

\* Original Article

## The Technology Foresight as a Strategic Planning Tool for the future construction of the Oswaldo Cruz Institute

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### Abstract

This paper presents the purpose of a prospective study as an essential tool for the Strategic Planning, in order to subsidize the decision making process and the formulation of institutional policies that enable Oswaldo Cruz Institute (IOC) to reach its future vision. The applied methodology covered the literature review in order to build the theoretical reference, the comparative analysis of three prospective studies (realized) carried out in the country and one by a similar foreign institution, and also the identification of instruments and tools used in these studies. The result was the purpose of a prospective study divided into three phases: initial, consisting of data collection, treatment and systematization; Primary, consisting of data analysis and interpretation (of information) and knowledge production; and Commitment, consisting of results dissemination, which will enable IOC to reach the excellence (y) described in its future vision.

**Key-words:** Technological Forecasting; prospective studies; research institutes; public institution; RDI Management

### Introduction

The Oswaldo Cruz Institute (OCI), a unit of the Oswaldo Cruz Foundation (Fiocruz) is turned for the biomedical research and intends reaching until the year of 2015 the status of "Institute for Research and Technology of international excellence, for being graduating scientists and engineers, recognized for its quality action reference for diagnosis, care and epidemiological surveillance, being able to respond to the demands in health care quickly and reliably, "as it was defined in the Second Meeting of the OCI, the institutional strategic planning instance, in March 2006, brought together representatives of its scientific managerial leadership (FIOCRUZ, 2005).

This article intends demonstrating the relevance of the prospective study as an indispensable tool for strategic planning to support in order to subsidize decision makings and institutional policy formulation for both the OCI and due to such reason guiding question was taken into account: a prospective study would be the adequate tool for the strategic planning that IOC will make possible to achieve excellence in its defined vision of the future?

To be able to answer the proposed question, the methodology involving a literature review for the theoretical construction and comparative analysis of the three studies' prospective and identification of the tools used in these studies.

After reviewing the theoretical and analyzing the chosen studies, it was found that the prospective studies enable the construction of a desired future through the qualitative and quantitative combination methods.

Soon, the results about such study are a prospective study about divided proposals into three phases: Initial, collection, processing and information systematization, Main, analysis and interpretation of information and knowledge production as well as the Commitment and results' dissemination.

In each of these phases are proposed prospective activities in order to build the present overview, Future Prospects and Recommendations which may help the OCI achieving a described excellence in his future vision.

Before moving to the next topic, it is made necessary to enlighten that such proposal would be an experimental exercise which admits adaptations throughout its implementation and should involve the community of the OCI since process' beginning.

## DEVELOPMENT

### Theoretical Fundamentation

The exploration methods are the tools which looks understanding the driving future forces in order to 'build knowledge'. The prospective studies seek adding values to this information, transforming them into knowledge in order to subsidize the strategies constructions and identifying the future directions as the opportunities to support decision making (SANTOS et al, 2004).

For Godet et al (2000), all the ones wishing to foresee or predict the future are liars, because the future does not exist and therefore it is not written anywhere.

*According to Kupfer e Tiger (2004), the technological prospection can be defined "as a systematic means which maps out scientific future and technologic developments that can significantly influence an industry, the economy or society as a whole. Unlike traditional prospected activities, dedicated to foresee a future as the only alleged, foresight exercises are built on the premise that there are many possible futures. These are typically cases where these actions change the future, as occurs with the innovation technology. Foresight exercises serve as a means for achieving two goals: first, it prepares industry actors to take advantage, facing future threats or opportunities. The second objective is to trigger a process of building a desirable future (KUPFER; TIGRE, 2004).*

Hamel e Prahalad (2005) reported that the difference between winning and losing companies it is alike clairvoyant ability, which's able to accelerate the birth of products, services and industry lacking sectors. For these innovative companies which aren't interested in existing competition spaces, but in new spaces building. The winning companies are concerned about the future conquest, because the past success does not guarantee the successful future.

Many methods and techniques are currently in use come from other knowledge fields which avail themselves about the advantages brought by information technology, by collecting and treating large data amounts available in electronic form in order to identify trends throughout such data selection.

