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WAKE-UP CALL for Ecuador's universities

Una LLAMADA DE ATENCIÓN para las universidades ecuatorianas

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ABSTRACT

The definition of wake-up call is something that alerts people to an unsatisfactory situation and drives them to remedy it. In this sense, today's publication of QS World University Rankings 2020 can be seen as a wake-up call for Ecuador's universities, SENESCYT, CACES and CES. First, the article assesses the performance of Ecuador's universities using the QS World University Rankings 2020 method. The analysis reveals that the group of Ecuadorian universities with better performance is extremely small and, in addition, most of the institutions included in the 2020 QS ranking saw their ranking declined with respect to their ranking in 2019. Parallel to the QS ranking, the publication record in SCOPUS journals of 11 better ranked Ecuadorian universities was analyzed for the period 2009-2019. The average annual number of published papers increased drastically in this period from 22.2 to 192 (873%), although the surveyed institutions saw their annual publication record raising, some of them were not able to maintain their position. The second section of the manuscript highlights what the Ecuadorian universities ought to do to improve their performance and their contribution to the progress of society. According to the author, universities must urgently invest in quality, take advantage of the potential of modern learning methods, make research a mature and equivalent component, stimulate cross-border collaboration at all levels and convert the spin-off into hubs of innovation. Doing so requires not only a changing attitude of the authorities, but of the entire academic community of professors and researchers, administrative and technical personnel, but most importantly of the government administrations in charge of higher education. To convert public HEIs into institutions that are capable of offering graduates who possess the knowledge and skills necessary to face the challenges of today and tomorrow while ensuring sustainable economic growth in harmony with the environment, universities must be reengineered in a straightforward way. The institutional pillars subject for renewal are described in the third section of this article. To convert the reengineering of the university into a feasible project, it is essential that the ones that make the decisions open their mind and realize that universities in the 21st century require a completely different governance. Additionally, the noses of all personnel should be turned in the same direction, personnel cooperate intensely, and corruption, collusion and nepotism are eliminated.

Keywords: University ranking, 21st century challenges, reengineering of HEIs, shared governance, multidisciplinary nature of problems, inter-faculty and inter-university cooperation.

RESUMEN

Una llamada de atención es una alerta sobre una situación insatisfactoria que impulsa a las personas a remediarla. En este sentido, la reciente publicación del QS World University Rankings 2020 puede verse como una llamada de atención para las universidades de Ecuador, SENESCYT, CACES y CES. En primer lugar, el presente trabajo evalúa el desempeño de las universidades ecuatorianas utilizando el método QS World University Rankings 2020. El análisis revela que el grupo de universidades ecuatorianas con mejor desempeño es extremadamente pequeño y, además, la mayoría de las instituciones incluidas en el ranking vieron bajar su posición con respecto al año 2019. Para el período 2009-2019 también se analizó el registro de publicaciones en SCOPUS de las 11 universidades ecuatorianas mejor calificadas. En dicho período el número promedio anual de artículos publicados aumentó drásticamente, de 22.2 a 192 (873%); sin embargo, algunas instituciones perdieron posiciones en el ranking a pesar de un aumento en su registro anual de publicaciones. La segunda sección del manuscrito describe lo que las universidades ecuatorianas deberían hacer para mejorar su desempeño y contribución al progreso de la sociedad. Según el autor, las universidades deben invertir urgentemente en calidad, aprovechar el potencial de los métodos de aprendizaje modernos, hacer de la investigación un componente maduro y de vinculación con la sociedad, estimular la colaboración inter e intrainstitucional en todos los niveles y convertir la escisión (spin-off) en centros de innovación. Hacerlo requiere no solo un cambio de actitud de toda la comunidad académica -autoridades, profesores, investigadores, personal administrativo y técnico-, sino también, y más importante, de las instancias gubernamentales a cargo de la educación superior. Las IES públicas deben ser rediseñadas de manera directa para convertirlas en instituciones capaces de ofrecer a los graduados los conocimientos y las habilidades necesarias para enfrentar los desafíos presentes y futuros, a la vez que garanticen un crecimiento económico sostenible y en armonía con el medio ambiente. La tercera sección de este



artículo describe los pilares institucionales que requieren renovación. Para que la reingeniería de la universidad sea un proyecto factible, es esencial que los tomadores de decisiones abran sus mentes y se den cuenta de que las universidades en el siglo XXI requieren cambios sustanciales de gobernanza. Además, las narices de todo el personal deben girar hacia la misma dirección, lo cual significa una intensa cooperación, en la que cualquier rastro de corrupción, colusión o nepotismo, sea eliminado.

Palabras clave: ranking universitario, desafíos del siglo XXI, reingeniería de IES, gobernanza compartida, naturaleza multidisciplinaria de los problemas, cooperación entre facultades y universidades.

1. UNIVERSITY RANKINGS

A multitude of classification systems exists, each of these systems uses a specific set of indicators, as for example the QS World University Rankings®, The Times Higher Education University Ranking, SCImago University Ranking, Webometric Ranking, etc. University classification systems often show very variable results, and the question is which one should we trust? Classification systems, therefore, must be used with care, and one ought to be aware of the indicators used in the classification system. However, classification helps identify the position of a given institution at regional, national and international level, and the specific areas in which the institution is weak compared to institutions with a better ranking. Knowing the weak areas, the institution can take the most appropriate measures to improve the institution's performance in education, research, innovation, dissemination, social impact, etc. As example, the ranking of Ecuador's universities according to the QS World University Rankings® 2020 and the institution's ranking based on the record of publications in journals registered in SCOPUS is discussed in the following.

