Strategy and Challenges for Setting Up an Institute of Technology at Hawassa University in Ethiopia

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Abstract—The best asset of a nation to secure affluence and inner peace is a well educated population with a profound knowledge in modern technologies. Hence, the development of higher education is a touchstone towards achieving food security, alleviating poverty, eradicating diseases and other social problems in Ethiopia. In November 2005 the bilateral Ethiopian-German Engineering Capacity Program (ECBP) was launched to enhance the role of the industrial sector as a source of employment and economic growth. The program focuses on reforming the education in the fields of engineering both at universities and at vocational institutions. Achieving this goal setting up autonomous Institutes of Technologies within the universities providing quality teaching and research combined with an efficient technology transfer is viewed as a high priority. This paper presents the fundamental, thoroughgoing change management that is required to transform the previous Faculty of Technology into an Institute of Technology at Hawassa University. A developed strategy plan is shown and the challenges are described under the prevailing policies and cultural background in Ethiopia.

I. INTRODUCTION

Ethiopia’s industrial sector has enjoyed annual economic growth rates of about 10% in the past 12 years due to an ambitious industrial policy. In the course of this impressive development due emphasis has been placed on and efforts are being undertaken in the higher education sector for the past 20 years to enable the provision of relevant, demand-driven and practice-oriented education in the fields of technology and engineering. The University Reform Component of the national Engineering Capacity Building Program (ECBP) that was launched in November 2005 as a bilateral Ethiopian-German program addresses a number of key issues including university governance, human resource development and university-industry linkage, among others. It supports nationwide reforms in the existing universities and the establishment of new universities that are indispensable to the industrial development of the country.

Since there were only three universities in 2000 the number increased to six in the year 2005. In 2010 further 16 Universities were in operation and at present there are 32 Universities either already established or still under construction. This dramatic and ambitious growth is accompanied by a huge increase of student numbers, teaching staff and administrative personnel. While in 2000 only a few thousand students had a chance to receive a higher education, mostly at Addis Ababa University, currently more than 250,000 students were enrolled in public Universities.

In the past, the educational system at universities, i.e. in particular at the existing Technical/Technology Faculties, were characterized by centralization, bureaucracy, a lack of access and equity, gender inequality, low staff profiles, high staff turnover, insufficient competence of graduates, poor infrastructure as for laboratories and research equipment, low commitment and responsibility of academics and minimal involvement of the general public in the educational process.

A key for fundamental changes as for higher technological education at universities is the Engineering Capacity Building Program which includes essential issues such as curriculum development, academic staff qualification, university infrastructure and governance, technology transfer, among others. The transformation of the previous engineering/technology faculties into far reaching autonomous Institutes of Technologies in which practice-oriented engineering education and applied research prevails and stronger emphasis is placed on university-industry linkage is given paramount importance by the Ethiopian Government.

Currently, six Universities nationwide are selected for this transformation process, i.e. introducing a profound change management for setting up effective Institutes of Technologies within their mother universities. One of these universities is Hawassa University in the southern part of Ethiopia located in the Ridge Valley which is known as the cradle of mankind.

Hawassa University

Hawassa University was established at the town of Hawassa on April 2000, by merging three colleges in Southern Ethiopia: Awassa College of Agriculture, Wondogenet College of Forestry, and Dilla College of Teachers Education and Health Sciences. Prior to the formation of the university, these three colleges were working separately and had their own historical backgrounds.

Awassa College of Agriculture was first established in July 1976 to offer a 2-year diploma course with specialization in Plant Science, Animal Science, Agricultural Engineering, and Home Economics. The main objective of the college was training middle level technicians that would serve as agriculture development and home agents all over the country.

In the 1990-91 academic years the college launched a four-year degree program in Plant Production and Dry-Land Farming, Animal Production and Range Land Management and a five-year Program in Agricultural Engineering and Mechanization.

Wondogenet College of Forestry was established as Forestry Resources Institute in January 1978 to train forest technicians in a two year diploma program. In 1996/97 academic year, the college was upgraded to a four-year
degree program following the transfer of the Forestry Faculty from Alemaya University of Agriculture to Wondogenet College of Forestry. The graduates of the College represent a major fraction of the trained manpower that handles the managerial and technical tasks of forestry development and environmental protection.