*It is emphasized that any method, technique or tool will be able to bring lonely, adequate answers to all the complex issues which are involved within the debate and in the future shaping. It is therefore necessary to understand and use properly the whole methods' set and nowadays available techniques, to be selecting the most appropriate for each case. Another important point is the participatory character which shall have each prospective exercise, so as to involve all the interested actors, preferably, from the beginning of the process, ensuring the coordination efforts as well as the consistency and credibility in the results (SANTOS et al, 2004).*

The prospecting can be used in order to expose the hardships and uncertainties considering the future facing, but the results of a prospecting activity typically points to four future attitudes: (i) liability, which suffers the change, (ii) reactive, which awaits the events to take some action, (iii) pre-active, which prepares for changing, and (iv) proactive, which acts in order to induce the desired changes. But it doesn't mean precluding the overlap of these attitudes, which will rely both on the moment as in the situation in which the organization is going to. For example, in the context of crisis, reactivity it is normal to override everything else(GODET et al, 2000).

According to Kupfer e Tiger (2004), within the literature there are three different views to the problem of exploring the future that are accepted and enshrined in a specialized environment. The more conventional view is based on inference, it is believed that the future seeks to somehow reproducing events and developments occurred in the past, this model does not have the characteristic to identify breaks or discontinuities in the evolution of the objects under the analysis. Another view is the systematic generation for alternative trajectories where building scenarios represents possible variations for the future. And third, is the vision which guides the future by consensus, by using as a based collected opinion through the cognitive process and intuitive expert groups.

The methods and techniques can be further classified as "hard", based on quantitative data, empirical, numerical, by facing trustful historical series' necessity which are reliable standardized dates, or "soft", based on qualitative data, which requires judgments or tacit knowledge, vulnerable to the limited experts' knowledge, which's about their personal preferences and biases.

In general way, quantitative methods should be combined with the qualitative ones, where explicit knowledge should be added to the tacit knowing in the pursuit of complementary or different views (SANTOS et al, 2004).

*The study results' quality is strongly linked to the correct choice of the used methodology and employment of more than a technique, method or tool is a trend and recommended practice by experts in the field (SANTOS et al, 2004).*

## Looking Approaches

Prospective studies are conducted to allow planned interventions resulting from the opportunities identification and needs. Thus, it is common for a study prospective to apply various methods in a complementary way, where one supports the other, above of all, to minimize their weaknesses.

The systematic process of analyzing the emerging technologies routes for the development and its impacts in the future are found embedded in the Technology Futures Analysis (TFA) concepts, which integrates the notion of Technology Foresight, Technology Forecast and Assessment studies incorporating a methodology technological forecasting variety.

Nowadays, there are many the ways to line up the future, from which we can highlight the most popular approaches, are them: Forecast, Foresight and Assessment.

Assessment consists on monitoring progress and identifying changing signs, attained in a more or less systematic and continuing way and have received several denominations: *veille technologique* in French, *technological watch*, *environmental scanning and assessment*, in English and *vigilancia tecnológica*, in Spanish. According to Santos et al (2004), the different denominations have generated confusion in the terminology, making difficult their building concepts and that's why some notions are used for purposes which differs that ones to which they were created.

The forecast works information about the historical, mathematical models and projection of future situations' evolution. According to Salles-Filho et al. (2001), it has a connotation to the next prediction, it means, related to the models constructing which defines the causal relations about scientific and technological developments and outline probabilistic scenarios of the future, giving the character a deterministic technique.

Porter et al. (2004 apud SANTOS et al, 2004) suggest that forecast Technology is the process of describing a technology sometimes in the future, which can be: its emergence, performance, characteristics and impacts.

