UMST UNIVERSITY
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تميز بلا حدود
Sustained Excellence

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UMST UNIVERSITY

UNIVERSITY OF MEDICAL SCIENCES AND TECHNOLOGY (UMST) TANZANIA
Business Plan 2022-2025

Promoter: UMST Company (Tanzania)

25
اليوبيل الفضي
جامعة العلوم الطبية والتكنولوجيا
2021 - 1996

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Letter to H.E Prof. Kihampa, Executive Secretary, Tanzania Committee for Universities

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01/01/2022

His Excellency,
Prof. Charles Kihampa

Executive Secretary,
Tanzania Commission for Universities
Tanzania

Dear Sir,

The company that owns the University of Medical Sciences and Technology (UMST) in Sudan and the affiliated hospitals/health centres and dormitories wish to expand their investment into Africa. They, in the last 2 years established a state-of-the-art diagnostic centre (FRONTIER) in Kigali, Rwanda. They went into partnership in establishing and running a school for allied health sciences (starting with Nurses). The school in the name of Ununio College of Health and Allied Sciences is its first enrollment is this month (Jan 2022).

The group who run the business has a rich experience in provision of medical services and university education. They have an accumulated experience of over 30 years. The group is headed by Prof. Mamoun Homeida (Prof. of Medicine, been Director of a teaching hospital, Vice chancellor of Khartoum University, Minister of Health in the State of Khartoum (Sudan) and pioneer in introducing medical technology in Sudan (MRI, CT, Ultrasound) and has established a private university which is 25 years old now. He taught medicine in the University of Bristol (UK) and Khartoum and examined in many schools of medicine.

He is a WHO expert and advisor (Geneva) in tropical disease for 10 years Chairman of the Technical Consultative Committee of the African Programme for Control of Onchocerciasis (APOC) in Ouagadougou, Burkina Faso.

The group is diverse speciality with many specialists medical/engineering/public health & economist.

The present Business plan is mainly prepared by: Prof. Mamoun Homeida & Dr. Mounkaila Noma, Dr. Sumaia Aukud with advice from the group.

The report highlights the activities of the UMST Sudan **("Who We Are" UMST at a glance)** and reflects the rich resources which support the university. It is timely to get going in Africa after UMST (Sudan) has completed 25 years of excellent services to Sudan and the region. The report on UMST is short but supported by photos and tables and references. (For more information please see our website: www.umst-edu.sd).

The second part of the report which comes under the title **"Rationale of establishing a private university in Tanzania"** is a brief about the educational and health status of Tanzania to justify the need for such a private university. The short report is supported by an 11 pages document on Tanzania which gives details about the country / population / Education and health provision. The document is well referenced.

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We would like to state that through our study in Tanzanian health and education services there is a dier need for an increase in the number and quality of universities particularly medical / dental / nurses / pharmacy and other allied sciences. The gap between goals and what has been achieved in these activities is wide.

Any private university which set foot in Tanzania should provide both under and postgraduate studies. The latter is highly needed to address the acute shortages in university academic staff.

UMST Sudan has the financial abilities the know-how and desire and sincere determination to establish a UMST (Tanzania) to be affiliated and linked mainly but not solely to the mother university UMST (Sudan).

The UMST has already bought a 50,000 sq. meter land in Kigamboni, Dar es Salaam for the building of the university and affiliated institutions. The architectural plan is finalized.

We hereby respectfully apply to the Ministry of Education, Science and Technology (MoEST) (Tanzania) and to the Tanzania Commission for Universities (TCU) to grant us a no-objection Licence to get the building starting.

With thanks,

Prof. Mamoun Homeida, Professor of Medicine
MBBS, MD (Bristol), FRCP (London)
Chairman, Board of Trustees, AlZaytouna Network Company, UMST
P.O. Box 12810,
Khartoum-Sudan 11111

Enclosure: University of Medical Sciences and Technology (UMST) Tanzania
Business Plan 2023 -2035

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Executive Summary

Having adequate numbers of qualified human resources for health (HRM) is essential for any effective healthcare system. However, there is a global shortage of skilled healthcare workers, especially in African countries. This shortage is exacerbated and became evident by a disproportionately high rate of infectious diseases, the burden of emerging chronic non-communicable diseases (e.g. diabetes, hypertension, cancer, heart disease) on top of the devastation of the already endemic diseases e.g. malaria, parasitic disease, and HIV AIDs.