The QS World University Rankings® 2020 system evaluates and classifies a university on the following criteria: academic reputation (30%), employer reputation (20%), academic/student ratio (10%), scientific citations by publication (10%), scientific publications by academics (10%), academic staff with doctorate or PhD (5%), international research network (10%), and WEB impact

(5%). The total score for an institution is the sum of the score on the 8 indicators, accounting the percentage weight of the metrics. The results of the world ranking 2020 for 1000 universities is available on the website <https://www.topuniversities.com/university-rankings/world-university-rankings/2020>, and from this website, the report *QS_World_University_Rankings_2020_report* (pdf) can be downloaded. Only 4 Ecuadorian universities are among the 1000 best institutions on the planet; respectively, the Universidad San Francisco de Quito (rank: 751-800), the Escuela Politécnica Nacional, the Escuela Superior Politécnica del Litoral and the Pontificia Universidad Católica del Ecuador (rank: 801-1000). The other Ecuadorian universities are further down the ranking, and only 17 public and private universities, of a total of 30 public and 49 private institutions are classified. More information on the ranking of the Ecuadorian universities is available in the publication *QS_Latin America_Rankings-2020_report*. This report gives the ranking of the best 200 universities in Latin America. Only the 150 best universities receive an individual classification; those below the 150th rank are classified in bands of 50. According to this report, 11 Ecuadorian universities (USFQ, ESPOL, PUCE, EPN, UCE, UC, ESPE, UTPL, UEES, UDLA, and UCSG) are among the 200 best HEIs in Latin America (see Table 1); and a total of 17 institutions are among the 400 best HEIs (the 11 institutions mentioned before plus the Universidad de Guayaquil (UG) and the Universidad Politécnica Salesiana (UPS): rank 301-350; the Universidad de Azuay (UDA) and Universidad Tecnológica Equinoccial (UTE):

Table 1. World University Rankings® Latin America 2020: 11 Ecuadorian universities classify among the 200 top universities in Latin America, and 17 universities belong to the top 400.

2020 Rank	2019 Rank	Institution	Academic reputation (30%)	Employers reputation (20%)	Ratio Academics / Alumni (10%)	Scientific publications per academician (10%)	Scientific citations per publication (10%)	Fraction of academics with doctorate or PhD (5%)	International research network (10%)	WEB impact (5%)	Total score
Ranking of 11 Ecuadorian HEIs following the publication: The top 200 universities in Latin America 2020											
55	51	Universidad de San Francisco de Quito	44.4	67.6	57.4	24.2	72.0	32.1	52.0	50.8	54.9
64	64	Escuela Superior Politécnica del Litoral - ESPOL	40.2	63.2	49.7	22.3	36.4	30.6	77.1	76.7	51.8
75	70	Pontificia Universidad Católica del Ecuador	38.7	58.6	53.7	8.2	82.3	6.1	57.2	46.7	48.6
98	126	Escuela Politécnica Nacional	28.6	39.1	55.6	31.5	58.4	32.3	60.1	56.5	43.8
139	138	Universidad Central del Ecuador	33.7	46.0	40.0	4.9	37.5	1.4	35.5	30.5	34.4
161-170	151-160	Universidad de Cuenca	21.8	-	-	20.2	96.2	-	64.3	31.8	30.6-32.1
171-180	149	Universidad de las Fuerzas Armadas - ESPE	-	46.2	31.8	19.7	-	-	41.8	48.0	28.9-30.4
171-180	191-200	Universidad Tecnica Particular de Loja - UTPL	23.2	22.8	-	27.9	43.7	-Un	55.6	48.8	28.9-30.4
191-200	201-250	Universidad de Especialidades Espíritu Santo	-	30.8	28.4	23.8	37.5	54.6	-	-	26.3-27.1
201-250	201-250	Universidad de Las Américas (UDLA)	23.5	34.7	-	-	-	-	19.9	-	19.8-26.1
251-300	201-250	Universidad Católica de Santiago de Guayaquil	-	39.7	-	-	-	-	-	-	15.6-19.6
Ranking of 6 additional Ecuadorian HEIs following the website: https://www.topuniversities.com/universities/country/ecuador											
301-350	-	Universidad de Guayaquil	-	-	-	-	-	-	-	-	-
301-350	-	Universidad Politécnica Salesiana	-	-	-	-	-	-	-	-	-
351-400	-	Universidad de Azuay	-	-	-	-	-	-	-	-	-
351-400	-	Universidad Tecnológica Equinoccial	-	-	-	-	-	-	-	-	-
?	-	Universidad Andina Simón Bolívar	-	-	-	-	-	-	-	-	-
?	-	Cambridge School of Language	-	-	-	-	-	-	-	-	-

Table 2. The annual ranking of 11 Ecuadorian universities (EPN, ESPE, ESPOL, PUCE, UC, UCE, UDLA, UG, UPS, USFQ, UTPL) for the period 2010-2019 on the basis of the number of scientific articles published in a journal registered in SCOPUS journal database. The last column shows the ranking of the 11 universities on the basis of the institution's total article record in SCOPUS journal database.