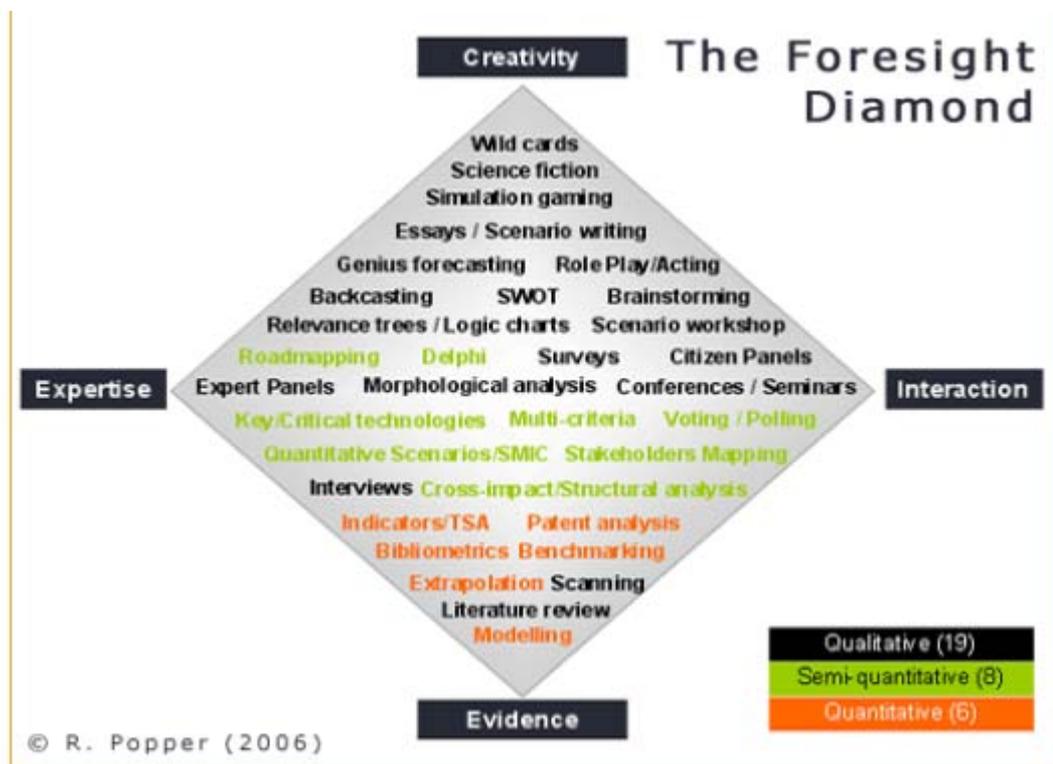
Coates (1985) defined *Foresight* as a process used to understand the forces which shapes the long-term future and which must subside the policy formulation and decision making, a view which's closely linked to the foresight planning.

Ben Martin (cited Aulicino & Kruglianskas, 2004) before setting Foresight, explains the four mainly change drivers in the global economy during the recent decades, affecting the economy of any country which can be summarized in four Cs: increased competitiveness; increase of constraints (restrictions) in public spending, increased complexity, and increasing importance of scientific and technological competence. Thus, the author expanded the Foresight beyond just predicting the future, defining it as: "A process that is concerned to systematically examine the long-term science future, technology, economy and society, in order to identify strategic research areas and emerging technologies having the propensity to generate greatest economic and social benefits (AULICINO; KRUGLIANSKAS, 2004).

Porter et al (2004) and Skumanich e Sibernagel (1997) have classified the methods of prospecting families, as: Creativity, Descriptive Methods and Matrices, Statistical Methods, Program Specialist, Monitoring and Intelligence Systems, Models and Simulation, Scenarios, Trend Analysis, and Systems Assessment and Decision.

The group of Rafael Popper (2006), from the Manchester University offers the latest classification for methods and techniques, called Diamond Foresight, which's related in four dimensions: a) **creativity**, linked to the imagination; b) **expertise**, influenced by the experience and knowledge; c) **interaction**, seeking discussion and interaction d) **evidence**, considers a real data analysis. Popper (2006) suggests choosing and matching methods in order to balance these four dimensions (Figure 1).

**Figure 1:** The Foresight Diamond



**SOURCE:** POPPER, 2006.

Coelho et al (2005) points out that this classification added to the classification of Love ridge is called as a "triangle of foresight." According to the authors, foresight is already being widely used in the world and its implementation is still the greatest faced difficulty, once the future studies are complex, for trying to foresee an uncertain future, affected by a huge number of a non controlled variables, such as: social, political, environmental, economic, technological and cultural.

However, the perspective studies constitutes important subsidize for the decision taken which are to be pursued and the approach taken in the work which shall incorporate the social assessment, ethical and environmental technology impacts.

