, which is the stability of regular funding lines for the promotion of research. It also allows the proposition of special innovation programs, with a view to boosting new areas of research or dealing with specific difficulties within the State of São Paulo Research System. FAPESP's statute limits the overheads to a maximum of 5% of its budget.

In nearly 50 years of operation, FAPESP has awarded over 45,000 fellowships and 35,000 research grants². FAPESP is an agile, autonomous organization, managed by specialists both highly qualified and directly committed to the Foundation's objective of promoting scientific and technological R&D in the State of São Paulo.

FAPESP has two main management levels. The Board of Trustees establishes the Foundation's general guidelines and is in charge of high level management issues, investments and major scientific policy decisions. The board consists of 12 members elected for six year mandates. Six trustees are freely chosen by the State governor and six are selected by the governor from triple lists elected by the State universities and public/private research institutes in Sao Paulo. The Executive Board, or Technical Management Board, is the executive branch of the Foundation, formed by the President, the Scientific Director and the Management Director. Each one is chosen by the governor, based on triple lists provided by the Board of Trustees, and has a renewable three year mandate.

1 The structure of the Scientific Directorate

FAPESP received approximately 17,964 proposals in 2010. Proposals are submitted by researchers linked to higher education or research institutions, public or private, in the State of São Paulo. Generally speaking, the

² For information on grants and fellowships funded by FAPESP, please access <http://www.bv.fapesp.br/en/>

proposals are divided between research grants and fellowships. The grants and fellowships are awarded by FAPESP to individual researchers, not to research institutions³.

A proposal, according to FAPESP, is a group of documents usually composed of a research project, the budget required for its execution and the academic background of the proponent. When the proposal is for a fellowship, the candidate's academic reports must also be included. According to FAPESP, in the latter case, the researcher who acts as advisor or supervisor is considered responsible for the proposal.

Within FAPESP, the Scientific Directorate is in charge of evaluating each proposal. Evaluation involves assessing the documents which comprise the proposal in order to reach a conclusion on whether to financially support the request. In order to reach this decision, the Foundation applies a system of multiple levels, including Area Panels, reviewers and the Supervising Panels.

It is important to note that FAPESP's Scientific Directorate analyzes not only proposals, but also ongoing project reports. Usually on an annual basis, researchers with FAPESP grants or fellowships have to hand in progress reports, including a final report at the end of the project. These are assessed and the researcher is informed of the approval or non-approval of the report. In extreme cases when the researcher repeatedly fails to have a progress report approved, the grant or fellowship may be canceled.

The process of analysis and selection of proposals involves six different groups:

- a) **Area Panels:** committees constituted by senior researchers, active within the State of São Paulo, organized according to areas of knowledge or according to one of the Foundation's programs (item b). Each Area Panel has between 1 and 20 members. The size of a panel basically depends on the number of proposals submitted to each area. FAPESP currently has 14 Area Panels with over 95 members⁴. The Area Panels meet at FAPESP once a week, where they look at the incoming proposals and select one or more reviewers for each proposal. From 2005 onwards, some of the larger Area Panels were divided into Tables, according to sub-areas of knowledge. They meet on the same day and room, but sit at different tables, interacting with each other whenever necessary. The members of each panel are published on the Foundation's website. However, Area Panel members are not allowed to discuss any proposal with any other person outside the panel, including the proponent. There are specific mechanisms within the Foundation for clarifying any doubts the proponent may have or to listen to researchers from the scientific community. Every researcher who wishes to talk about their proposals or ongoing projects can schedule an interview with a member of

³ The researchers must be associated with a higher education or research institution in the State of São Paulo. The proposal must also include documents whereby the institution commits itself to complying with the requested grant or fellowship.

⁴ FAPESP currently has 14 Area Co-ordinations: Agronomy and Veterinary Sciences (9 panel members); Architecture and Urbanism (3); Astronomy and Space Science (1); Biology (10); Chemistry (4); Computer Science and Engineering (3); Economics and Administration (2); Engineering (12); Geosciences (4); Health Sciences (21); Humanities and Social Sciences (16); Mathematics and Statistics (3); Physics (4), Research for Innovation (4). Total: 96

the Supervising Panels (item d) or can write directly to the Scientific Director. The Area Panels do not make decisions regarding proposals: after reading the review on a specific proposal, issued by the reviewer chosen by them, they issue a recommendation for the Scientific Director, which is first passed on to the Supervising Panels.