	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	Total
1	PUCE	USFQ	USFQ	USFQ	USFQ	ESPE	ESPE	ESPE	EPN	EPN		USFQ
2	USFQ	PUCE	PUCE	PUCE	UTPL	UTPL	UTPL	USFQ	USFQ	USFQ		EPN
3	UTPL	ESPOL	UTPL	UTPL	ESPOL	EPN	ESPOL	ESPOL	ESPOL	ESPOL		ESPOL
4	EPN	EPN	EPN	EPN	PUCE	USFQ	EPN	EPN	ESPE	ESPE		ESPE
5	ESPOL	UCE	ESPOL	ESPOL	UC	ESPOL	USFQ	UTPL	UTPL	PUCE		PUCE
6	UC	UTPL	UCE	UCE	EPN	UC	UPS	PUCE	PUCE	UPS		UTPL
7	UCE	UC	ESPE	ESPE	ESPE	UPS	UC	UPS	UPS	UTPL		UC
8	ESPE	ESPE	UC	UC	UCE	PUCE	PUCE	UC	UG	UDLA		UPS
9	UDLA	UG	UPS	UPS	UPS	UCE	UCE	UG	UC	UC		UCE
10	UG	UDLA	UG	UG	UDLA	UDLA	UDLA	UDLA	UDLA	UG		UG
11	UPS	UPS	UDLA	UDLA	UG	UG	UG	UCE	UCE	UCE		UDLA
Σ	244	269	354	401	625	1 055	1 676	2 383	3 071	2 112		13 820
Min	1	2	6	8	8	27	46	116	148	126		587
Max	64	81	107	88	92	150	246	394	444	304		2 176
\bar{X}	22,2	24,5	32,2	36,5	56,8	95,9	152,4	216,6	279,2	192,0		1 256,4
STD	20,8	24,0	29,4	26,8	26,8	38,4	69,1	91,9	98,2	63,7		502,2

Legend: Σ = the sum of all registered publications in a year by the 11 universities; Min = the lowest number of registered publications by one of the 11 universities; Max = the highest number of registered publication by one of the 11 universities; \bar{X} the mean number of registered publication by the 11 universities; STD = the standard deviation of the score of the 11 universities.

rank 35-400; and -without rank- the Universidad Andina Simon Bolívar (UASB) and the Cambridge School of Language (<https://www.topuniversities.com/universities/country/ecuador>).

The overall score of the 11 Ecuadorian universities classified in the top 200 Latin American universities varies from 54.9 (USFQ) to 15.6-19.6 (UCSG). From UC downward, the universities do not receive a unique total score since by lack of institutional data not all indicators could be calculated for those universities. Under those conditions, the QS system classifies the universities in an approximate range. An additional observation of the 2020 ranking compared to 2019 is that 70% of the universities in Latin America dropped in ranking. Among the 11 surveyed institutions in Ecuador, EPN, UTPL, and UEEs improved in 2020 their ranking with respect to their 2019 ranking (EPN and UTPL considerably), ESPOL and UDLA maintained their position, while USFQ, PUCE, UCE, UC, ESPE and UCSG dropped in ranking.

In most classification systems, the scientific capacity of a university is measured based on the number of articles published in impact journals, for which the general rule is articles published in journals registered in ISI Web of Science (WoS) and SCOPUS. In the following example, 11 Ecuadorian universities were classified based on their annual publication record in journals registered in SCOPUS in the period 2009-2019. SCOPUS has one of the largest journal databases, covering 36,377 titles (22,794 active titles and 13,583 inactive titles) of approximately 11,678 editors, of which 34,346 are peer-reviewed journals in high-level thematic areas, such as life sciences, social sciences, physical sciences, and health sciences.

Table 2 presents the annual ranking of the 11 selected Ecuadorian universities (EPN, ESPE, ESPOL, PUCE, UC, UCE, UDLA, UG, UPS, USFQ, UTPL) on the number of articles published in journals registered in SCOPUS. The

lower part of the table shows the sum of the annual number of publications of the 11 universities, the minimum and maximum number of records at university level, the average score of the 11 universities and the standard deviation. The last column offers the classification of the 11 universities according to the total number of articles published in a journal registered in SCOPUS, from the first published article to the present. Table 2 depicts the change in the position of the 11 universities based on the institution's record in SCOPUS registered journals. UPS for example improved its position from the 11th (in 2009) to the 6th rank (in 2019), PUCE's position declined from the 1st to the 5th rank over the same period, and UC declined in ranking from the 6th position to the 9th, and most importantly this institution's position declined linearly from 2014 onwards. Figure 1 shows the average production level of articles in peer-reviewed international journals of the 11 selected Ecuadorian universities over the period 2009-2019 versus the production of scientific articles in SCOPUS by KU Leuven² in the period 1965-1974. The average annual production level of SCOPUS registered publications for the 11, publication-wise most productive, Ecuadorian universities is very similar to the annual production of KU Leuven, but 45 years ago. This institution is today the first Belgian university in the QS World University Ranking 2020 and occupies the 80th rank worldwide.