Twelve percent of the world's population live in Sub-Saharan Africa, yet the region suffers 24% of the world's total burden, has only 3.5% of the world's healthcare workforce and 1.7% of the world's physicians (WHO Statistics 2018).A stable and sufficient healthcare workers is essential to meet the healthcare needs of any population. To meet the globally agreed target of healthcare for all by 2030, the WHO estimates that Africa should produce 3.7 million healthcare workers by that time.

In Tanzania the shortage is seen more clearly in the number of doctors as the ratio of a physician to 10,000 population is low at 0.6. Tanzania has achieved high growth rates based on its vast natural resources wealth and tourism with a GDP growth average 6-7% per year. The government has developed an ambitious development agenda on creating better business environment. With the directions laid by the current president foreign investors are encouraged to work in Tanzania.

Despite commendable progress made in university education with 84 universities (43 are private) the gap to meet the needs for university graduates to man the health system and other speciality is still wide. This is seen more clearly in medical care. The private sectors in education are still weak and largely dominated by faith base-organizations. The conditions of work in Tanzania for a big project in university education – graduate and postgraduate, with good funding are optimal. UMST (Sudan) has long experience in provision of high quality education and has a strong financial base. Experiences gained in Sudan and Rwanda and recently Tanzania make the UMST in a good position to promote education in Tanzania. Despite the fact that the current proposal is a private for profit project it is expected that it will be very successful and will attract students from Tanzania (60%) East African countries 20% and Africans living in Europe and USA (20%). The UMST has experience in getting NGOs and philanthropist to pay the fees for brilliant students who can not afford to pay.

The project will promote the economy of Tanzania and will strengthen the higher education system in all universities and will provide in due time healthcare facility (hospitals /heath centres) which will add good care to the Tanzania patients.
In this report we have outlined.

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- Who we are, a brief note about UMST (Sudan) the investor.
- The Tanzanian high education system pointing to the strength, deficiencies and opportunities. We gave a rationale to why we want to invest in this sector and why Tanzania.
- Financial analysis and projection is given based on a market survey in Dar es Salaam (Tanzania)
- Appendices are attached.
  ** Brief on the United Republic of Tanzania
  ** CV of Prof. Mamoun Homeida Chairman of Board of Trustee UMST (Sudan)
  ** CV of Dr. Mounkaila Noma who helped in preparation of this report

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Who We Are (UMST – University) Sudan

UMST at a Glance

The University of Medical Sciences and Technology (UMST) was established in Khartoum/Sudan in 1996 in a campus in the centre of Khartoum, with 2 Faculties, Medicine and Lab Technology. The main campus stands on 40,000 square meters and apart from the lecture halls, labs, main library it also includes a high level international conference centre. The campus is known of its beauty and green environment (Photo). The UMST is often called the green University of Khartoum. The Faculty of Medicine was the first private school of Medicine in Sudan to enroll male students. The University grew to include 17 Faculties in 25 years with an increase of students population from 60 (1996) to over 7000 in the year 2021. (Table 1) shows the total number of faculty students graduated 1996-2021.

Photos of the UMST main campus (Riyadh-Khartoum, Sudan) & the Global Conference Centre (GCC)

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Table 1: UMST Graduates 1996-2021

No.	Faculty	No. of Batches	Total
1.	Medicine	23	1992
2.	Dentistry	21	525
3.	Pharmacy	18	586
4.	Medical laboratory Sciences	24	668
5.	Nursing Sciences	17	673
6.	Upgrading of Nursing Diploma	8	166
7.	Engineering(Biomedical)	15	372
8.	Engineering (Electronics)	9	222
9.	Engineering (Electrical)	4	32
10.	Radiological Sciences	13	273
11.	Anaesthesia Sciences	12	288
12.	Business Administration	14	783
13.	Computer Sciences & Information Technology	17	224
14.	Economic ,Social & Environmental Studies	7	148
15.	Mass Communication	7	100
16.	Law	6	73
17.	School of Nursing Technology	9	338
TOTAL			**7463**