Above of all, it is needed emphasized that drawing the future is to go beyond what is known, allowing the entrance of new ideas and positions, sharing disturbing questions and provocative questions which still finds a common language and belief to establish a mindset that allow building changes path (SANTOS et al, 2004).

## METHODOLOGY

The used methodology in this study involves the review about the literature in order to construct the theoretical framework, a comparative analysis of several prospective studies and identification of instruments and tools used on these studies.

The theoretical framework reference was constructed from the literature review, made in the database Koricgee Centre for The Strategic Studies and Management (CGEE), Program Management Information Science, Technology and Innovation from the Brazilian Institute of Information Science and Technology (Prossiga) of the Latin American and Caribbean Literature Health Sciences (LACLHS) and in magazines. Selected articles, essays, dissertations and thesis from the 1985 period until 2008, related to studies and prospecting technology activities.

After the comparative analysis of several prospective studies that could bring significant contributions to this work, the PROSPECT Study () and the Pasteur Institute studies (), initially served as guiding northern proposed base.

The prospect study, conducted in 2000 by the Ministry of Science and Technology(MST) and the National Council of Science and Technology (CST), became a benchmark for being the first major national prospective study, which had the merit for mobilizing the Brazilian science technology community and scattering technological forecasting and methodologies among different stakeholders from all the country regions.

The Pasteur Institute study (2008) showed significant similarity between the OCI and its mission to contribute on the prevention and disease treatments, primarily infectious diseases, through research, education and public health actions. Another relevant factor in the choice of the Pasteur

Institute is that the Institute had been at the centre of the main scientific and medical advances, current issues facing public health and providing new and innovative perspectives in the biomedical field.

However, a new approach into the available studies, the Prospective Study of the Medical Equipment Division, Hospital and Dental (MEDHD) (ABDI, 2008) was methodologically more appealing because of its relevance and to have as a starting point his future vision, namely:

*Reaching the next 15 years, the international recognition as a medical equipment producer, hospital and dental pattern in the segments of global technological diagnostic imaging, optics, haemodialysis, and newborn with national companies globally competitive*(ABDI, 2008).

Very similar to the future OCI vision, we do highlight:

*An Institute of Technology and Research of international excellence, which enables scientists and engineers, renowned for the quality of its action reference for diagnosis, care and epidemiological surveillance and able to respond to the demands in health care quickly and reliably*(IOC, 2005).

The methodological approach of the prospective sector MEDHD was based on the theoretical model developed by CGEE in order to guide prospecting actions in the ST & I, which was their theoretical and practical reference from the of elements incorporation developed by experiments conducted around the world with great diversity of applications and by using different approaches and methodologies.

It is known that the effectiveness of foresight in STI is intrinsically linked to an appropriate methodological designs, obtained from a precise definition of the questions which's about to be answered, the type of desired response, spatial orientation, the scope of the topic as well as the structuring of an acting network enabled of consensus and needed commitment to implement action identifying courses.

Thus, it becomes a powerful aid in the planning and management of high uncertainty levels associated with the process of decision making.

The first stage of our comparative prospective studies analysis served to establish a baseline of our proposal inspired by the methodological approach of CGEE, which provides the route into three phases described in sequence in order to make the complete understanding easier within the process.

The Initial Phase aims to collect, process, analyze and systematize the information making it possible to show the positioning of the research institute related to scientific research in its operating area in Brazil and worldwide, providing the design of the CURRENT SCENARIO.

The Main Stage is up to analyze and interpret the information collected in the initial phase, producing knowledge that will subsidize the foresight exercises, which will indicate the likely technological routes to be taken by the research institute order to achieve its vision for the future, allowing the visualization of their PROSPECTS FOR THE FUTURE.

The Commitment Phase aims to make the necessary the recommendations in order to achieve the strategic vision of the OCI and spreading the prospective studies results to be implemented throughout an institutional policy, including the Technology Technological Routes and Schedules elaboration.

In the second comparative stage analysis, we identify the instruments and tools used in studies in order to prospect, the Pasteur Institute, the MEDHD industry which could be adopted in a prospective study from the Oswaldo Cruz Institute, taking into account the peculiarities and diversity of its activities.