This brief analysis is only related to the institution's ability to publish research results in international peer-reviewed journals registered in the SCOPUS journal database. To obtain a complete image of the scientific production in the format of articles of Ecuador's HEIs, a similar analysis of research results published in national and international journals of a lower level is necessary, for example, in journals registered in Latindex, DOAJ, Redalyc, REDIB, or even local journals not even registered in journal databases. This will not be that easy to accomplish given the large number of active and inactive magazines each

² KU Leuven: Catholic University of Leuven, Leuven, Belgium

institution publishes. Another interesting metric to measure the research level of an institution, but also not so easy to achieve, is the total number of citations. Probably, a simpler inventory could consist in conducting a survey of the citation index of the professors and researchers of each institution.

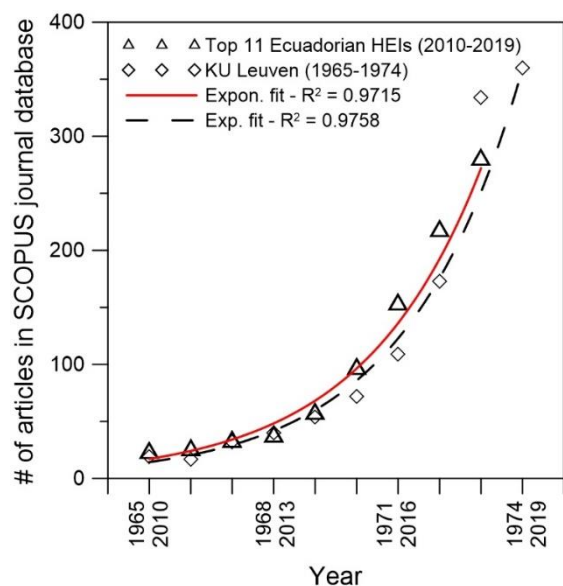


Figure 1. Average number of articles published in journals registered in the SCOPUS database by the top 11 Ecuadorian universities (EPN, ESPE, ESPOL, PUCE, UC, UCE, UDLA, UG, UPS, USFQ, UTPL) in the period 2010-2019 and the number of articles published by the KU Leuven in journals registered in SCOPUS in the period 1965-1974.

The title of an article published on the 27th of May 2019 in the newspaper EL MERCURIO³ mentions that “Ecuador is 20 years behind its scientific innovation environment”. It is the conclusion of a team of national and international experts in the field of scientific innovations who debated in Quito about the need for Ecuador to advance in terms of technological innovation, especially when it is 20 years away from the surrounding countries. According to the experts in the meeting, Ecuador has not made the “leap” that marks a positive impact on the productive sector, despite the introduction in 2008 of the National Secretariat of Science, Technology, and Innovation (SENESCYT), with the aim of promoting the spin-off of investigation. Although, the creation of SENESCYT, translated in number of patents submitted by Ecuadorian residents, is considerable and resulted in an increase of 268% between 2009 (19 patents) and 2018 (51 patents), the number of patents remains low in comparison to Ecuador’s neighboring countries. Experts in the meeting also indicated that Ecuador in 2014 only dedicated 0.44% of GDP to research and development, while the countries of the Organization for Economic Cooperation and Development (OECD) dedicated 2.4% of GDP. Investment in research and innovation in Ecuador amounted in 2014 \$50.84 per capita; for the years following no information is available, not allowing to assess if the country increased investment

in research and innovation. An additional observation, made in the meeting, is that the resources for R&D are very inefficiently used, due to (i) the enormous fragmentation of resources over a large number of public (30) and private (49) institutions; (ii) the weak cooperation between HEIs and industry, between researchers belonging to several units within an institution and between institutions; and (iii) the overall low research level of most universities. One of the conclusions of the experts meeting is that Ecuador needs to change “drastically” because, otherwise, a “drastic, complex and dark” future could occur.

The analysis shows clearly that whatever classification system used, Ecuadorian universities are lagging behind, the HEIs ought to take and implement drastic political and strategic decisions to correct the dramatic backlog in certain areas of the academy.

2. CHANGE COURSE

According to Öszoy (2008) higher education provides an important form of investment in human capital development, and is it rightly regarded as the engine of development in the 21st world economy. This author summarizes the contribution of higher education to development as follows: (i) the provision of manpower to the society with professional, technical and managerial skills; (ii) the provision of not just educated workers, but knowledge workers; (iii) the provision of a new generation possessing the capacity to make possible attitudinal changes necessary for the socialization of individuals and the modernization and overall transformation of societies; (iv) HEIs help through teaching and research in the creation, absorption and dissemination of knowledge, in the formation of a strong nation-state and in globalization; and (v) last but not least higher education allows people to enjoy an enhanced ‘life of mind’ offering the wider society both cultural and political benefits.