UMST has always been very strong in the medical sciences (medicine, dental, pharmacy, anaesthesia, radiology, Lab-technology). It adopts the concept of hands on training, this is why it established hospitals and health centres owned and run by the University. At present the UMST has 2 specialized hospitals (AlZaytouna and Yastabshiroon) and a general hospital (The Academy Charity Hospital and Academy Dental Hospital). (Photos) A new general hospital (Prof. Hassan Teaching Hospital) will be operational in February 2022.

Al Zaytouna Hospital

Yastabshiroon Hospital

Photos of 2 specialized hospitals

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Academy Hospital

Academy Dental

Basheer Hospital

Basheer Dental

Photos of Academy Hospital and Dental and the Bashaer Hospital and Dental

Prof. Hassan (New) Hospital

Photo of Prof Hassan (New Hospital)

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In addition to the hospitals the UMST established a health centre on charity basis to enable proper teaching of Family Medicine (Al Salam Charity Health Centre – Khartoum). Clinical teaching is always in small groups for the convenience of patients and students.

Photo of Al Salam Health Centre

Since AlZaytouna and Yastabshiroon are tertiary hospitals teaching related to tertiary medicine: cardiac catheterization, Intensive care nursing, Advanced radiology (MRI and CT) with specialized ultrasonography investigations (foetal medicine) are offered to the students in these hospitals.

MRI

CT Scan

Photos of MRI & CT Scan

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UMST is a community linked university and gives weight to teaching of public health and provision of community services to around Khartoum and in the rural communities as far as Darfur (far west Sudan). Medical students and nursing students spend a compulsory 2 weeks a year in the community on a structured training. Pharmacy students spend two weeks on medicinal plants' identification and collection for research studies in the Eastern part of Sudan.

UMST encourages the students' voluntary works through their charity societies to provide help to poor deprivileged population with health education and provision of in-kind support (masks, medicines, blankets and food).

UMST adopts and updated curriculum with the main features of student-based teaching practical and tutorial orientation, development of students' extracurricular talents, Continuous assessment with constant renewal of the curriculum and methods of assessment. UMST has been pioneer in the country to introduce the PACES examination in the final medical (MBBS) degree.

Table 2 shows the number of Academic staff (full time & partial contract). The overall Student: Teacher ratio is 1:12 one of the best compared to regional and international universities. It varies between faculties and is never above 1:10 in the medical school.

Table 2: UMST Academic Staff Members (2020-2021)

No.	Faculty	Full-time Contract	Partial Contract	Total
1.	Medicine	51	16	67
2.	Dentistry	8	10	18
3.	Pharmacy	15	3	18
4.	Medical laboratory Sciences	22	2	24
5.	Nursing Sciences	5	0	5
6.	Engineering	17	3	20
7.	Preparatory College	18	0	18
8.	Radiological Sciences	6	0	6
9.	Anesthesia Sciences	5	0	5
10.	Business Administration	11	0	11
11.	Computer Sciences & Information Technology	8	1	9
12.	Economic ,Social & Environmental Studies	10	0	10
13.	Mass Communication	5	0	5
14.	Law	6	0	6
15.	School of Nursing Technology	5	0	5
16.	English Language Department	8	0	8
17.	Printing &Packaging Technology	1	0	1
TOTAL		**201**	**35**	**236**

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The University celebrated its Silver Jubilee in the year (2021) and is proud to have contributed 7463 graduates (Table 1) from 17 faculties with 1992 medical doctors and 525 dental doctors. The graduates are with high academic standards mostly working in Europe (notable UK or Ireland), USA, and the Arab countries. The medical/dental graduates are registerable in the General Medical Council (Ref.), Medical Board of California (USA). 17 Batches have been graduated from the Faculty of Pharmacy and the degree is recognized internationally (California…..)