These instruments and tools were:

- 1) The creation of a Working Group;
- 2) A coordination implementation;
- 3)The hiring of technical assistance for coordinating the study;
- 4)The study institutionalization in the OCI;
- 5) The specific resourcing allocation for the prospective study development;
- 6) The foresight exercises development adopted methodology;

- 7) The creation of a database having all the collected information.
- 8) The analysis and information collected interpretation;
- 9) The study of technological and strategic routes;
- 10) The absorption and training of human resources;
- 11) The development of specific software;
- 12) The development of technological routes;
- 13) The identification of recommendations to achieve the strategic vision;
- 14) The results' spread.

The project was reviewed and approved by the National Ethics Committee School for Public Health Sergio Arouca, in Opinion No. 147/08 of September 5, 2008.

## **RESULTS AND DISCUSSIONS**

The prospect ABOUT prospective studies will assist the OCI in order to achieve its future vision for the 2015 year has guided this work.

The result is a proposal for a prospective study to support the development for an appropriated methodology related to the OCI. After this prospective study analysis which exploits, thereby the Pasteur Institute and the MEDHD industry became evident that a prospective study would be institutionalized, in fact, a fundamental tool for the OCI will fully achieve its future vision.

This section presents the developed proposal in SUCH study by pointing out that, alike the analyzed experiences, intended as an experimental exercise which admits that adaptations throughout its implementation should involve the OCI community and other stakeholders EVER SINCE the process' beginning.

By discarding the prospects for classical prediction which's dedicated to foresee a supposed future as unique, in our proposed study to the OCI study, the perspectives for prospective studies are built from the premise that there are many possible futures (GODET et al, 2000).

Agreeing with Prahalad & Hamel (2005), who claims the past success does not guarantee success for the future, so given the consideration they have shown that by winning companies they're are concerned about the future conquer, we designed a proposal for the OCI estimating that his attitude towards the future will to be proactive in order to induce the desired changes. Thus, the proposal is as a tool to identify and seize opportunities or only face future threats and trigger constructing desirable future process (TIGER; KUPFER, 2004).

On the other hand, considers that any method, technique or tool are able to bring appropriate responses separately for all complex issues which involves the debate and the future shaping, and which the study quality results is strong link to the correct choice of the methodology in order to be used as an employment of more than one technique, a method or tool (SANTOS et al, 2004).

Our study then adopted the method of raising the set of methods and techniques available today through an extensive literature review and studies comparison, identifying techniques, instruments and tools which are used to build an appropriate OCI proposal.

As already explained above, the prospect was chosen for being the first major national prospective study, which had the merit to mobilize part of the Brazilian scientific and technological community as well as spreading the technological forecasting and methodologies among different stakeholders from all the country regions.

The Pasteur Institute study has shown significant similarity between the OCI and its mission, so that he was the main scientific and medical advances centre where, current issues facing public health and providing new and innovative perspectives in the biomedical field.

However, after a new approach into the available studies, the Prospective Study about the Medical Equipment Division, Hospital and Dental ( MEDHD ), led by CGEE, was methodologically more appealing because of its timeliness and the fact that his methodological approach have already been built based on extensive review of the technique art state, incorporating elements from experiments conducted around the world by combining different approaches and methodologies as well as presenting a great variety of applications. The construction of the OCI proposal took the three-phase models developed for this prospective study as a starting point.

## **A proposal for the IOC**

We present OCI prospective proposal study, developed in this work.

The Initial Phase, identified as INFORMATION phase, where the collect, processing, analysis and systematization of information occurs throughout the preliminary Sector Studies.

In order to conduct the proposed study, a Working Group (WG) shall be established, composed by professionals who represent different areas of the Oswaldo Cruz Institute: 1) Research, Technologic Innovation Development, 2) education, 3) Reference Services and Collections and 4) Management. This WG will report itself directly to the Director, whose the degree of institutionalization is very high, somewhat which is essential to provide policy and technical capacity to carry out their activities for the absorption of its results. Coordination should be established within the GT, preferably under the technical assistance.

It shall occur specific allocation funds for the development of this study, once this measure is essential for their success, because, besides the need to fund the same, the experiments demonstrated that the greater are the allocated resources the largest will be institutional commitment. One of the resource allocation goals is to enable the financing of visits into foreign research institutes such as the one held during the prospective study at the Pasteur Institute (PASTEUR INSTITUT, 2007).