Analysis of the QS World University Rankings® 2020, as outlined in previous section, clearly illustrates that a range of HEIs for several reasons do not score well, particular in the middle-income and less developed countries. The latter countries, due in part to the lack of well performing HEIs, have a low to medium Human Development Index, and are still struggling to establish itself in all fronts and make itself sovereign. So to move to the status of “developed country”, an important tasks of the lesser developed countries is to create and/or transform the HEIs to well-functioning engines assisting the society in evolving step-by-step to the status of a country having an acceptable standard of living, health care, industry, infrastructure, transportation, communication and technological advancement, higher per capita income, increase in life expectancy, etc. The question is what a country needs to do for evolving from the current less developed status to a more prosperous society for every individual and the community as a whole? Similarly, what must the HEIs do to improve their entrepreneurship towards society? If the HEIs can improve their role in the society, they will automatically improve their ranking at national and international level. With respect to the

³ <https://ww2.elmercurio.com.ec/2019/05/27/ecuador-esta-20-anos-por-detras-de-su-entorno-en-innovacion-cientifica/>

Ecuadorian HEIs, the question can be raised if they possess the capacity and means to reduce the gap in ranking with the more performing Latin American universities, let alone with the majority of universities in the northern hemisphere. Can Ecuador's HEIs turn the tide?

In the following, based on the analysis of the ample literature on this subject (Reichert & Tauch, 2004; Bryde & Leighton, 2009; Underwood, Williams, & Thurairajah, 2009; Jiju, Krishan, Cullen, & Kumar, 2012; Cardoso, Tavares, & Sin, 2015; Heitor & Horta, 2016; Prakash, 2018) an attempt is made to define what universities today ought to do to improve their performance and contribution to society's progress, and in parallel their ranking. It is complex and challenging, but essential for the regional and country's development. Actions to be taken are:

1. Invest in quality. Programs should be frequently evaluated as to continuously improve their quality. Quality programs require a curriculum that is reviewed and refreshed with emerging content. In fact, learning goals ought regularly to be re-examined and strengthened in tandem with the human capital needs of the society and economy. Foregoing comes down to linking study programs to jobs, involving the linking between universities, the local and international private sector and policymakers.
2. Harness the potential of modern learning approaches, such as activity and experimental based learning, blended learning, online learning, personalized learning, the blending of disciplines, the integration of artificial intelligence technologies, and so on. Social sciences should not be forgotten in the overall picture of education; there are too many stories of technological developments not serving. Cross boundary education programs are more than ever needed. Independent of the study field, teaching should involve more and more the active interaction between docents and students, as to prepare students to the conditions in the workplace.
3. Make research an essential and mature component of higher education. Students when involved in research-based learning will learn more and better than when they would without the integration of research. Doing so, will automatically improve the overall quality of the thesis projects students are supposed to make before graduation, and might lead to a gradual transfer of a classical dissertation to a research or technical note, or even an article, which in turn will contribute to an improvement of the institution's visibility. Further on, teachers in collaboration with researchers should be actively involved in research, and contribute group-wise to innovations fueling local development and economic growth. The latter also involves a strong synergy between academia and industry.
4. Stimulate collaboration within the institution between disciplines and across institutions. A claim often made is that by lack of funding and human resources cutting-edge teaching and research tackling problems related to the local and regional needs cannot be accomplished. Forming collaborations at local level between disciplines and among scientists in different

universities might enable to make progress. Similarly, universities should strive making strong links with the private and public sector. For example, businesses can partner with local universities to create high quality STEM or STEAM curricula⁴. Additionally, businesses could help faculties to design and deliver courses that equip students with both a deep understanding of science and technology, as well as practical skills for the workplace.

5. Develop innovation hubs where students of different fields, including social sciences, and research staff are engaged in experiments pertinent to what their world of work would look like. Hubs will not only contribute to an improvement of the institute's prestige, but also stimulate the public and private sector to invest in spinoffs and start-ups.

The implementation of those and other measures will not only require a fundamental change of the policy and management of the institution's academic authority, but requires most probably an even more adjustment of the philosophy and policies of the government administrations, in charge of the funding, control and evaluation of the public higher education institutes, and the quality control of private universities. The question that should be raised is if in Ecuador, administrations like SENECYT, CACES and CES, did line-up their regulations with what universities stand for and how they should fulfil their role in the technological driven knowledge society of the 21st century? That universities can play their role, shall not only depend from the funding level, but also and perhaps even to a greater extent, of the quality of the regulations applied by these administrations. As an example, the limited success of the costly PROMETEO program is likely due to the fact that the program was not adjusted to the today needs and operation of Ecuador's HEIs. It will be without doubt beneficial for the challenging tasks of the HEIs should administrations, like SENECYT, CACES and CES, fine tune their policy and regulations to what the society expects from higher education; how higher education can be made more performant and contributing to the overall well-being of the society.

A major concern of the 30 public universities, with the exception of a few institutions, is the uncertainty in government financing, which led to numerous manifestations in the past. It is classical towards the end of the year, the beginning of the new calendric year that rumors surge that the government intends lowering the university's budget, primarily because the university not completely spent the budget of the past year, to which the university replies that they could not do so because government funding was transferred late. However, whatever the reason, it is evident that the public universities will use the uncertainty and late transfer of government funding as an excuse of not being able to improve their performance, and as such not being able to improve their ranking at national and international level. However, from economic point of view the question could be raised if it makes sense to invest public funding in universities with a low score in national and international ranking systems. With reference to the HEIs listed in

⁴ **STEM** stands for Science, Technology, Engineering and Mathematics, while **STEAM** stands for Science, Technology, Engineering, Arts and Mathematics. Both, however, are far more than just sticking those subject titles together, it is a philosophy

of education that embraces teaching skills and subjects in a way that resembles real life (Connor, Karmokar, & Whittington, 2015; Madden *et al.*, 2013; Walker, 2015).