Accreditation and Certificates of equivalence and Registrability of UMST graduate

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The Postgraduate College (UMST) started very early in the history of the University, it includes 7 postgraduate diplomas, 19 master degrees, 4 Ph.D. degrees by Research and one Ph.D. by courses & research (Table 3). In the current academic year (2020-2021) the total number of registered students is 447 with a Male:Female ratio of 40-60% respectively. The number includes 60 students from 12 countries (8 African countries and 3 Arab countries + Afghanistan).

Table 3: The postgraduate studies which started early in the history of UMST included:

DIPLOMA:	MASTER DEGREES:
1. HIV/AIDS 2. Research Methodology 3. Mass Communication 4. Development Studies 5. Medical Security 6. Infection Prevention & Control 7. Epidemiology & Biostatistics	1. Advanced Ultrasound in Obs & Gynae 2. Biomedical Engineering (BME) 3. Business Administration (MBA) 4. Development Studies 5. Medical Diagnostic Ultrasound 6. Diagnostic Medical Imaging 7. Electronic Engineering 8. Family Medicine 9. Infection Prevention and Control 10. Information System 11. Medical Laboratory Sciences 12. Nursing Sciences 13. Public and Tropical Health 14. Pharmaceutical Technology 15. Tropical Medicine and Infectious Diseases (TMID) 16. Mass Communication 17. Global MBA In Impact Entrepreneurship 18. Pharmaceutical Analysis and Quality Control 19. Pharmacology
Ph.D. PROGRAMMES:	
By Research: ▪ Public & Tropical Health ▪ Medical Physiology ▪ Pharmacy ▪ Medical Laboratory Sciences **By Course & Research:** ▪ Business Administration	

The Postgraduate College is now supporting colleges in Somalia, Eretria, Nigeria, South Sudan. (Photos)

The College in 2020 signed two memoranda of understanding to offer postgraduate degrees in Public Health, Tropical Medicine, Family Medicine, Development Studies

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with Capital University (CU) and University of Health Sciences (UOHS) both in Somalia.

The Master of Public Health is now taught to Somali students on a hybrid method face-to-face and on-line. Faculty Staff from UMST (in person) teaches for short to long periods in Capital University (Magdishou) Somalia.

The UMST has strengthened the on-line teaching by acquiring a platform and a server strong enough to provide services all over the world from Istanbul, Turkey. The University has a company (AlZaytouna Network Company) in Istanbul which shoulders the operation work of the platform.All steps from the registration of the students to issuing the academic certificate are done online

Photo of Collaboration with Capital University (CU)

Research: Students are mandated to study research methods and write up a thesis good enough to be published. Staff is also encouraged by various incentives to do research and publish. A total of 44 publications in International journals have been published in the year of 2021. (Table 4)

Table 4: Published Researches in Journals & Periodicals (2019-2021)

No.	Faculty	No. of Papers
1.	Medicine	12
2.	Medical Laboratory Sciences	9
3.	Pharmacy	7
4.	Dentistry	4
5.	Business Administration	4
6.	Law	3
7.	Engineering	3
8.	Radiological Sciences	1
9.	Mass Communication	1
TOTAL		**44**

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Extra-curricular activities and social responsibilities of the UMST

Students extracurricular activities is wide with all type of sports (football, basketball, volleyball, swimming, and gym). The activities and competition between students and graduates from different faculties and staff run regular tournaments (pictures). Girls are as active as boys in basketball and swimming and gym.

Photos of extracurricular activities UMST campus

UMST has the biggest and updated gym equipment (a total of 35 pieces) in the country. There are over 1000 students actively practice in the gym with 40% being girls.

The music and singing club is also very attractive to both girls and boys.

The UMST runs a very active and ambitious social responsibility programme. Poor students are offered scholarships. On quota basis Muslims& Christians students are equally offered exemption of the tuition fee on an open and fair competition quota. Students in any class who excel as the top grader is exempted from the fees. A total of 12% of the students are on a scholarship.