- b) **Program Panels:** committees of senior researchers, distinguished in their areas, which support the Scientific Directorate by supervising the Foundation's special programs⁵. The work is similar to that of Area Panels. Some members of Program Panels are also Area Panel members or are Area Panel Coordinators. Some Program Panels get involved in merit analysis while others are active in the coordination and articulation of the programs.
- c) **Reviewers:** active researchers, based in the State of São Paulo, in other Brazilian States or abroad. Researchers who receive grants or fellowships from FAPESP commit themselves to issuing reviews for FAPESP whenever requested. The level of qualification needed in order to become a FAPESP reviewer varies according to the type of proposal being analyzed. With a view to training reviewers, FAPESP can request reviews from post-doc researchers with FAPESP fellowships, who are called on to analyze less demanding proposals, such as Scientific Initiation fellowships (for undergraduate students). High level requests, however, such as Thematic Projects, are only reviewed by senior researchers. FAPESP's database of reviewers has approximately 15,000 researchers, made available to the Area Panels. In FAPESP, proponents do not suggest reviewers upon submitting their proposals. Reviewers, however, can suggest other names when unable to accept a review request, and the suggestion will be analyzed by the Area Panel.
- d) **Supervising Panels:** smaller committees of senior researchers, frequently former members of Area Panels. Their names are also made available on FAPESP's website. Currently, there are eleven members of the Supervising Panels⁶.
- e) **Scientific Directorate Management:** sector in charge of all the operational procedures. This work is carried out by technicians, supervised by the Manager of the Scientific Directorate. This position is occupied by a person with a higher education degree. Divided by areas, the employees supervise each proposal as it goes through the necessary channels/processes.
- f) **Area Directors:** FAPESP staff with an academic background, preferably with a post-doctoral degree. They supervise and accompany the proposals in each major area of knowledge, interacting with the Area Panel members and coordinators, Management and the Scientific Director. They also

⁵ As of October 2011, FAPESP's current programs are Biota (biodiversity); Research on Technological Innovation; Cepid (Research, Innovation and Dissemination Centers); Public Education; Public Policies; TIDIA (IT in the development of advanced internet); BioEn (bioenergy); ANSP (academic network); Climate Change.

⁶ The members of the Supervising Panels also work in groups and are divided according to the following areas: Humanities and Social Sciences; Life Sciences; Hard Sciences & Engineering; Research for Technological Innovation.

liaise with the scientific community in some specific tasks, such as helping out in the development of proposals, clarifying doubts and giving out information. Under the Scientific Director, they assist with the development of the procedures for the analysis and selection of proposals and on collaboration with other institutions.

2 Analysis and selection of research proposals

The procedure for the analysis of research proposals by the Scientific Directorate includes 6 steps though in some cases there might be some overlap between steps. The steps are:

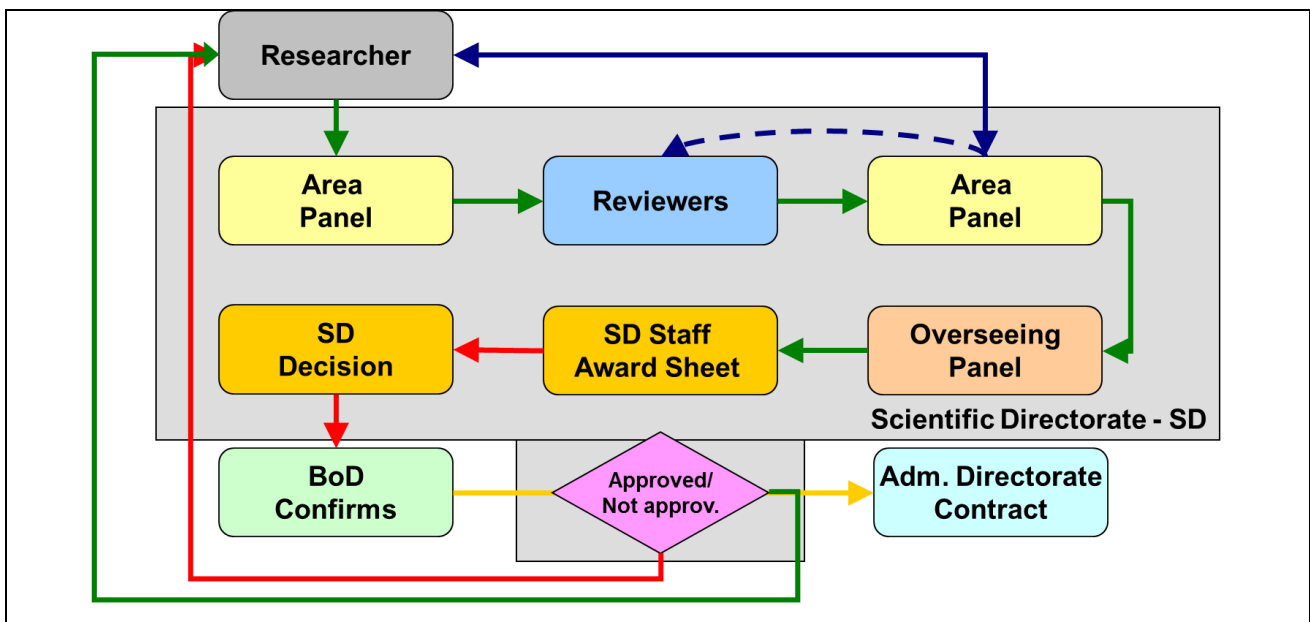


Figure 1. Procedure for the analysis of research proposals in the Scientific Directorate