Table 1, only 6 of the 17 universities, or 35.3%, are public institutions, representing only 20% of the 30 public Ecuadorian HEIs. Given the relatively large spread in the performances, perhaps a logic decision of the government could be linking funding to the institution's ranking, and to increase government's allowance only when the university shows being capable of moving up in ranking. Of course, the QS ranking system cannot be used for such an exercise since it is not adapted to Ecuador's reality; it would involve the selection of a ranking system adjusted to the Ecuadorian conditions. But as illustrated in several countries (Burke, 2002; Herbst, 2007; European Commission, 2014; de Boer *et al.*, 2015) coupling of funding to the institutions' performance stimulates HEIs to work on improving their performance. Of course, given the overall modest economic situation of the country, the Ecuadorian government could eventually decide to reduce the number of public HEIs, and redistribute the current package of financial resources for higher education over a smaller number of institutions, as a result of which the allowance per institution, whether or not coupled to the institutions performance, will increase and enable the institutions to work on improving their performance. The latter option is probably politically not feasible, neither in the short nor the long term.

Although, Ecuador's better performing universities project themselves as HEIs with national and international recognition for its excellence in teaching with research and relationship with the society, in line with regional and national development plans and with a positive impact on the society, based on their position in the QS ranking system and the fact that most of those institutions dropped in ranking (see Table 1), the authorities of the institutions in cooperation with the contingent of employees ought to take the actions that will result in a gradual improvement of the institution's performance. In essence this comes down to transforming a mainly teaching university to a full-fledged, research and job-oriented educational institute; in other words, turning the university into a higher education institute capable of delivering graduates that possess the knowledge and skills needed to cope with today's and tomorrow's challenges; it is producing graduates that are able in cooperation with all societal actors to improve the well-being of the people at local, regional and country level while assuring sustainable economic growth in harmony with the environment. It is evident, that modernization of the university or bringing the university in line with the requirements of the 21st century is not only the responsibility of the authorities but also of the cohort of academic, technical and administrative personnel. It is a very complex process, all the more as a result of the backlog of the institutions compared to the more advanced universities in Latin America and the economic more developed countries.

In the following section an attempt is made to concretize what exactly can -need to- be done to improve the overall performance of the university to a successful conclusion in the long term.

3. REENGINEERING THE UNIVERSITY IS ESSENTIAL TO ADVANCE

In principle, monitoring and measuring the efficiency and effectiveness of education, both at the lowest and the

highest levels, is a continuous task of the government administration responsible for education as to guarantee that graduates are prepared in the best and most efficient way for the continuous changing challenges of society. There is great evidence that education has a high impact on a country's economic development. According to Dumciuvienea (2015) depends the growth and welfare of a society more and more on knowledge-intensive industries and services, involving an increasing number of personnel with higher education qualification. Economic and social effects and human welfare are directly related to the quality of the educational system, it not only positively affects earnings at the personal level but also non-monetary outcomes, such as health, the health of family members, the schooling of one's children, life choices made, fertility choices and infant mortality. A good educational system also has a positive effect on the environment and has a strong influence on crime reduction. Based on the regression of the socio-economic situation of several countries in Latin America and the overall medium to low ranking of the majority of its higher education institutes is a clear sign that the current educational system is not producing the graduates the society needs to turn the tide. Likely previous is partly due to the allocation of insufficient government funding to education. Given the current country context, the question can be raised what need to be done as to wake up the Ecuadorian higher education platform.

As the first cause of the medium to poor performance of higher education, the authorities generally indicate that the financial means are insufficient to implement the necessary changes. As stated earlier, the cause of this might be that the government budget for higher education is distributed over too many HEIs, a total of 30 public universities for a country population of 17.4 million residents; which amounts to one public higher education institution per 0.59 million residents. A hypothetical reduction in the number of public universities, will likely automatically result in a higher funding for the remaining institutions but at the same time in a higher influx of students, such that it is not that likely that the financial resources per student will significantly increase. It may be probably more obvious for the public universities to conduct a thorough investigation into the efficiency with which the available resources are used, in order to create room for interventions that result in an improvement of the institution's performance and ranking.

Before enumerating a series of measures, it is recommended to first design a global plan in collaboration with the various actors and then submit it to the wider academic community for discussion. Based on the discussions, the plan may or may not be adjusted and/or expanded. The reason for this approach is obvious because of the interaction between the measures to be taken. The overarching goal of the plan ought to improve the educational, research and outreach profile of the institution, and at the same time a strengthening of the interaction between the three profiles. It means, a professor should be involved in teaching and research, and both activities ought to be closely related to the real world; similarly, students should receive an integrated package of learning material and practice that prepare them best for life after the university. An important aspect thereby is that during the education all students are forced to cultivate the pursuit of lifelong learning. In contradiction to the past, learning does not stop at graduation; the dynamics of

today's society requires continuous schooling during the professional career. This is not only true for the students, even more for the academic staff and researchers. They should be ahead and being able to integrate all new technological and sociological developments in the study material. Important side aspects that ought to be included in the renewed learning process are the knowledge of the English language, the development of the culture of reading and writing, the working together among students and the lecturer, and the connectivity and interaction with the society.

