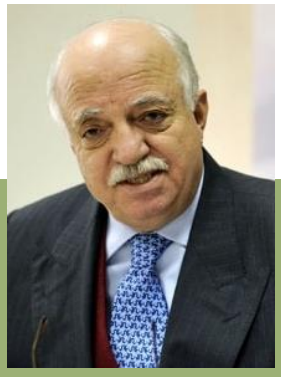

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URAP (University Ranking by Academic Performance)

Entrepreneur universities towards 2030's

1. Introduction

In order to forecast the future of higher education properly it may be appropriate to recall the evolution of schools to universities. It is known that the first schools were founded 5000 years ago by Sumerians. When we talk about the universities we should bear in mind that the Sumerian scribal schools were the first giant step for the foundation of higher education institutions. Sumerians created the numerals and then around 3000 B.C. developed the alphabet. The kings and the priests needed clerks to keep records for them. The number of clerks was not enough to meet the demand. The Sumerians were the first innovative civilization who designed the formal schools. The Sumerian scribal schools became a model for schools of all civilizations afterwards. The kings in Mesopotamia did not know how to read or write. The clerks wrote all messages of the kings, and read the arriving messages to them. The clerks made copies of medicinal, technological and religious documents and had knowledge about those subjects which made them the first polymaths. Since some of them taught in scribal schools, they may be considered as the ancient academicians. The scribal schools being the highest education institutions of their time can be considered as the ancestors of universities. Hittites, Egyptians and Chinese opened their own schools later. The schools of Athens appeared around 450 B.C. Few centuries after early Greek schools, the first schools in Europe were established which later inspired the idea of founding Bologna and Oxford universities.

2. ICT and MOOCs will cause significant changes in universities

Since the establishment of Sumerian schools, the basic principles of teaching have not change significantly. Sumerian classrooms were special rooms dedicated for teaching, a teacher lectured in the classroom, the students had to pass the exams and graduate from the school after completing all courses, like today.

Of course the infrastructure of universities, the quality and the number of teaching staff now is incomparable to Sumerian schools (or even to the universities of 1980's). The widespread availability of desktop computers and internet in 90's created significant changes in our methods of teaching. Information and Communication Technology (ICT) created a new world for the academicians as well as the students. Universities must prepare themselves to use ICT as a significant platform in teaching. They must also be prepared for delivering most of the courses using blended learning methodologies. All high school graduates entering the universities will be highly digitally literate; they will prefer the universities which are best equipped with ICT infrastructure. If some universities do not have proper infrastructure, their students may prefer to follow on line lectures of top lecturers in the world. Then they may start to criticize the quality of lectures given in their own universities on social media, which may harm the reputation of their universities. The universities must use simulators and 3D technologies in some classrooms and laboratories as soon as possible. Reducing cost of sensor technologies will make it possible to measure gaze of computer users by interactive sensors. In future, personalized learning interfaces, such as MOOCs will employ those technologies. This will allow universities to make inferences about learners' interest by following their gaze patterns in online learning sessions. Learners' personal experience during the course of learning, such as difficulties in learning a specific topic may also be analyzed. Adaptable learning environments will incorporate technological development to fulfill the requirements of developing individualized learning systems of the future. Even though some experts suggest that MOOCs will replace traditional teaching in 15 to 20 years, this may not happen so quickly. Presently there are some problems with MOOCs, such as not giving credits or a diploma to the students. The other one is that only about 10% of the students complete those courses. Universities should offer online degree oriented programs for adults to help them to find better jobs. Universities should motivate their best lecturers to prepare on line courses. They will need talented lecturers to deliver MOOCs in English to attract international students.