- The proposal goes to the Area Panel, which selects the reviewer(s) who will evaluate the proposal.
- Analysis of the proposal by the reviewer(s) who issue reviews that will guide the Area Panel's recommendation.
- The Area Panel analyzes the proposal in detail, now accompanied by the review(s) issued by the reviewers. Based on the reviews and on their analysis of the proposal, the Area Co-ordination issues a recommendation for the Scientific Director.
- The Supervising Panel analyzes the proposal, verifying the consistency between the Area Panel's recommendation, the review(s) and FAPESP regulations.
- The staff at the Scientific Directorate prepares the process award sheet, with a summary of the recommendation by the panels including the approved budget (if approved), the duration, dates for scientific progress reports, dates for presenting reports on expenses and possible requests for further documentation.). SD staff also prepares an unidentified transcript of the review.

- f) The Scientific Director analyzes the proposal, based on the recommendations of the Area Panel Coordination and Area Panel, the review(s) and issues the Scientific Directorate's decision.

The Scientific Directorate's decision is sent for ratification by the Board of Directors (BoD). If the proposal is approved, it is then sent to the Administrative Directorate for preparation of the grant/fellowship contract. If the proposal is not approved, the documents are filed in the Foundation's archive. In both cases letters are sent informing the researcher of the decision, including the full transcript of the reviews that based the decision.

The five steps that make up the Scientific Directorate's analysis are detailed below.

2.1 Selection of reviewers

The choice of the reviewer(s) is one of the most delicate decisions made during the analysis of a proposal. The Area Panel must analyze and understand the proposal in order to select the reviewer(s). The reviewer(s) must be active in the area and have the greatest scope in the field of the proposal. Potential reviewers are listed in FAPESP's database. Records on reviewer include information such as the number of reviews issued in the last 12 months (there is an effort to avoid excessive concentration of requests to the most efficient reviewers) and the average time each reviewer takes to issue a review (another effort is to avoid "slower" reviewers when the proposal has an unchangeable starting date, such as grants for participation in scientific meetings or the organization of events). An important aspect of this choice is the Area Panel's knowledge of the scientific community in that specific area of research, always trying to avoid known conflicts and other idiosyncrasies.

The Area Panel must follow FAPESP's rules for selecting reviewers, choosing a new name if one or more of the following situations are identified:

- a) Current or past participation in the project subject of the proposal;
- b) Regular collaboration in research activities or joint publications in recent years with any of the main researchers involved in the proposal;
- c) Advisor or Supervisor/Student relationship, present or past, between reviewer and proponent;
- d) Reviewers with commercial interest in the research being proposed;
- e) Family ties between the reviewer and any the researchers involved in the proposal;
- f) Any former relationship with the researchers involved in the proposal that can be perceived as impeding an unbiased review.

FAPESP regulations establish that fellowship proposals are appraised by one reviewer. Most types of research grants are also sent to only one reviewer, unless the requested budget is over R\$ 300,000 (approximately US\$ 170,000 in October 2011). Exceptions are proposals for Thematic Projects or Young Researcher, always sent to at least three reviewers.

2.2 Analysis of the proposal by the reviewers

The proposal is then sent to one or more reviewers, who analyze the proposal and issue reviews, which form the basis of the Area Panel's recommendation.

In most instances FAPESP uses mail reviews. For special cases, such as FAPESP's Program for Innovative Research in Small Businesses, there are panels of reviewers that come to the foundation. In any case the reviewers receive the proposal by mail or on-line, depending on how the proposal was submitted to FAPESP. They receive a form with specific questions directed to the type of funding being requested, along with instructions on how to complete it. They are requested to issue the review in up to four weeks. In some funding lines with a set starting date such as grants for participation in scientific meetings, for the organization of scientific meetings and for visiting researchers, the review is due three weeks after being sent.

The Foundation expects the reviews to be objective and substantiated, assessing the proposal's characteristics such as quality, originality, impact in area of knowledge, the team's qualification to satisfactorily carry out the proposal and budget adequacy. The reviewer is not expected to decide if the proposal should be funded or not, as the decision befits FAPESP. The review must allow the Area Panel, the Area Panel Coordination and lastly the Scientific Director to reach a well informed decision regarding the adequacy of funding the requested grant.