Main shortcomings in the current system, most often a consequence of unrealistic and poor government regulations, is that the primary task of academic staff is teaching, with a teaching schedule varying between 16 and 24 hours in a week, leaving extremely little time left for other academic tasks such as research and the supervision of students. Supervision of students in their reading, writing and learning is super-important, because that is the way that the attitude of self-learning emerges and strengthens. It is really old fashion such a heavy teaching load at university level. Even more old fashion is the government regulation that the number of alumni in the class should not exceed 30 to 40 students, as a result of which the method of education at the university reduces to the educational approach at high school level, where the professor transfers knowledge to the students spoonwise. The learning process must be organized in such a way that students make the greatest effort and the teacher mainly acts as a coach of the learning process. In order to get the students to take control of the learning process themselves, many modern learning techniques can be used, such as blended learning being self-study combined with group discussions, distant learning, etc. The step needed to reduce the number of teaching hours consists in either the organization of teaching in large lecture rooms with a capacity between 150 to 500 students equipped with audio and other technological devices enabling the lecturer to interact with the students, or the WOW⁵ Room concept, being today the most advanced lecturing approach that breaks with the traditional onsite, blended and online education models. The lecturer stands in a virtual classroom (<https://www.timeshighereducation.com/world-university-ranks/ie-university>), with a curved wall of screens, displaying the images of up to 80 participating students, who are joining the class from different places. During the lecture students can contribute and join the debate. High level courses of the institution can in this way be followed by students of other universities and will contribute to an improvement of the prestige of the institution from where the class is broadcasted. Indirectly, it might stimulate team lecturing, whereby academicians from different disciplines work together in the development of advanced lecturing material. This evolution will lead to the organization of common courses over the boundaries of faculties, and with the use of modern teaching technologies will strongly reduce the teaching load of the contingent of professors, creating hours the academic staff can devote to research and other academic activities. The evolution on lecturing approaches in the near future will be enormous and according to Hauptfeld-Göllner (2016) it is to be expected that in 2030 eighty per cent of lecturing will be delivered by massive open online courses, online courses, video and video-call sessions from experts in the field, methods that

do not require attendance in class. Not to run after the evolution in lecturing, Ecuador's universities be better prepared and stimulate staff to master the new developments in lecturing and stimulate them to apply the new technological-based lecturing methods step-by-step in their teaching.

The hours that are released as a result of the reorganization of teaching provides the opportunity to academic staff dedicating time to research, which in the long term will result in an increase in the production of scientific articles positively affecting the institution's ranking, and social and technological contributions to the society, essential with regard to the justification of the public financial resources HEIs consumes. Getting into research when the main academic activity has been teaching is not that easy; this also applies to the new generation of graduates when their education is still based on the old approach, i.e. essentially passive absorption of knowledge. For students it is a must to be actively involved in research during their study and, in addition, trained in the reading and analysis of research papers, preferably related to the subject of specialization. Not only scientific articles in their mother tongue, but also the reading and analysis of articles in English should be mastered, because the English scientific literature cover a broader view of the scientific developments around the globe.

In preparation of the dissertation, students should also be trained in academic writing, and this from the early years of the program onwards. Foregoing requires that solid research groups are present in the institution, yielding research applications suitable to be analyzed and handled by students, and this during the development of the undergraduate and/or graduate thesis project. It is fundamental that the thesis project not only reduces to a scientific exercise such as the review of literature but deals with technological and societal developments and the finding of appropriate economic solutions for the broad spectrum of societal problems. Previous can only be realized given research groups be in touch and cooperate with the various actors of the society.

To get the staff with low to moderate experience in research actively engaged in investigation it is essential that coherent and well-functioning research groups are present in the university, to which they can be associated. The latter can only exist and survive given academic personnel and researchers work together. Working together becomes very important given the complexity and multidisciplinary nature of the problems the society is confronted with. The effectively and success with which solutions are generated might even increase when cooperation links are established between scientists belonging to different national and international institutions. Working together, over the borders of the faculty and the institution, in connection with the society becomes every day more essential to make progress, something that seems to be very difficult and not very common in the Ecuadorian society. To train the young generation in this, it is imperative to organize during the program project-oriented activities in which the students are trained in group work, a skill very much needed in professional life. In a modern HEI ought teaching and research, both with a connection to practice, to be interwoven and students are supposed to play an entrepreneurial role.

⁵ WOW room: Window on the World room

What without doubt obstructs the operation of public universities is the awkward and cumbersome hassling of documents. For every activity or action, a set of documents need to be prepared and signed at different levels of the administrative hierarchy; for example, contracted staff have to prepare every fortnight or month an outstanding report of their activities, reports that are seldom or even not read. Enormous time is lost in the passing of documents from one level to another level. The continuing dominance of the administration is also likely the consequence that professors by tradition possess a very individual attitude and do not have attention to emerge as a coherent front to rise in rebellion, and urge the administration to modernize, to be an aid in teaching, research and outreach, not an obstacle. The nature of the role of the administration should be supporting the authorities, professors, researchers and students in the organization and handling of administrative matters rather than to take the lead and overload the institution with needless and inefficient bureaucratic matters, for the simple reason as to stay in control of the strings. Time is running out, the administration of public HEIs ought to shift the focus of control to service.

