

Chile's Education Crisis: Part 5 of a Country Study

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Abstract

In this article, we analyze the situation of the Higher Education System in Chile. There are a number of obstacles to be overcome so as to undergo a breakthrough towards a master goal, with reference to the training of our students leading for well-recognized professional titles and/or academic degrees. The standards of both excellence and quality should be met at the right speed and in a rather comprehensive process. Difficult decisions will have to be taken so as to organize the Higher Education System as a whole avoiding any influences other than the academic ones. The System in Chile is made up of three categories of Institutions, namely the Professional Institutes (IP), the Centers for Technical Training (CFT) and the Universities (Private and Public Institutions). Several attempts have been made over the last three decades aiming to organize the whole system in a number of Institutions highly recognized and well structured; nevertheless the overall System is still fragile and weak from the academic viewpoint. The situation is becoming rather critical, in particular in the case of Universities since many weakness and inconsistencies have deteriorated the quality of the whole system. As we shall discuss in the text, the time has come to put forward a number of solid and plausible recommendation so as to improve, once and for all the poor quality of the Higher Education System in Chile.

We believe that it is urgent to move the whole system forward and to make the necessary changes so as to make available to students good Universities and as a consequence, professional titles and academic degrees valid and fully recognized in global and integrated economies all over the world.

Throughout the course of the current article, we suggest a model to be followed so as to have the most homogeneous and coherent higher Education System in Chile. We do emphasize the urgent need of fundamental changes a complete revision of these Institution and the Accreditation Agencies so as to establish a number of basic attributes to be fulfilled by all and each Institutions to be recognized as Universities. These processes should be dynamic and in agreement with the advances in Science, Technology and Social Sciences in developed countries. We must become competitive and to have a fair access to the open economies so as to avoid becoming a weak and fragile economy. Competition in global markets has no flags other than quality, innovation and creativity. A number of attributes are worked out throughout the course of the current articles and all and every Institution named University should be compelled to meet.

Key words: Higher education system, requirements, and accreditation model.

1. Preliminary Remarks.

In a series of articles [1-4], we have made a thorough analysis and diagnosis of the Higher Education System in the Republic of Chile. It has been mentioned that a substantial amount of human resources and infrastructure has become available so as to improve the whole education process from the early stages of our fellow citizens; nevertheless, the results are not very satisfactory at all.

It is indeed a priority to make available to our citizens the best possible system of education. The situation is becoming more and more complex, since the fourth technological revolution has already hit us in a rather serious way. We must prove ourselves, that we are able, proactive and in fair conditions to face the many challenges in front of us. It is quite illuminating for many people in Chile, to travel abroad mainly to the USA, Europe and Japan to work for Master and/or PhD academic degrees and then be back in our country so as to contribute to society with the updated knowledge obtained abroad. There are a well-known Government Institutions known as Conicyt (National Council of Sciences and Technology), where people can apply for funding for their projects and also, the youth can apply for a scholarship/fellowship to travel abroad to work for an academic degree from a well-known and highly reputed Institution. This is in simple words, the actual situation in Chile.

There is no doubt that most of our students abroad are well gifted and endowed. In general terms, they obtain their academic degrees and according to the Chilean law, they are compelled to return to the country to continue with their duties in both lecturing and research. There is, though a lack of job positions at the Universities and it is rather frustrated to observe that they have to become, in a great number of cases, part time lectures and the most fortunate access to chairs in reasonable national Universities. Additionally, we must declare that a non-negligible number of Institutions in Chile, also offer academic degrees such as Masters and Doctorates in a significant number of disciplines. At this point of the discussion, we can easily conclude that the lack of job positions in good Universities is by no means to be neglected. As we have already pointed out [1-4], there are also a number of opportunities associated with the very fundamental concept of a well-organized society. The challenges to be tackled are formidable, therefore, we believe that the country as such must take a number of measurements heading to improve the quality of its Institutions. It does not stand any longer to have several dozens of Universities along the country having different standards since this kind of situation deteriorate the whole system and we run the risk of having around more unemployed professionals with a rather incomplete and non-competitive training.