Reviewers who are researchers in the State of São Paulo issue reviews for free. Their reward is the possibility of presenting proposals to FAPESP. Reviewers from other Brazilian States or countries are paid a symbolic fee. FAPESP's database of reviewers has currently 15,000 names, of which 8,215 issued 22,313 reviews in 2010.

2.2.1 FAPESP's commitment to confidentiality of the reviewer and the reviewer's with FAPESP

International experience as well as FAPESP's experience shows that this system's effectiveness essentially depends on the preservation of the reviewers' anonymity. The degree of independence and objectivity of peer reviews is proportional to the degree of reliability of the non-disclosure guarantee provided by the agency as to the identity of these reviewers. Thus, by means of a decision taken by the FAPESP's Board of Trustees, every request for a review is accompanied by an express commitment to preserve his/her anonymity.

Reviewers also commit to the non-disclosure of the content of their reviews, accessible only to reviewers and sectors of FAPESP actively involved in the process of evaluating the requests, as well as the proponent, who receives an unidentified transcription. A circle of trust is established between FAPESP and its reviewers that cannot be broken under any circumstance.

2.2.2 Monitoring time spent on issuing reviews

The time a reviewer takes to issue a review is an essential part of the total amount of time spent evaluating proposals. It is worth noting that the analysis of the proposals demands careful examination of various

documents. Frequently the documents that make up a proposal have dozens of pages. Commonly the reviewer needs to consult the literature indicated in the proposal or other databases, for example. At the same time, the reviewers are active researchers and professors, with classes to teach, exercises to correct, department meetings and other committee meetings, research reports to prepare (frequently for FAPESP funded projects), students to oversee, so given their schedules it is not reasonable to expect them to find the necessary time to issue a report in less than a few weeks.

On average, the reviewers issue the reviews within the established time frame, but there are many cases in which the time frame is exceeded.

Figure 2 shows the distribution of time frames for an initial review to be issued by a reviewer. It can be noted that 75% of the reviews are issued in less than 40 days. There are also a few cases where the reviewers need 100 days or more to issue the reviews.

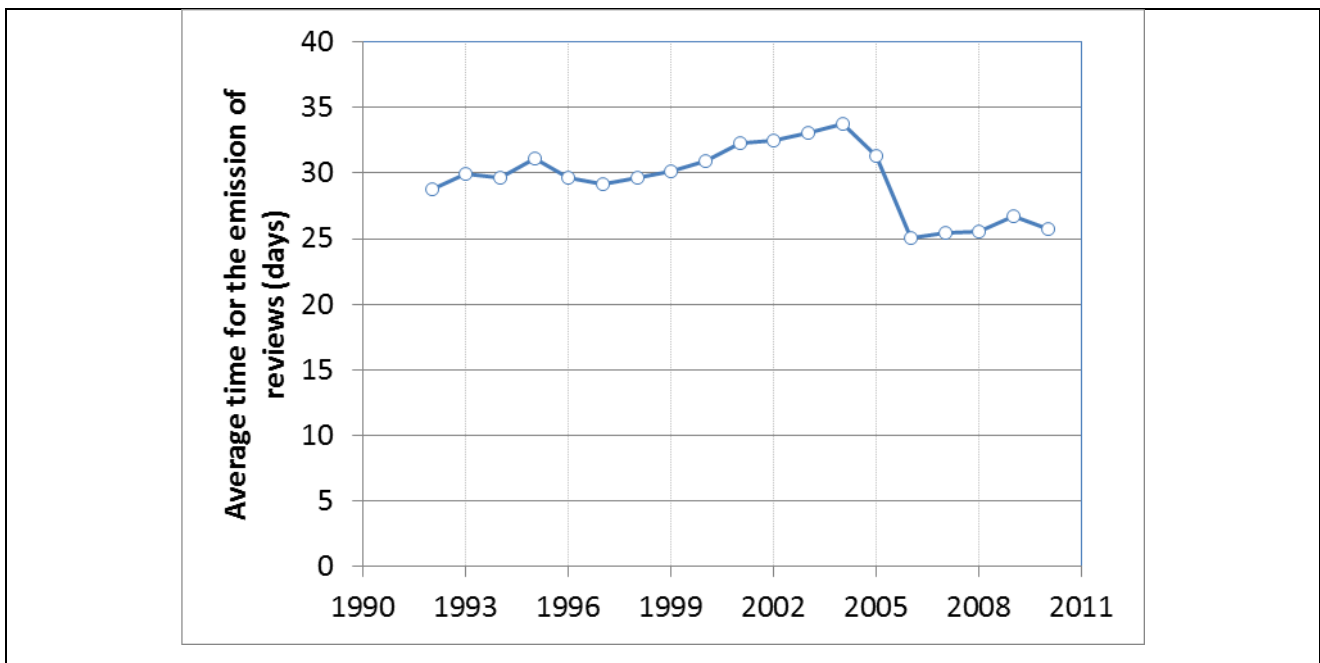


Figure 2. Average time for initial reviews issued from 1992-2010.