Furthermore, typical for the public institutions is the development of regulations; for each new initiative an agreement is made subject to approval at the different levels of the hierarchical ladder. Similarly, the handling and financial processing of research projects are complex and it is not exceptional that for this reason academic staff does not want to initiate research activities. The complex nature of the administrative procedures should not be surprising, given the bureaucratic character of government services. The working method contrasts sharply with the procedures at overseas universities. There, the emphasis lies on the approval of the project, and once approved, it is the responsibility of the project coordinator to implement the project in terms of content and received financial means. Usually, the project coordinator, a professor or appointed researcher, has an institutional online bank account on which the project funds are deposited, and he/she can manage the financial resources in accordance with the specifications in the approved project proposal. In the event of deviations in the use of financial resources, the coordinator must request prior permission from the donor. The online research accounts are so designed that the project coordinator cannot spend more than the awarded grant. Such an approach simplifies considerably the administrative control and handling of research projects. It is the responsibility of the project coordinator to submit a financial and substantive report to the donor for approval upon completion of the project. The nowadays available digital and innovative technologies should be applied in a responsible way to streamline and simplify all bureaucratic processing, not only the bureaucratic handling of research projects but also the administrative processing of all services. The administrative services in public universities absorb a considerable fraction of the annual budget, and by their upgrading more means could become available for teaching, research and extension, the primary objectives of higher education.

The most difficult problem to deal with in the reengineering exercise of academic institutions are the

authorities, who have been in charge of the management of the university for decades. The question can be raised if they are really preparing the institution for the 21st century, taking into account that most of the time they operate and manage the institution with 20th century thinking (O'Brien, 2008). It is fair to ask if the governance structure of today is suited for the complexities of higher education in the 21st century? As formulated by Santa Ono (2017), the 15th President and Vice-Chancellor of the University of British Columbia⁶ "Do the participants in governance – the Consejo Universitario – have the expertise, the discipline, the authority, and the accountability necessary to cope with the powerful social, economic, and technological forces driving change in the society and its institutions?". Today's challenging academic environment demands a new way of governance. Governance in most of the public higher education institutions in Ecuador is top-down and geared to remain in control of power. The University Council – the so-called democratic decision organ of the university – in which, in addition to the authorities, the deans and vice-deans, the directors of a number of administrative services participate, are organized bi-weekly and discusses usually for hours on regulations, faculty and other matters, but seldom a debate is held how the institution should evolve, adapt, and governed. From a small nuclei of governance, the governance system urgently needs to evolve to "Shared Governance", consisting of a dialogue among boards, directors, deans, faculties, administrative services, staff and student unions, etc. It is even desirable to include into the board of the institution highly representatives of public and private institutions, as to be well informed of the socio-economic situation in the field. It is complicated yet it is a much-needed path, and more and more discussion around the globe are taking place on shared governance. Important issues to be tackled by the authorities are the delegation of authority, responsibility and decision making, controlling that the government at the different levels is free and remains free from corruption, collusion and nepotism, continuous updating of the institution's mission, evaluation if the institution fulfills its mission effectively now and in the future, and if necessary taking sound, corrective and effective measurements.

4. CONCLUSIONS

The performance of the Ecuadorian universities is, according to the QS World University Ranking system, not so excellent, only 4 HEIs of the 30 public and 49 private institutions are among the 1000 worldwide highest ranked universities. At the level of Latin America, 11 universities rank among the top 200 institutions, and a total of 17 institutions are within the top 400 HEIs. Publication-wise accumulate Ecuador's top universities a tremendous backlog of the order of 45 years in comparison to educational institutions belonging to the world 100 best ranked institutions. The main focus of most public and private HEIs in Ecuador is on teaching and the governance of the institutions is still very much alike as the way higher education institutions were governed in the 20th century,

⁶ <https://president.ubc.ca/speech/2017/03/03/university-governance-in-the-21st-century/>

it is a top-down governance. To improve the institutions performance and beneficial effect towards the society, universities should teach students to be successful in a 21st century knowledge-based economy, train the students heavily in entrepreneurship, self-learning and discovery, be more involved in research preferably in close cooperation with the economic and social actors of the society, evolve from the 20th century type of governance to shared governance consisting of a delicate balance between faculty and staff participation in planning and decision-making, on the one hand, and the authorities and administration on the other hand. Improvement of the institutions' performance is possible given: (i) the authorities wake-up and realize that a modern university requires a different governance and management, a system in which the academia instead of the administration governs; (ii) individual professor's to the whole system work on fostering basic academic values (academic freedom, autonomy, excellence, university community, and so on); (iii) a proper environment and institutional mechanisms (formal and informal) are in place; (iv) a transparent cooperation in teaching, research and outreach over the borders of the faculties and institutions at national and international level is pursued; and (v) staff and employee nomination and promotion is based on employee's performance. The regulation to recognize and reward teaching and research contributions through nomination or promotion enables the university to achieve its strategic teaching and research goals, while simultaneously advancing and sustaining its community of academics and research scholars and their professional standing in the national and international environment.

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