Dilla College of Teachers’ Education and Health Sciences was established in 1996 with two faculties: Faculty of Teacher Education and Faculty of Health Science. The objective of the college was to train secondary school teachers and mid-level health professionals. The college is upgraded to the level of an autonomous university in 2006.

Due to its geographical location and other advantages, Hawassa was chosen as the administrative centre of the University. Following the establishment of the University, the Faculties of Social Sciences, Natural Sciences and Technology came into existence at Hawassa-Main Campus. Hawassa University is a comprehensive university with more than 21,000 students and 2,500 employees. It offers undergraduate and graduate courses ranging from Medicine and Health Sciences, the Natural and Physical Sciences, Technology, Agriculture, Forestry and Natural Resource Management, to Law, Business, the Humanities and the Arts. The University has four campuses, four institutes 25 departments, a teaching hospital and a teaching hotel.

The academic staff profile of the University at present is:

On duty

Professors 3; Associate Professor 12; PhD holders 51; MSc 419; BSc 271

On leave

PhD students 119; MSc students 156

The university is undertaking a range of research projects in collaboration with national and international research and education organizations. The research projects are in the areas of agriculture, forestry, food sciences, health, education, environment, social sciences, and engineering.

Within this environment and cultural background the Ethiopian Ministry of Education decided to set up an Engineering Capacity Building Program in cooperation with the German Government (GIZ) to improve the deficits in the higher engineering education and to cope with the explosion of student numbers. The German engineering education system with the focus on practice-orientation was regarded as a suitable example for Ethiopia. In this context an Institute of Technology at Hawassa University was founded which replaced the previous Faculty of Technology. This Institute ought to provide academic excellence through university-level services in education, research and technology transfer serving the demands in Southern Nations, Nationalities and People’s Region (SNNPR). Concentrating on specific fields of study, research and consultancy that are essential for the region and the country as a whole it will build up its own unique identity by administering its educational business autonomously as far as possible from its “mother” Hawassa University after a given transformation period.

II. STRATEGIC STRUCTURE OF THE HAWASSA INSTITUTE OF TECHNOLOGY (HIoT)

The organizational structure in Fig. 1 follows the ECBP governance framework /1/ with slight modification to suit the existing situation peculiar to Hawassa University /2/. This governance structure is based on the assumption that the HIoT is legally recognized as an autonomous unit beneath the leadership of the University’s top management. In this context, the structure has to provide the HIoT with autonomy in management and administration, and a means for ensuring accountability to its Supervisory Board and the University.

The HIoT’s degree of independence from the university and the extent of its autonomy have been clearly stipulated in the rules and regulations for the establishment of this unit. The various units in the organizational structure are separated into the following three levels:

- The strategic level includes the boards which the HIoT is accountable to, i.e. in particular to the Ministry of Education (MoE) and the Supervisory Board as the HIoT strategic leadership
- The management level consisting of the HIoT’s Managing Board and the HIoT-Council
- The operational level which is made up of all academic and administrative units that are accountable to the HIoT’s Managing Board, i.e. academic units are accountable to the Scientific Director whereas the administrative units to the Managing Director.

The organizational structure in Fig. 1 will allow the HIoT to develop its core activities to meet further demands and considering future circumstances, such as the student enrolment, curricula revision, research activities, and technology transfer. The structure has been organized in a flexible way to open the door for improvements, changes and expansions during the development phase of the HIoT and above that.

Strategic level

As depicted in Fig. 1 the working relationship between Hawassa University and the HIoT can be explained at the board and the leadership level. The HIoT Supervisory Board is accountable to the Hawassa University Supervisory Board. As the superior decision-making body, this University Board provides the HIoT Supervisory Board with the necessary general leadership. The university president and one member of the university senate hold HIoT Supervisory Board membership. This ensures that the HIoT’s strategic objectives are compatible to those of the university and also supports the University’s overall development.

At the leadership level, the university president and the HIoT Scientific Director should meet regularly to discuss the ongoing academic and administrative matters at the HIoT and university levels. In these meetings they will aim to find a mutual understanding on issues concerning the relationship and accountability between the university and the HIoT.

Management level

The core members of the Managing Board are the Scientific Director and the Managing Director. The Deputy Directors and the speaker of the HIoT Council are voting members.
The Scientific Director is accountable to the HIoT Supervisory Board; he is superior to the Managing Director who is the head of the HIoT's administration and the supervisor of the non-scientific staff.