Figure 3 shows the number of reviewers used yearly for emitting Initial Reviews⁷ (IR) from 1992 to 2010. Currently, around 8,000 reviewers receive requests each year for the analysis of all proposals received by FAPESP. Each one issues on average 2.5 to 4 reviews a year. The average time frame for each IR to be issued is 33 days while for reviews of proposal Progress Reports (PR) the average time is 40 days.

⁷ FAPESP distinguishes the initial review, before the proposal has been granted or denied, and the progress reviews, when the reviewer who issued the initial review is asked to comment on the development of the granted proposal.

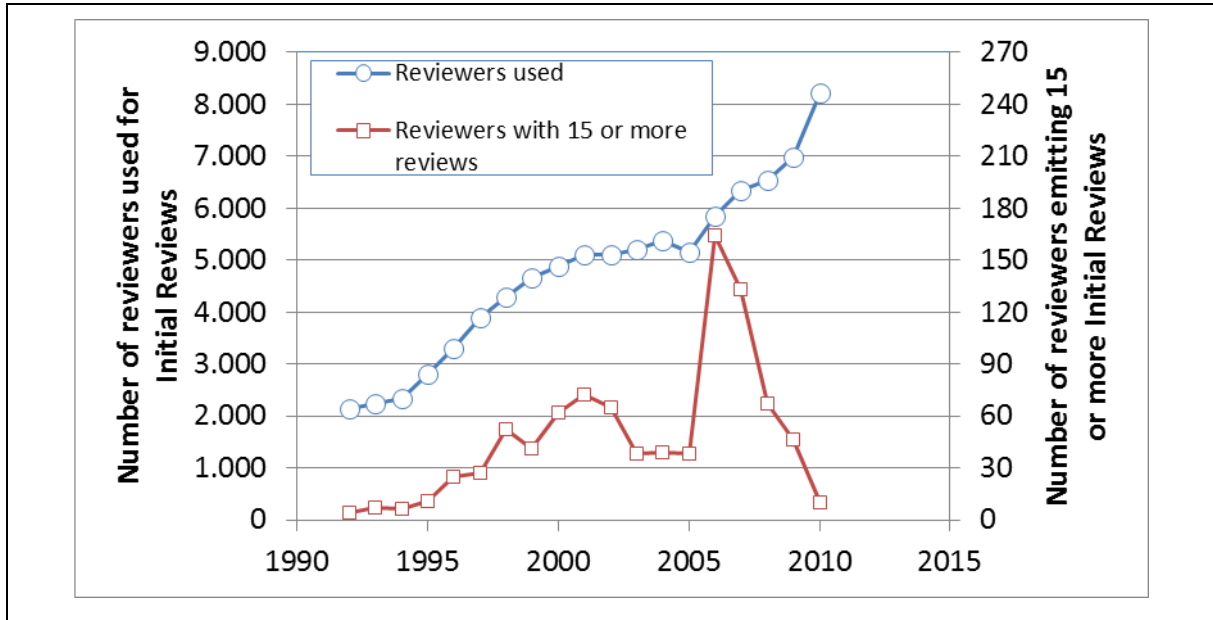


Figure 3. Number of reviewers used per year.