Once created this initial support, it's fundamental to be engaged from the born of the OCI community as well as about the different actors in its preparation which commits themselves into the final results.

Regarding the construction of a desired future, the OCI had set up an event entitled Second OCI Meeting - Building the future to answer basic questions based on his scientific management leadership: How do we want the OCI in 2015? What is our vision for the future? (FIOCRUZ, 2005).

About this question, others were raised to subsidize the construction of the future OCI vision in terms of scientific excellence, technological development and innovation for the health sector about diagnosis and reference care for the National Epidemiologic Surveillance.

It was also asked how did the community want the OCI to be was seen in 10, 20 years by Fiocruz, society and its pairs.

Once created this initial support, the involvement is also essential, since the beginning, the community of the IOC and the different actors in its preparation and committing them to the final result.

Regarding the construction of a desired future, the IOC organized an event titled Second Meeting of the IOC - Building the future to answer the basic question made his scientific leadership and management: How we want the IOC is in 2015? What is our vision for the future? (FIOCRUZ, 2005).

**What do we better do (which are our essential competencies)? For what are we identified and in what we differ from the others?**

**Which are the themes, areas, activities in which we both operate today as we would be operating in 10 years from now?**

**The given answer about the scientific and managerial OCI leadership at the Second Meeting was:**

- The fundamental OCI competencies are focused on biomedical research, which encompasses professional trainings into research and reference service. We are differentiated by the multidisciplinary extent and the regular external evaluating process. Ten years from now, we would have the skills and flexibility to operate on themes which address the needs about healthcare and C & T at that time.***

**We can here highlight that in the topic related to technological development and innovation for the health sector, the need for "identify opportunities through strong technological forecasting mechanism" was emphasized, what shall be one of the study results here presented.**

**It's important to beef up that, besides the fact that OCI hasn't prioritized a specialized prospective study; activities of prospective nature were developed according to his future concern.**

According to Santos et al (2004), within science systems, technology and innovation, foresight prospective exercises or technological forecasting have been considered essential to promote the creation ability to set up innovating systems which meets with the society interests. These same authors points out that it is important for a growing awareness that the scientific and technological development is the result of complex interactions between different factors: the existence and the social actors' action in technological trajectories into evolution and competition, conflicting future visions, urgent social needs, opportunities as well as economic and environmental constraints, and many other questions, which belongs, to the imponderable field. Thus, the "prospective" exercises which it was already done by the OCI, in our view, they will prove themselves as being extremely useful as part of an early and essential awareness for the community about future studies, because such wide term encompasses all activity which boosts the understanding about the future consequences into current developments choices.

However, only these exercises already attained in the OCI, wouldn't be enough for reaching the described position in his future vision. Therefore, this proposal adds in its initial phase some complementary activities. One is the adoption of an operational information system which monitors the network based on global scientific publications from PubMed, and which allows you to both explore as expand your professional network acknowledgement; it helps on finding publications and authors in Brazil and abroad as well as monitor the scientific potential organization, from Brazil and the whole world through a text-mining program.

According to Porter et al (2004), monitoring provides the necessary background in which the survey is based and it can be used to search all information sources for producing a rich and varied information group. The main sources on which it relies on are about technical nature, such as magazines, patents, books, papers, among others. Furthermore, interviews with experts can be done as well as other collecting non-literary information.

The monitoring is widely used, because it constitutes a basic source of relevant information. Monitoring means observing, checking and updating itself into the developments in a well defined area of interest, for specific purposes (19). Some possible objectives about monitoring are: 1) scientific identification, technical or socio-economic importance to the organization, 2) the potential definition threats into the organization, implicit in these events, 3) Identification of possible opportunities for the organization changes in the environment and 4) an indication of trends which are converging, diverging, increasing, decreasing or interacting.

An additional activity as part of this initial proposal phase are the trends analysis of what should be done by mapping the technical-scientific Chronic Diseases, Infectious and Parasitic as well as Neglected Diseases in MEDLINE, aiming to identify knowledge trends, publication issues and mapping skills of the country using the system LATTES / CNPq / MCT.

The trend analysis throughout mapping is an analysis future technology method. Being the simplest path of prospection based on the assumption that past patterns will be kept in the future by collecting information about a variable over time (SANTOS et al, 2004).