> International students will be of great importance to higher education institutions in future

3. International students will be in high demand in near future

International students will be of great importance to higher education institutions in future. They will globalize the academic environment more than other factors. The number of international students between 2000 and 2012, increased from 2.0 million up to more than 4.0 million. The increase is expected to grow faster in the next 20 years which will intensify competition between universities. Internationalization in universities creates opportunities for global partnerships. In about 20 years, significant population increases are expected to occur in developing countries. This will increase the demand for higher education which will be a great opportunity for universities worldwide, to attract high quality international students. The international students will be more technologically literate than today. Their higher expectations will increase international competition. All universities must develop new strategies to attract a higher share of top international students. In 2012 highest numbers of international students were in: USA (18%), UK (11%), France (7%), Australia (6%) and Germany (5%).

4. Cross-border higher education activities will enhance globalization

Mobility of students as well as faculty members in and out of the countries must be increased considerably by all universities. Increasing the number of mobile students and exchange of faculty members will enhance international profile of universities. The top universities in the world employ a large number of international faculties. The universities in future will compete with each other to employ the top academicians of other countries. Increasing the number of international students and employing the best postdocs will increase the number of international faculty. The students sent abroad for 2-3 semesters act as catalysts to enhance future student exchanges. There will be significant advantages of sending academicians abroad too. Top academicians, sent to developing countries will help their universities to modernize their teaching models and to initiate new research projects. This will improve the reputation of the university in the host countries and will attract students and post-doctoral researchers from those countries. Academicians, who are sent to top universities, will have a chance to work with the leading scientists of the world which will enhance future international research collaborations with top universities.

5. Double major or minor degree diplomas will make a difference

Fast development of computers, mechatronics and artificial intelligence will direct the robots to enter our everyday life. Service robots are expected to be one of the major industries in future. By 2030, robots are expected to replace a significant percentage of the labor force in developed countries. It is not easy to forecast which professions will diminish or disappear in future. To cope with this, the universities must educate the students with flexible curricula to equip them with a broader knowledge in several fields. The universities must design cross disciplinary curricula and design new courses to be partly taught by professionals from the industry. They should encourage the students to graduate with double major or two minor degree diplomas. All students must take part in cultural activities, arts and sports. These measures will give them a chance to find a new job through their second major or one of their minor degrees in case they lose their jobs. They may even find a new job related to one of the student clubs in which they were active. The universities must be prepared to open new departments and perhaps close some others due to new technological advances.

6. Entrepreneurship courses are essential elements for high technology

In near future all countries will need a large number of entrepreneurs for developing high technology products. The students and alumni need to be exposed to culture of innovation and entrepreneurship at universities to be successful entrepreneurs. The development of countries enhances as they increase the number of niche technologies that they create. The entrepreneurship courses must be used as an essential tool to enhance university industry collaboration. These courses teach the students to differentiate between an idea and a real business opportunity. They learn how to build business models and how to adapt them to the needs of the market. These courses will help the students to learn about technology transfer system and global entrepreneurial networks through the

universities. The students will learn the guiding roles of universities, science parks and business angels on entrepreneurship. Those courses help them develop business plans and build technology based companies. Later they can scale their companies and be part of global networks. As a result the students, universities and their countries will be able to produce and export new high technology products. The entrepreneurship courses will direct many students to set up their own businesses rather than keep looking for a job.

> Entrepreneur universities will be well prepared for future cuts of government support on research budgets

7. Technology Incubators for young faculty and students

The fast growth of technology is expected to cause the developed countries to be even more developed. The technological gap between highly developed countries and the rest of the world is expected to increase further more. Therefore the universities must guide the regional economic initiatives through new technologies. Universities must promote the development of high technology businesses as well as spin-off companies by their faculty and the students. The universities must support and guide the technology entrepreneurship and emerging technologies in their countries. Only the universities can bring together the university based and the private technology entrepreneurs for the growth of niche technologies. The most productive way for universities to guide the development of niche technologies is to establish technology incubators. If they cannot establish incubators by themselves they must take part in the present ones. If there is no local technology incubator, they should convince the authorities to establish one. They should share the incubators with other universities to create synergy. The universities should integrate the young faculty and students in incubators for the emergence of high technology products. Universities must facilitate technology transfer, licensing and joint venture opportunities for the entrepreneurs in incubators. Success of technology incubators will help universities to create higher research funds in the long run.