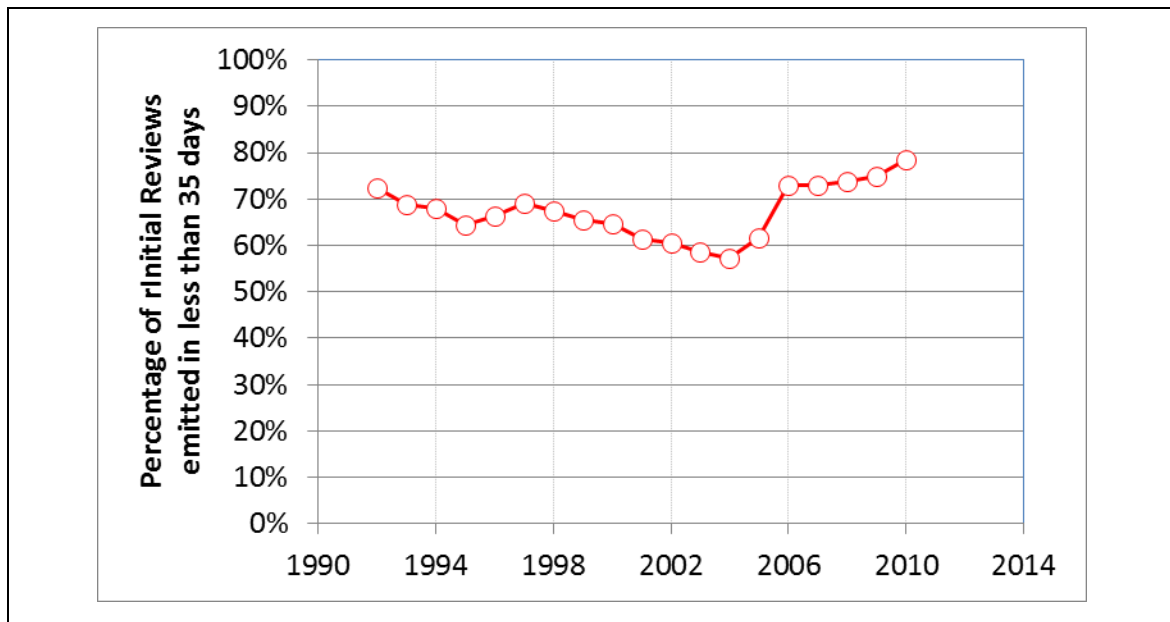


Figure 4. Percentage of initial reviews issued in less than 35 days.

Since 2006 the Scientific Directorate's Management keeps track of the proposals' time frame for each proposal, be they a paper version or submitted directly on line. As soon as the deadline of 4 weeks comes up, the system issues an automatic letter reminding the reviewer that his comments are due. One week later, if the review still has not been issued, a second letter is sent. If this is of no avail, the Area Directors step in to personally contact the reviewer, in order to avoid further delay and damage to the evaluation of the proposal.

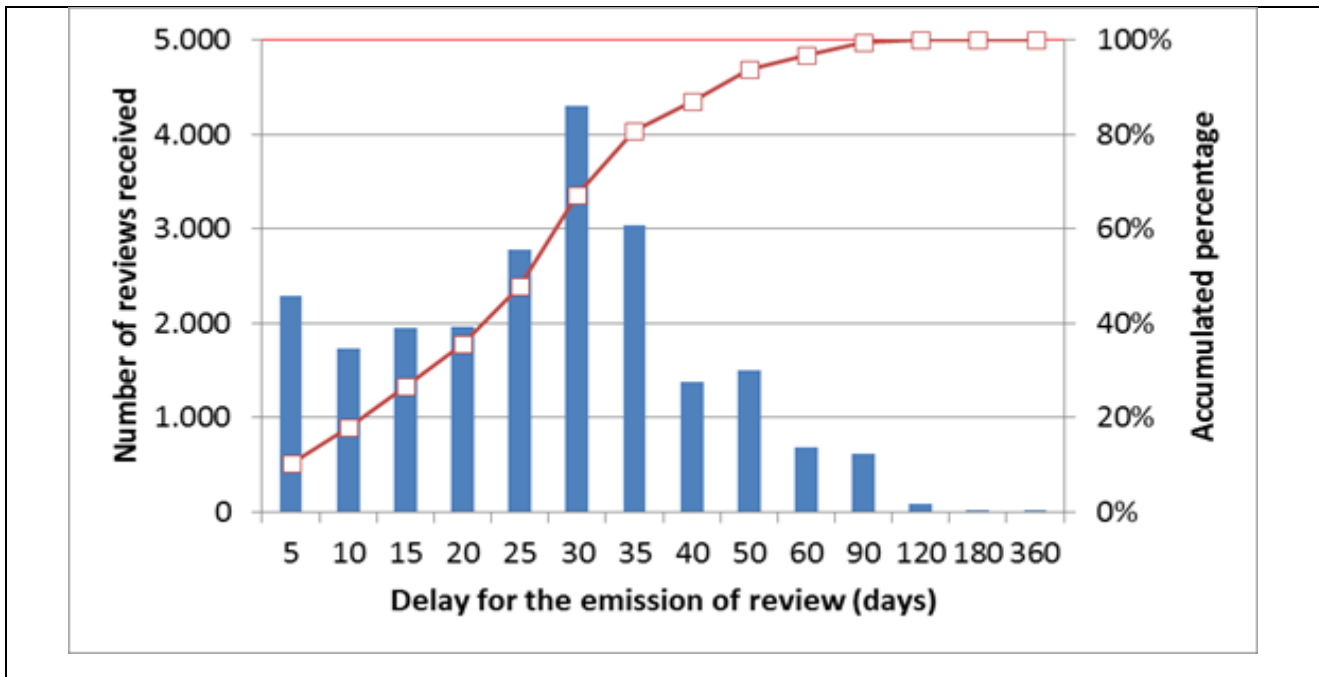


Figure 5. Histogram distribution of the number of reviews received classified according to the time for their emission; 2010.

2.3 Analysis of the proposal and the reviews by the Area Panel

Once the review or reviews have been handed in, the Area Panel must carry out a detailed analysis of the proposal, in order to issue a recommendation for the Scientific Directorate as to whether the proposal should be funded or not. This stage demands a significant amount of work by the Coordination as they must read and understand the project, the curricula and other documents, as well as compare the review with the proposal.