The Managing Board has the full decision making power for all operational levels of HIoT. It provides information for control and advice as needed to the Supervisory Board on matters of strategic importance and other issues to ensure the smooth functioning of HIoTs operational business.
Operational level

Currently, the HIoT accommodates the following eight departments:
1. Biosystems and Environmental Engineering (BEE)
2. Chemical Engineering (CHE)
3. Civil and Urban Engineering (CUE)
4. Construction Technology and Management (CTM)
5. Electrical and Computer Engineering (ECE)
6. Informatics (INF)
7. Irrigation and Water Resource Engineering (IWRE)
8. Mechanical and Industrial Engineering (MIE)

Currently, the number of academic staff is 222 with 5 PhD, 83 MSc, 84 BSc holders, and 50 technicians with Diplomas; and the number of engineering students is close to 6000.

The departments offer a variety of study courses both at undergraduate and post graduate level according to the regional and national economic demands. Research activities will be concentrated in Competence Centers (CC) to utilize costly resources efficiently interdisciplinary as for personnel and equipment.

The administrative departments together with the central service units will ensure the autonomous operation of the HIoT under the umbrella of the Hawassa University.

III. REALIZATION PHASE

The Scientific Director took office at Hawassa Institute of Technology on September 2011. Since this period a good deal of measures were realized on the way from the previous Faculty of Technology to the HIoT according to the organizational structure in Figure 1 and “behind” it.

- On the operational level two additional departments were established, namely Construction Technology and Management, and Chemical Engineering with basic Bachelor degree courses.
- Additional study courses were developed and commenced with a particular focus on post graduate studies that are supported financially by governmental authorities.

Among the central service units the Quality Assurance Office was realized and concerning the University Industry Linkage besides a running Internship program for all departments a technology transfer structure was developed including a technology park. The practice-oriented engineering education needs suitable well equipped laboratories. The existing by far too less laboratories are in general in an unacceptable condition, i.e. equipment is either not state of the art, or it is defect and hence not in use. The laboratories are not operated with a clear responsibility hierarchy resulting in no safety regulations, no maintenance or repair strategy, etc. So, a new structure was developed in which heads of laboratories are responsible for highly effective and efficient equipment that can be used for practical training of students as well as for research purposes. Training of engineering students requires a reorganization since the current methodology let them participate via demonstrations only and not having them involved by carrying out experiments hands-on.

In a current procurement process all Department are in a position to purchase new laboratory equipment.

In the course of striving for autonomy of the HIoT the three most important administrative departments - the Finance Administration, Human Resource Management and Infrastructure & Facility Administration - were transferred from the University to the HIoT. In short the HIoT can administer its own budget, can recruit personnel and purchase all kind of required equipment.

The HIoT will have its own campus on the main campus of the University. Construction of new buildings for lecture halls and laboratories has already begun and it is expected that the HIoT staff can move into this campus in approximately two years.

- On the management level the HIoT Council was elected in a democratic procedure with representatives for all academic and non-academic, and student groups.

Additionally, a Deputy Scientific Director and a Managing Director were appointed. Actually, the position of a Managing Director ought to be filled by a German. However, no competent candidate could be attracted for this job, yet.

- On the strategic level the members of the Supervisory Board were proposed by the University president. After approval by the Ministry of Education the Board can be inaugurated in short. The installation of the Supervisory Board will be a big step forward to ease the swift transformation process on the operational level.

As the HIoT’s highest approving and monitoring body, the Supervisory Board is accountable to the University Board. Its responsibilities are to approve and oversee decisions made by HIoT governing units.

IV. CHALLENGES TO THE REALIZATION

Ethiopia faces many historical, cultural, social and political obstacles that have restricted progress in higher education for many decades [3]. According to UNESCO reviews, most people in Ethiopia feel that work is more important than education, so they start at a very early age with no to little education. The secondary schools impart an education that in general is not satisfactory enough for commencing an engineering study at a University compared to the situation in Europe and Germany especially.

So, the qualification of freshmen students is rather low and will even be more on the decline due to the huge amount of student intakes into the Hawassa Institute of Technology that is expected by the Ethiopian Government in the years ahead. If the quantity of engineering graduates becomes the benchmark than it is very obvious that quality falls by the wayside.