Additionally, we propose a survey to check the status of scientific research in relation to the OCI sub-agenda "Disease" of the National Agenda of Priorities in Health Research through the Delphi method with a structured questionnaire, to be applied on Research Leaders, registered directory of Research Groups from the CNPq, considering a degree of expertise range in three levels (Low, Medium, High).

During the exploring study the Delphi exercise was effective to make the information collect easier from respondents, making it possible to build a comprehensive consultation process.

According to Cole et al (2005), the Delphi method has been used to solve uncertainties about future conditions and trends as well as revealing causal relationships and exploring plausible scenarios. The author states that their applicability is greater in cases involving scientific and technological issues and social values, which are hardly tractable by other simultaneous approaches.

The Main Stage is the one about KNOWLEDGE, where occurs: the interpreting analysis; the data interpretation collected in the initial phase; and the knowledge production as well as technological study for likely routes through further preliminary Sector studies.

From this stage, the presence of an expert in the prospective studies becomes essential in order to add information value already collected and to provide training for human resources internal within IOC, in these studies.

The presence/expert opinion allows the model and perceptions identification, making them explicit, so that intuition finds space exploration (13). Moreover, in our opinion, the experience in doing it is an extreme important factor in such studies due to its complexity.

As in the initial phase, this phase has also some additional activities proposed as a SWOT analysis of Strengths and OCI Weaknesses (internal and current factors) and the Opportunities and Threats (external and future factors) through a workshop with the scientific leaders' participation and the OCI management (Laboratory Heads, Heads of Department, Service, Commission Coordinators and Graduate courses) with the following question stimulus: What are the requirements for realizing the future vision?

In this exercise the results of the initial phase shall be initially presented. Then, the SWOT analysis might focus on segments, such as: 1) Research, Technological Development and Innovation, 2) education, 3) Information and Communication, 4) Reference Services and Collections, and 5) Management, regarding the technology dimensions, talent, investment, physical infrastructure and institutional policies.

- Technology dimensions will be necessary elements for the technological development process of transfer or technology acquisition.
- The size Talents represents human capital, which encompasses the knowledge, education, training and support manpower creations.
- The vesture sizes represent investments in RD & I, funding and actions which supports entrepreneurship.
- The Physic Infrastructure dimension represents the physical frames related on working, equipment and machinery.
- Policy and Institutional Dimension represent the intellectual policy properties, for business regulation, collaborating structures between innovating actors.

The prospective study from the MEDHD sector, through the SWOT analysis, got to rise beyond the trends, the strategic objectives and guidelines for actions to the segments which constitute the strategic content routs' essence and technology agendas (reference MEDHD).

It is believed that the outcome of the SWOT proposal analysis for the IOC, will subsidize the definition for strategic routes and schedules of their technological segments, such as: 1) Research, Technological Development and Innovation, 2) education, 3) Information and Communication, 4) Service References and Collections, and, 5) Management. All these results shall be discussed and validated by the GT, under the specialist's survey coordination.

As a final activity within this phase, we suggest a session with the Research Area analysts in order to propose the subgroup Working creation for the SWOT analysis development in which each specific researching area, that united comprises the thematic scope of all OCI projects, which are: 1) Chagas' disease, 2) Leishmaniasis, 3) Protozoan, 4) Helminths, 5) Dengue, 6) Viral Rickettsioses; 7) Bacterial and Fungal; 8) STD / AIDS, 9) Chronic Diseases and Genetics, 10) Functional Genomics, 11) Immunology and immune-protection; 12) Education and Society, 13) Pharmacology, 14) Taxonomy and biodiversity; 15) Epidemiology and Surveillance.

Phase Commitment is the COMPROMISSE phase where there is the recommending and disseminating results' identification about the strategic vision building.

This step is the Technology Technological Routes prepare and Schedules. The development of routes requires the harmonizing views into different actors and for that workshops should be organized in order to raise shares to the various segments directives which compose the strategic routes technology content's agendas.

For the future vision the achieved results and recommendations will be presented in a Final Report and implemented through an institutional policy for technological forecasting.