This analysis must be carried out through a collegiate, with at least two members of the coordination independently analyzing the documents and debating the conclusion with their colleagues. From 2002 onwards the establishment of annual quotas of post-graduate and post-doctorate fellowships has become necessary. Therefore, proceedings for analysis and selection of these fellowships necessarily include Comparative Analysis Sessions. Recommendations regarding grants for proposals for Thematic Projects, Young Researchers in Emerging Centers and Regular Research Awards requesting budgets over R\$ 300 thousand, as well as for all graduate and post-graduate fellowships are required to be made during Comparative Analysis Sessions, when all members of the coordination participate, analyzing and comparing the proposals. These sessions take place on a monthly basis, with the exception of Masters fellowships which are analyzed bi-annually.

If the Area Panel finds serious inconsistencies between the proposal and the review, analysis by a new reviewer may be necessary. In other cases, the proponent may be asked to send in more information, which takes place through a process FAPESP calls Diligence. When the requested information reaches FAPESP, it may be sent back to the reviewer for further analysis, depending on the type of information sought. Unfortunately, in these cases, there is a significant delay in the final decision on the proposal, which

increases if there are multiple reviewers. In order to only issue requests for more information when it is vital, any Diligence must be referenced to the Supervising Panel.

The Area Panel's recommendation must be conclusive and must include an assessment of the proposal's merit, itemized recommendation of the budget to be granted (when necessary) and the indication of a reviewer who will accompany the progress reports (when more than one was required for the initial decision).

2.4 Analysis of the proposal by the Supervising Panel

The Supervising Panel's role is to analyze each proposal, accompanied by the review(s) and the recommendation issued by the Area Panel, verifying the consistency between this recommendation, the review (s) and FAPESP's regulations. One important role of the Supervising Panel is to smoothen the differences between each area of knowledge's references and standards, whenever possible.

Members of the Supervising Panel also have the role of hearers in the Scientific Directorate. This is carried out through interviews with researchers who have doubts, suggestions or criticisms regarding FAPESP's activity. These interviews are held by the Scientific Directorate when all the other channels of communication between FAPESP and the researchers have been pursued unsuccessfully. They can also take place by initiative of FAPESP.

2.5 Preparation for submittal to the Scientific Director

After the recommendation by the Supervising Panel is ready the staff at the SD prepares the process for submittal to the Scientific Director. This preparation includes checking the consistency among recommendations by the reviewers, Area Panel and Supervising Panel, the preparation of the transcript of the reviews eliminating portions that might give away the identity of the reviewer as well as a thorough checking of the budget items recommended regarding consistency with FAPESP's regulations.

2.6 Analysis by the Scientific Director

With the recommendations by the Area Panels and Supervising Panels, the Scientific Director receives the proposals ready for the decision as to whether they should be funded or not.

When the recommendations issued by both Panels are consistent, the decision is practically automatic. Management verifies the necessary documents and also checks the review(s) and budget, which are sent to the proponent.

When the recommendations issued by the Area Panel and Supervising Panel differ, which happens infrequently, the Scientific Director must analyze the whole proposal. In some cases, a discussion with the Area Panel or Supervising Panel is called for. In others, the Scientific Director reaches a decision by the analysis of all the presented documents.

After the Scientific Directorate's decision is issued, the proposal is sent to the Technical Management Council to be ratified. Following ratification, the Scientific Directorate sends a correspondence to the

proponent(s), containing the Foundation's decision and review(s). If funding was approved, the documents are sent to the Management Directorate, which prepares the grant.

For denied requests, all proponents are granted the right to have the decision reviewed.

3 Requests for decision reviews

In all of FAPESP's regular funding lines, proponents are guaranteed the right to request a new analysis of their proposals or requests. This is called a "Request for Decision Review". In order for an efficient decision review, the request must follow the procedures specified by FAPESP:

In all cases, requests for decision reviews are sent to the reviewer whose review established the basis for FAPESP's decision. Therefore, it is important that the contestation of relevant items of the initial review be made in objective and technical terms, in order to be adequately analyzed by the reviewer.

In some requests for review of a decision the Scientific Directorate may decide to consult a second reviewer, but this is done only after the initial reviewer is heard. For this reason, the time frame for the analysis can be significantly larger than those regularly practiced by FAPESP.

When the proponent finds it fit to question the quality of the review or the adequacy of the reviewer, this must be done through a separate communication, directed solely to the Scientific Director, justifying his/her request that the proposal be sent to a different reviewer(s).