In parallel to the inflation of student numbers the infrastructure of HIoT does not expand accordingly. Despite the construction of new buildings there is a shortage of suitable classrooms and laboratories, and lectures have to be given in the evenings and Sundays. Due to the frequent power failures - without any announcement ahead - evening lectures have to be cancelled or interrupted and Internet access is cut off for longer periods.

Educatng these high student numbers assumes the availability of corresponding numbers of qualified teachers. Both is a serious problem: the number and the qualification. There is not enough staff available on the labor market and HIoT has to compete with other Ethiopian universities and the
private enterprises. Particular in Civil and Urban Engineering and Construction Technology the market in Ethiopia is swept empty because those graduates are offered excellent job opportunities by private companies and governmental authorities.

Academic staff is very young and mostly low qualified as for their degrees. Department heads hold Bachelor or Master Degrees only, and in one exceptional case a PhD. Freshly graduated Bachelors or Masters or even still Master students are employed as instructors or teachers. With these prerequisites currently it makes no sense to establish Chairs within the departments as shown in Figure 1. Hence, as a temporary solution Heads of Modules were assigned to represent the different disciplines. HIoT is forced by the Government to run new Post Graduate Study Programs. With academic staff overwhelmingly on a Master’s Degree level and only a handful with a PhD it is far below international academic standard to teach students in Master Courses. There is also a strong intention in the Government to launch PhD programs as soon as possible. Without the support of Professors from abroad and framed in a sandwich system this project seems too ambitious in a short range.

The inadequate qualification of teachers gives cause for complaints of the students. And meanwhile for the slightest reasons that are not in the context of the lecture subjects at all students boycott lectures.

The low salary of the academic staff is another topic that makes many problems. Academics do not feel motivated to be engaged deeply in the higher education process at HIoT. They fulfil their teaching duties just with a minimum of expenditure. A good deal of them is not reliable as for their obligations: without any information beforehand they miss lectures and examinations as invigilators, they are often unpunctual and they quit their employment without any notice. Many educated Ethiopians seek higher salaries in foreign countries thus many of those who manage to finish higher education emigrate from Ethiopia creating an endless shortage of qualified professionals in every sector of the country. As of 2006, there are more Ethiopia-trained doctors living in Chicago than in the entire country.

The Technology Transfer System that will be realized soon is a big task, of course but also a good opportunity to improve the income situation of staff by generating new projects and even jobs.

The relationship to the University management is not without frictions and even conflicts. Creating a far reaching autonomous Institute of Technology within the university campus that will be off the direct influence of the management is new and without any example in the past and hence disturbing. But operating its own academic business and administering its own budget, and overcoming the hindering inflated bureaucracy is just the idea and the intention of ECBP and the Ethiopian government. Therefore, it needs a good diplomatic skill to convince the university management that the set up of the HIoT is not against the university as a whole but for the improvement of the engineering education and hence for the benefit of the coming young generation in Ethiopia.

V. CONCLUSION

The presented Strategy to establish the Hawassa Institute of Technology in the frame of the organizational structure shown in Figure 1 serves as a guideline to ensure the success of the transformation process. In this context, it is a backbone but cannot replace the personal commitment of the people involved on this way of change. Without creativity, flexibility, open-minded for improvisations, competent and convincing leadership, mutual confidence, and other positive characteristics no strategic framework can be put into practice. It is indispensable to select a core team transparently and objectively from the very beginning that is willing and engaged to follow the reform and to realize it actively. A fast and an efficient qualification process for the academic and administrative personal is a continuous key task. The trustworthy co-operation of the Management Board, in particular the Scientific Director, with the Ministry and the supportive leadership of Hawassa University, i.e. president and vice-presidents, is the basis of establishing an autonomous HIoT and essential for the successful implementation and sustainability of the reform process.

Despite the many challenges and difficulties that were mentioned in sketches only the transformation process is on a good way and some exceptional milestones were reached so far. It is pretty much encouraging and motivating how engaged and willing many of the young open-minded HIoT academics are to improve and at least to overcome the limited opportunities offered currently by the low levelled higher education system in the field of engineering.

With this spirit of optimism and dynamics the establishment of the HIoT as an acknowledged center of excellence in practice-oriented engineering education, research and technology transfer will be accomplished undoubtedly in a few years ahead. And last but not least the HIoT as a higher institution well known for its outstanding education and research will be a great asset for Hawassa University.

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