Furthermore, the end of each step can be described above, a workshop should be

organized in order to disseminate the results' study and provide next step allowance. The *workshops'* attainment, counts with lectures handled by experts in the various methods of prospecting information and help on the dissemination of the subject so as to involve the whole community, from the beginning of the process, it ensures the coordinating efforts. These meetings have the allowing advantage into a greater interaction between both participants as balances in all segments representation.

It is up to us to highlight that the prospective study requires a time of learning and maturation for the institution to learn and get involved with the continuity of the process, whose activities requires advices from technical experts. This once again reinforces the need for the expertise advice on prospective studies in order to be coordinating and guiding the human resources development for the process' continuation.

Another important issue is in related to the scientific training and technological exploration, having in sight the relevant themes for the Strategic Enterprise Training. According Thiesen (2008), the initiatives taken by educational institutions as well as research and Santa Catarina State management within the exploration field is very weak and the literature on such subject which is available in the libraries of two public probed universities is insignificant, one aspect which, somehow, shows an academic failure schooling debate.

According to these diagnoses, it is important that the subject be inserted into the grid disciplines of post-graduate from the OCI, encouraging in training researchers into thinking exercise about future, especially within the constructing institution roles into public policies Health issues.

## CONCLUSION

Scientific research of the OCI reached a excellence already recognized level, ever since its laboratories provides reference service for more than two thirds of the health problems diseases into sanitary interest for the country, especially about infectious issues and parasitic diseases which happens regionally, nationally and internationally, as well as its Scientific Collections form as a sample of strategic value for the study of various diseases within the universities and other national and international scientific institutions (FIOCRUZ, 2007).

When building your future vision of an institute of international research and technology excellence, demonstrates that the OCI still have many ways to follow achieving these goals, requiring, above of all, a better definition of into its current position in order to draw the necessary path to reach desired situation in the future.

We therefore believe that a prospective study will be an indispensable as a tool for the OCI designing in this prominent place described in his future vision, because it will give out the forecast for anticipating, and providing understanding into the driving forces for the future to build pathways which supports strategic planning and institutional investment about researching as well as creating the most favourable conditions for its developing long term mission.

With the organization of the Second Meeting within the OCI - Building the future, where his scientific leadership and management jointly outlined his future vision, the OCI has shown the adopting exercise foresight importance. The modernization of its infrastructure and the restructuring of its networking research is also another indication for his effort in order to suit conditions necessary to achieve their desired future vision.

This proves that there is an already growing interest for the OCI foresight adoption, which should be encouraged with more information about technological forecasting, by raising further interests into the community and researchers to this issue importance for an institution which desires both achieving as keeping nowadays' world excellence standards.

So a proposal, as described here, is divided into three phases which will get to provide the time needed for the OCI in order to mature themes, adding value to their already recognized fields.

Similar to the Pasteur Institute, who decided to prepare for the desired future by probing several fronts, both within the infrastructure as in the scientific scenario, the OCI have also adopted actions for modernization, such as upgrading its organizational structuring and reorganization of its horizontal research bodies integrated in networks.

Allied to this, the current proposal seeks to signalize trends and relevant issues in order to plan strategic and investment decisions in research, development and innovation, preparing scientific and managerial leadership from the OCI in order to develop new strategy skills which enables them to achieve their future visions.

The moment seems to be optimal to implement this project, which aims to anchor its methodological bases onto the *foresight* (preview) concept, having as principle the collective, in which leaders and experts will gather themselves to discuss strategies guided by an institutional expert advice which's is able to coordinate the study in order to sensitize and internalize the knowledge institution subject.

In this sense, the hired advice should prove itself able enough for developing adaptive methods in each case and should have given prospective studies as well as designed contribution to the country in recent years. Additionally, should demonstrate ability to provide the confluence of public and private issues shares sectors, besides dialogue, coordination and interaction among these sectors of science, technology and also the productive sector, making up an environment to develop ideas, by building consensus and identifying opportunities as well as spreading information, experiences and society's project.

It is expected that the OCI get to contribute as an organization in the Brazilian public health which intends developing prospective about studies as a way to articulate innovating priorities having the scientific research needs. The aim is also being able to indicate acknowledgement areas and strategic themes, which allows us to overcome technological challenges as well as bottlenecks and consequent increases within the competitiveness of the RD & I sector in Brazil.

### Conflict of Interests

Authors have declared they have no conflict of interests.

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