Through the requests for decision reviews, FAPESP makes room for dialogue between the reviewer and the proponent. In many cases, this dialogue leads to an initial decision being changed or to a reformulation of a proposal and subsequent approval of a modified version. This possibility is considered a quality factor in FAPESP's work. It is also an explanation for FAPESP's high approval rates: approximately 40% of all proposals are granted. The possibility of improving a proposal and re-submitting it to FAPESP increases its chances of eventually being funded.

It is also worth noting that proponents also have obligations towards FAPESP regarding the Foundation's method of analysis and selection. When presenting a proposal to FAPESP, the proponent explicitly states that he/she is aware of the method adopted for the analysis of proposals; and that he/she authorizes the proposal to be analyzed according to this method, agreeing it will be submitted to the analysis of researchers chosen by FAPESP, whose identity will remain undisclosed.

4 Time frames for analysis and selection of proposals

FAPESP has a great interest in quickly issuing decisions on submitted proposals. However, the Foundation's main commitment is to the quality of the method of analysis and selection. Thus, FAPESP has never introduced maximum time frames or regulation time frames, only average time frames for the analysis of requests in each line of funding.

“Total time frame for analysis” is made up of the steps described before, as well as the additional time allotted for associated administrative arrangements. By way of example, after the Area Panel nominates a reviewer for a certain proposal, the sector in charge must verify if the reviewer is available, check if there is any indication of conflict of interest and, when the proposal is submitted in paper form, it must be packaged and sent off to the reviewer.

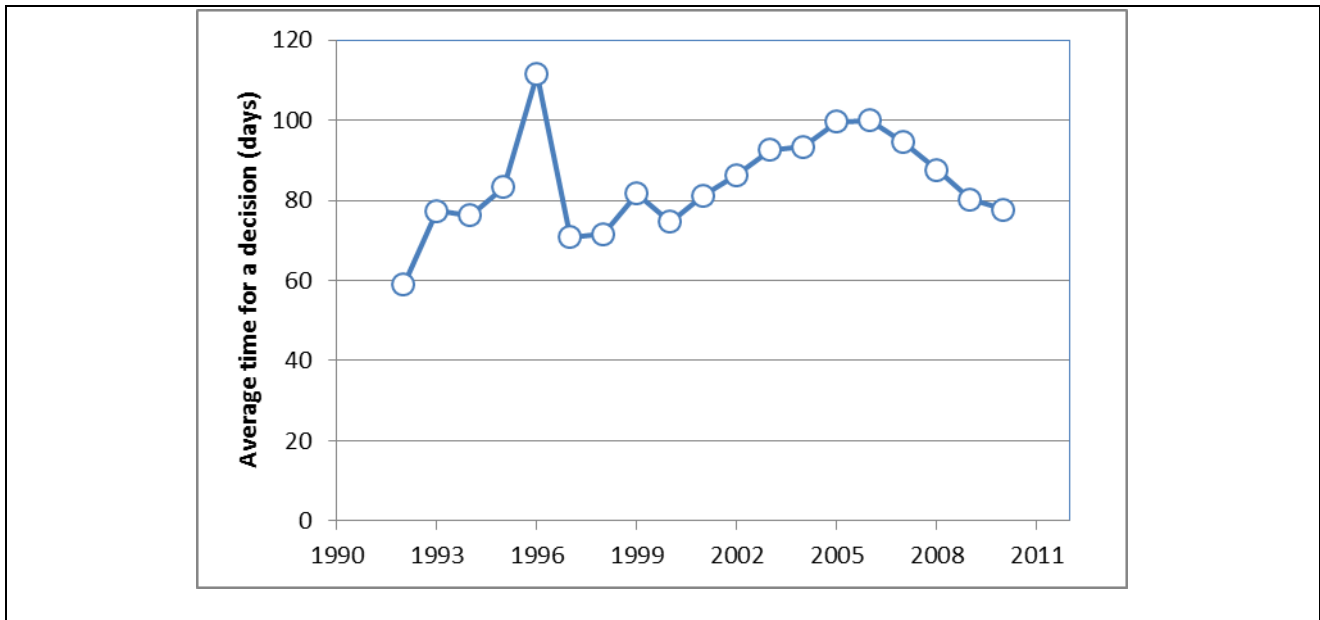


Figure 6. Average time between the reception of a proposal and the emission of a decision by FAPESP; 1992-2010.

The evolution of the yearly average time to analysis since 1992 is shown in Figure 6. It should be taken into account that in 1992 FAPESP analyzed 3,655 new proposals while in 2010 the number was 17,964. For the 17,964 new proposals received in 2010 the average decision time was 78 days⁸.

⁸ In 2010 FAPESP analyzed about 1,000 proposals for special programs for Multiuser Large Research Instrumentation and Books for Scientific Libraries that required longer times than usual. Discounting these proposals (about 800) the average time for the remaining 17,164 was 76 days.