8. Science parks of universities enhance collaboration with industry

In 2012, IASP International Board defined science parks as: “An organization managed by specialized professionals, whose main aim is to increase the wealth of its community by promoting the culture of innovation and the competitiveness of its associated businesses and knowledge-based institutions. To enable these goals to be met, a Science Park stimulates and manages the flow of knowledge and technology amongst universities, R&D institutions, companies and markets; it facilitates the creation and growth of innovation-based companies through incubation and spin-off processes; and provides other value-added services together with high quality space and facilities”. In near future the importance of science parks (technology park) owned by universities will be more important than ever. Collaborating with industry will reinforce the role of universities as leaders of innovation for the growth of their countries. One of the best tools for universities for fruitful collaboration with the industry is to own or be part of a science park. Possibly 15 years from now, the main indicators to rate the research performance of

a university will not be the number of articles published or citations received alone. Number of patents received, number of spin-off companies and intellectual properties owned by the universities will be just as important. The universities will need to increase the number of product oriented collaborative research projects with industry. A significant number of academics, graduate and some of the undergraduate students should be part of innovative projects developed in science parks. The companies in science parks need the scientific back up of faculty members and graduate students to develop niche technologies. Silicon Valley is the first science park of the world which was founded in late 1950's in California. Silicon Valley, Research Triangle and the other science parks in USA played important roles in increasing the level of high technology products of USA.

Nine predictions of the future of higher education:

1. ICT and MOOCs will cause significant changes in universities
2. International students will be in high demand in near future
3. Cross-border higher education activities will enhance globalization
4. Double major or minor degree diplomas will make a difference
5. Entrepreneurship courses are essential elements for high technology
6. Technology Incubators for young faculty and students
7. Science parks of universities enhance collaboration with industry
8. State universities must be prepared for performance based budget
9. Major problematic developments should be solved by universities

9. State universities must be prepared for performance based budget

As the demand for higher education increases, the enrolment and the number of state universities will also increase. The students will demand better infrastructure on campuses, cheaper room and board as well as scholarships. As the technology develops, the cost of basic research in universities will also become more costly. The governments will not be able to meet the ever increasing cost of state universities. Presently in many countries the budget allocated by governments to state universities is mainly based on enrolment. In some countries certain part of the budget is based on performance. In future most of the governments are expected to slowly shift to performance based budget allocation. Since governments cannot cut the budget of basic needs, their financial support on research will be based on performance. If the universities spend a certain portion of their research budget on applied research, they can have some return from royalties, patents, copyrights and trademarks. Therefore they can generate more funds for research and have a chance to increase their research performance. The annual research budgets of Harvard, Stanford or MIT are more than 800 million US dollars. The percentage of federal support of their research budgets is about 70 percent. They earn millions of dollars from royalties, patents, copyrights and trademarks. In future, only the entrepreneur universities will have high enough research budgets. Entrepreneur universities will be well prepared for future cuts of government support on research budgets. High research budgets will help universities to create funds to spend more on research and produce more patents and scientific articles. As a result they can step up in world rankings and receive more funds from national and international

sources. Some governments may start to use ranking results for performance based budget allocations. Therefore the universities must do their best to step up in rankings.

10. Major problematic developments should be solved by universities

Some problematic developments are expected to take place in future which will require solutions from universities. The followings are just a few of those: a) water shortage b) aging population c) petroleum, coal and natural gas shortage d) genetically modified foods etc.

CONCLUSION

Technological developments will enforce universities to restructure their teaching platforms. They must follow the rapid developments of ICT and MOOCs and start using blended teaching methodologies. They must plan to start using simulators and 3D technologies in some teaching laboratories and classrooms. They must develop flexible curricula to educate the students with broader knowledge in several fields. They should exchange a significant number of international students and academics to enhance cross-border higher education activities. In future, entrepreneur universities will have more chance to adopt themselves to technological developments and to performance based budget allocations. Universities which have access to technology incubators and science parks will be better equipped towards 2030's. They will step up in rankings and receive higher shares of research funds from national and international sources.

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