The main target of these articles [1-4] has dealt with a number of attributes which are of paramount importance to improve the quality of life and welfare of the citizens. We must, therefore, do our work in the state of the art of the disciplines we are engaged with; otherwise it is pointless the energy and the time spent in this way to the future. We should be very much aware about broad topics such as Robotics, Artificial Intelligence, Data Mining, Nano Science, Nano Technology, Biotechnology, Entrepreneurship, Social Business and Social Science, since many substantial advances have been achieved in well developed countries. This is a very important issue, since we do compete with these huge economies and we need to export our goods and be welcome for the quality of our products. It is not to be forgotten that any wise country should work for having the right balance between exports in imports of goods, otherwise we start a rather obscure path, leading just to pain and failure. We must develop and increase economical resources on a regular basis, so attributes such as pro activity, novel ideas, entrepreneurship and social business among others must be considered seriously.

We also need to keep the right balance between investment and the environment and this is indeed not a trivial equation to work out. Also, Chile has a great deal of natural resources such as Copper, Lithium and Rare Earths and also a magnificent desert (a rather unlimited source of solar energy).

There are also a number of other traditional resources such as forest, wine and other commodities, however, all these resources must be handled with most caution and care. In addition, we must mention the long coast by the Pacific Ocean and all those sea resources. Just to give an overall picture to the reader, we must say that the total population of the country is about 18 millions of people, taking into account the large number of immigrants, who have come over to Chile to start a new life. Though, what we mention in the above paragraphs, the country is not doing the work properly and the lack of opportunities and access to a proper health system is still rather primitive for the average citizens. Wealthy people can afford the private health sector of travel abroad for health treatment but the number of these very well of people is less than 5% of the whole population. We have many formidable issues to address in this article, since we feel that any Government in office should do a better job. We believe that the key for success is without any doubt a high quality education of our fellow citizens, so we shall work out in the next section a model made up of several attributes so as to normalize and organize the whole system of education in the country.

2. A Systematic Model for a Higher Education System, Universities.

Chile is a rather unique country in many aspects and one of them is the lack of a good, homogeneous, high quality system (deficiency of a sensible set of attributes), absence of sensibility towards the professionals and academics trained in Higher Education Institutions and so forth [5-9].

We have observed that the academic discussion about the quality of the whole system show a great deal of unwanted ideological ideas. Sensible people know and very well indeed, that we all come to this world to be happy though no perfect, also to conclude an academic career is by no means the only and comprehensive way of becoming happy and prosperous. It is a great pity to realize that many families in Chile do believe that their children must mainly attend Universities. This is by every single mean not true at all. We are getting every single day, information about the need to prepare good technicians to work on broad economic areas as pointed out in the text previously. The situation is by no means simple to tackle, but we feel that a good starting point (at the University level) is to introduce a set of indicators to be fulfilled by any Institutions to be regarded as a good University. We strongly believe that a small economy like the one we have in Chile, has no way to waste resources creating unemployed professionals. ¡This statement stands by itself!

We have worked out a number of attributes that a University should fulfilled to remain in this category otherwise should be forced by the System to switch to a Professional Institution (IP) and /or a Center for Technical Training (CFT).

Let IA be the Institution Accreditation, then we must imagine a functions such as:

$$IA = IA(x_1, x_2, \dots, x_N, t)$$

The above generic function depends upon a number of attributes and the temporal coordinate time. It should be clear that the Institution Accreditation is a function of a number of attributes labeled as: x_1, x_2, \dots, x_N and t represents the time so as to include the evolution in time of the generic accreditation function. The evolution in time is crucial to assess on a regular basis, the state of the Higher Education Institution and following this procedure to make sure that the Institution is doing the job properly.

Some of the attributes are as follows:

- Years of the Institution (counted from the foundation of the Institution).
- Average of accredited careers (counted from the beginning of the accreditation system).
- Average number of (students per career), at the time interval $t_0 > t > t_1$.
- Tariffs per careers (average values and comparison with leaders Institutions in Chile).
- Quality of the Academic staff (full time academics, antiquity in the Institution/University, background of these academicians (formed in the same Institution/University?).
- Hierarchy Processes (assistants 2, assistants 1, assistant professors, associate professors and professors).
- Qualification Processes and maximum permanence in a given category. In a given University, it is expected that the assistants at the end of 4th year (except in exceptional situations) are opting with their records to the hierarchy of Assistant Professor. In the case of the Assistant Professors in a period not exceeding five years, must be able to apply the hierarchy of Associate Professor. The Professor hierarchy is defined as "essentially empty" and only they have access to this hierarchy, academics with a broad national and international recognition. It is important to note that it is considered the hierarchy of Associate Professor as a final position (for all practical purposes), being a reasonable retirement age of 65 years for men and 60 years for women. It emphasizes that at the previous ages, academics are able to request retirement to the passive sector. However, the maximum age of retirement should not exceed 75 years, in the case of active academics in teaching, researching, and senior management.
- Relationships (full-time / number of students per career race and per time).
- Infrastructure: (updated laboratories per career x students).
- Obsolescence considerations with respect to labs and instruments.
- Expedite access for academics and students to updated libraries, both printed and "on line". This information must be known by all and each of the careers offered by the Institution.
- Requirements for institutional accreditation and careers. Years given in the different processes to which the Institution has been subjected.
- Database with the access of the graduate students to the labor market. Statistics for the past 10 years. This information should be delivered by career.
- Mission and Vision of Universities or Professional Institutes in the country.
- Employability of the productive sectors, per careers and workplace (map of employability throughout the country). Market Niches per University / Professional Institute.

- Database of labor mobility of the graduate students; which is an indicator that is directly related to the perception of the market (productive companies) regarding the Chilean universities where they studied.
- University Ranking and relative positions in National, Latin American, American and European.
- Academics scholarships for post degree and specialization at the Institution (is important to note, that the academics were educated by the University/Institution in study or were hired from other Universities/Institutions). Dates of incorporation of these academics, essentially with post degrees (master and doctorate) and labor stability in these Universities / Institutions.
- Solid evidence about the relationship between University/ Institution and the productive sector. Main contributions. This should be delivered with diligence and validated data.
- Strategic value of the Institution at national and international level (mostly in Latin America).
- Patents, domestics (internal) and international publications properly indexed. The information must be delivered, whereas the last 10 years. This point is crucial, because a criterion should be set: suppose a given publication. The number of authors must be count, the number of Institutions which these authors belong and the impact factor of the journal in which the publication was done.
- Publications per career of the University/ Institution in the last 10 years.
- New Institutions (with a period of less than 20 years), the requirement must be proportionate but rigorous.
- Presence/ number/ proportion of foreign students' studies/activities of undergraduate, postgraduate and post-doctorate in laboratories of the Institution/ University.
- Respect the origin of foreign students who specialize in the Chilean University Institution: American, European, Asian, and Latin-American.
- Joint research projects signed with Universities and/or foreign Institutions of international hierarchy.
- Donations that receives the University from Institutes of the country or from abroad, to develop high-level research.
- Invitations (rate/year) received by academics from the Institution to participate in joint international projects, invitations to conferences, congresses, post-grade abroad, book chapters, etc.
- Visits of foreign groups to develop research in Chile together with the Institution/ University. Also, development of specialized courses in the Institution/ University.

We must understand that the University is a place in which are concentrated lectures and students, in consequence, they should be guarantors of the public faith. If an Institution shows indicators below the national average, according to the criteria previously outlined, then it should lose the quality of being considered as a Center of Higher Education (this is particularly valid in the case of Universities). In these cases, it is necessary to study the feasibility that Institution under the average might become Professional Institutes (IP) or Technical Training Centers (CFT). The reader is welcome to read carefully the Report regarding the Current State of Sciences Main Indicators in both Science and Technology 2017[9].

This report deals with the state of the art in Science (2017) and focuses its attention mainly upon a number of countries of Latin America and Ibero-America. There a number of issues to be mentioned as a conclusion of this report: In Latin America, a number of factors are worth mentioning: (a) it was observed that innovation processes are rather limited and as a consequence the involvement of these countries in Research and Development (R+D) is very scarce and as a consequence the demand of technology from the productive sector is very limited, (b) since the development of technology is not meaningful in both pure and applied technology, the number of patent's proposal forwarded through the agreement known as PCT of the World Organization of the Intellectual Properties showed a lowering in number, (c) it is important to emphasize that among the twenty most productive Institutions from the scientific viewpoint, ten are Brazilian, three Argentinian, two Mexican, three Chilean and two Colombian, (c) it is also to be mentioned that when the relative size of each University is taken into account, it is shown the existence of both relevant and significant structural differences when the number of full time academics is considered for each Institution, (d) it is also a relevant factor to be considered, in this discussion, the funding available for (R+D) projects in relation with the gross domestic product (PIB) per country. In our case of study the funding involved for this kind of projects is about 0.38 % of the PIB, whereas countries such as Israel (4.27 %), USA (2.79 %), Brazil (1.27 %), Argentina (0.63 %), Mexico (0.53 %), Colombia (0.29 %), Paraguay (0.13 %) , Honduras (0.02 %) and so forth, (e) as for the number of researchers and scholars per country considered in this study, the differences are significant. For the sake of completeness, we list some relative numbers [9]:

Number Researchers and scholars per country	Country	Number Researchers and scholars per country	Country
183,853	Brazil	6,364	Colombia
122,437	Spain	1.799	Uruguay
52,970	Argentina	2.590	Costa Rica
38,672	Portugal	1.222	Paraguay
29,921	Mexico	360	Guatemala
8,175	Chile	150	Panama
6,373	Ecuador	-	-

There are a number of Tables to be discussed, however it may be of some interest to consider the number of publications indexed in Scopus per University in the period 2010-2015. Some numbers (Graphic 6 of the report [9]) are:

Number of Publications indexed in Scopus (2010-2015)	University/ Country	Number of Publications indexed in Scopus (2010-2015)	University/ Country
67,734	Universidad de Sao Paulo/Brazil	10,487	Universidad Federal de Paraná/ Brazil
25,686	Universidad Autónoma de México /México	9,885	Universidad Federal de Sao Paulo /Brazil
18,393	Universidad Estatal de Campinas /Brazil	9,570	Pontificia Universidad Católica de Chile /Chile
17,358	Instituto Politécnico Nacional /México	9,413	Universidad Federal de Santa Catarina /Brazil
16,570	Universidad Federal de Rio Janeiro /Brazil	8,881	Universidad de Brasilia /Brazil
16,202	Universidad Estatal Paulista /Brazil	7,525	Universidad Nacional de Colombia /Colombia
15,696	Universidad Federal de Rio Grande Del Sur /Brazil	7,289	Universidad Nacional de la Plata /Argentina
15,076	Universidad de Buenos Aires /Argentina	5,140	Universidad de Concepción /Chile
13,488	Universidad Federal de Minas Gerais/ Brazil	5,044	Universidad Nacional de Córdoba /Argentina
12,163	Universidad de Chile /Chile	4,020	Universidad de Antioquía /Colombia

The information given by this report is formidable and we may continue our discussion, nevertheless we must admit that Chile is not doing as much as it should due to many structural reasons. The reader is invited to access to this report to obtain more information as required. As a country, we strongly believe that we have reached the stage whereby a new paradigm is needed to establish so as to find some sensible solutions in the short and medium term.

3. Discussion

One of the key believes of many family in Chile, is that their youth can reach a title or academic degree in a well-known University. Bearing this in mind, it is highly important that the Chilean Educational System can be the same for everyone. Quality, accessibility, infrastructure, labs, entrepreneurship, innovation, etc. are some of a vast list of requests. We have to face problems of job access in the productive companies, not only in number of positions, also in quality and payment.

So, the relationship between the Higher Educational Institutions, as Universities, and the Productive World throughout the country must be a must. If we don't have the correct chain of processes, the country will fail and be tied in a deadlock system, having hundreds of students with titles and academic degrees without a good job and with a bleak picture in their future. Therefore, the AI procedure and the list of statements previously mentioned must be considered to minimize the errors we have in our Higher Educational System and to ensure a better educational model.

It is a custom in the literature to present the accreditation attributes according to the scopes, say (a) Institutional and (b) Careers. As an example, to the best of our knowledge and for sake of brevity, we might argue that in the United States of America, three relevant areas are monitored according to their quality assurance: students learning, Institutional effectiveness and strategic planning, whereas in Europe, they focus their attention mainly in attributes such as: the objectives of the training program, the personal involved, the facilities and the material resources and the internal quality assurance. We have instead, listed all the attributes we strongly believe that should be considered so as to reach a rather sensible and homogeneous system of education in Chile.

It is important to realize that in our country the main difficulties may be summarized as follows: lack of a strategic planning and design of public policies in education (integration and coordination between the primary, secondary and tertiary sectors), institutional effectiveness (the extreme situation may be observed in the close down of several Higher Education Institutions which have already lost their authorization to carry their educational process due to financial unfeasibility of the educational project. We must also mention that in some Institutions the academic and administrative personal show a deficit of skills. A formal evaluation shows a significant gap between the expected and the resulting role played.

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