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DEVELOPMENT OF GEOMETRY AND TOPOLOGY IN THE STATE UNIVERSITIES OF IRAN (2018-2022)

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IN THE MEMORY OF DR. MOHAMMAD ALI ASADI-GOLMANKHANEH (1955-2022)

ABSTRACT. This note considers the speed of growth of the geometry and topology community of the country in the 5-year period of 2018 – 2022. According the published statistics, there is no growth in human resources, and expecting growth in the number of publications or significant scientific achievements does not seem so logical. Indeed, a logical outcome of such an observation, together with the announcement of officials regarding growth in science and publications is that this growth is related to other branches of science and not basic sciences. Basic sciences have actually experienced a negative growth in human resources. The descending number of academic member of staff at some of top rank universities in the country, is an example of such a saddening phenomenon.

1. Introduction

Point of view. Our main point of view is that the development in the number of experts in a branch of science is the main reason for the development of that branch of science (and its survival) in a society. In a sense, we think of this as the development of science itself. Accordingly, we believe that if we wish to quantify the development of a branch of science in a society and express it as a function

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then the number of experts in that branch of science must be one of the main and deciding factors in any such function. Indeed, we do not wish to define the development of (a branch of) science and we rather are interested in studying the change in the number of members of a scientific community (here the mathematical community) as a measurable quantity. We will try to convince the reader that such a study is important.

Development of science. The development of science, or a specific branch of it, in a geographical region, often a country, is a difficult and challenging problem. The first challenge from our point of view is that such a study should be an outcome of a study of the related scientific community itself as its members have the best knowledge about the shortcomings of their scientific society. Regarding mathematics, and specially geometry and topology, although the problem of development of this branch of mathematics has been discussed in gathering and semi-official meetings, but we do not know of any systematic study by the members of the community regarding this problem. However, the problem of studying development of science is challenging from another point of view which is observed in the criteria that are used to measure such developments. One of the most initial tools is counting the number of published papers in a branch of science in a specific period of time. But, this criterion, which we believe is a wrongly chosen and insufficient criterion, is itself under study (for instance see [2]). Some related deeper criteria are trying to associate numbers to the quality of papers or journals or the number of citations. Indeed, from someone out of the community, such criteria might be seen as the real tools which measure the development of science. But this could not be the case for several supporting reasons. In fact, such criteria only measure outcome of a specific type of scientific activity (writing papers) and by no means reflect the scientific achievements of a scientist. We believe that the number of students, lecture notes or preprints, discussions with various colleagues, participating in conferences, etc. all are examples of someone's role in development of science. More surprisingly, such aforementioned criteria measure outcome of an activity and not activity itself the counting number of papers. It looks like that we evaluate quality of teaching of an academic member of staff in a class by the final marks of the students or their mean or their average which is really about the activity of students and not the lecturer. It seems evident that using such measures to evaluate academic member of staff have negative impacts on the development of science.

Development of a scientific community. By a scientific community we mean the number of full time academic member of staff and postdocs in a specific branch of science. This society has a number of members and by development of a scientific society in a period of time we mean the change in this number in that period of time. We believe this is a more clear criterion to study.

2. Main Results

The main observations/results of our study are as follows

- In the period of 5 years which we have considered, there were at least 320 PhD graduates who were on the job market. This excludes those who have studies abroad.
- In this period, the state universities have hired about 32 of these graduates across the whole country.
- Noting that there are 607 state universities that could have hired these people, we conclude that the number of geometry and topology experts in many state universities has been a fixed number if not decreased.
- It is not logical to expect high level of activity and growth in the number of scientific production of this shrinking community.
- The country sadly is moving towards a death of scientific schools and traditions. The scientific communities have lost their potential followers and are unable to pass their heritage to the future generations.
- These number show that we are well behind the targets specified by the Scientific Map of the country that has predicted/suggested minimum values of the number of academic member of staff required to guarantee the scientific growth of the country and ensuring a scientific leadership position for the country in the region and worldwide.
- All of these sad news are coming while the country has the potential to provide a continuing flow of highly educated recent scientists to the neighboring countries in Persian Gulf and the Middle East. By the state published statistics, Iran has number of graduated much bigger than many countries in the region together.

3. Summary of Proofs/Conclusions

Our observations and result are based on publicized official statistics published by various organizations. Indeed, not in all cases we have access to precise numbers and in such cases we appeal to approximate numbers. For instance, the number of people in the job market for the period of 5 years that we have considered, is approximated by the number of PhD graduate in the 5 years period before. To attain the numbers in [8] we are able to offer an average velocity for the growth in the number of academic members of staff. The estimated values then help to make an estimation of the actual velocity in hiring new member of staff which is nearly 0. The numbers published by [5] also confirm our estimation. We are able to compare the policy of growth in the number of PhD students in the country to those in Saudi Arabia as a leading country in the Arab world and a member of G20 [1],[3] to show that the country has the potential to scientifically feed and support these countries and their institution, at least in terms of providing highly educated academic members of staff.

We then end to suggest that almost nearly a century of the foundation of the University of Tehran and ratification of its rule in the Iranian Parliament, it is now time to rethink about the philosophy of

higher education in the country and make policies not only based on need, but also based on a clear vision towards future and responsibility with respected to the future generations, helping the scientific communities, schools, and traditions to grow and flourish.

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