Other activities which fulfill a wide range of charity activities are included in a book (in Arabic) Link provided.

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Dormitories

UMST, uses English Language as the media of teaching and communication, hence Sudanese students who studied high secondary schools abroad (Europe, America) and foreign students are attracted to the university. Such students require boarding facilities. There are three dormitories 2 for girls and one for boys all with single rooms and full facilities for washing, cooking, sports and library. (Pictures)

Photos of dormitories of Boys and Girls

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Rationale of establishing a private university (UMST) in Tanzania

Education provision has been and continues to be one of the basic and essential conditions to promote socio-economic development. Countries labeled as developed knew higher education and universities as back as the sixteenth century. Dr. Mahateer Mohamed previous president of Malaysia, who developed the country as a technological giant stated clearly that he succeeded because he developed the education system. Education in Africa especially higher education lagged behind. The WHO has urged countries to provide healthcare for all by 2030. To achieve this, WHO estimates that the world will need an additional 10.1 million healthcare workers (https://www.who.int/hrh/documents /15/295Strategy-Report04-24-2015). Africa is the continent with the highest need, with a predicted shortage of 3.7 million health workers with an acute deficiency of physicians.

Tanzania has one of the lowest physician-population ratio in the world despite the high need created by the rapid growth of population and wide spread of disease (see appendix: Brief on the United Republic of Tanzania).

University Education System is relatively young in Tanzania. The first university Dar es Salaam started in 1961 as a College affiliated to the University of London only to become a full independent university by 1970 and until 1984 there were only 2 universities. Following the mid 1980 – ideological change from socialist's policy to a more liberal system, the university education started to increase. It is as late as 1995 that the private sector has been involved in provision of university education. During this early time in the history of private higher education the institutes are being established and run by Faith-Based Organizations (FBO) e.g. Catholic Church, the Lutheran Church, Anglican Church as well as Moslems. The policy adopted then was through Public-Private Partnership (PPP).

The Government of Tanzania has called on its medical schools to train more physicians. Through a concerted effort the number of admissions to the medical schools increased from 55 in 1991 to 1680 admission in 2015. Despite this commendable effort there is still a serious gap in the number of doctors/nurses needed to fulfill the Tanzania development vision which states "By 2025 the country will become a nation that produces the quantity and quality of educated people sufficiently equipped with the requisite knowledge to solve the society's problem and meet the challenges of development and attain competitiveness at regional and global levels".

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Facts on the Ground:

- Recent reports indicate that there are at present 84 higher learning institutes (HLI) providing higher education from diploma to Ph.D. 41 are public and 43 are private universities.
- The total number of university students is around 250,000, 34% are in private universities/colleges/campuses.
- The admission (enrollment ratio) to the HLI is still low around 3-9% while in developing country e.g. Germany is around 51.9%. In the September 2019 report according to the Ministry of Education and Science Technology (MoEST) there is a drop in the enrollment ratio from 8.5% (previous year) to 6.5%
- The number of medical schools (in universities, colleges, campuses) are 12 with 7 accredited by the Accreditation Council.
- The health system in Tanzania is burdened by various health conditions (see appendix). However, the density of medical doctors, nurses, and midwifery personnel dentists and pharmacist remained low ranging from 0.1/10,000 population (dentists and pharmacists) to 5.8/10,000 (nurses/midwives). The country suffered from lack of medical doctors whose density was estimated as low as 0.6/10,000 population.
- Despite a good and commendable effort to increase the population of health workers there are still some areas of concern and require urgent attention.
    a) Deficiency in Faculty/Staff in some universities which directly affect the quality of education. Mgaiwa, SJ and Poncian, J (2016) Published a paper in Bandung Journal of the Global South, outlined a serious deficiency of staff in some universities especially private ones and in 2016 the East African Community Partner States National Medical and Dental Practitioners Regulatory Boards/Councils expressed concern about faculty shortage in Tanzania schools. Shortages are more visible in basic sciences and public health.
    b) The private universities though increased the overall enrollment ratio but fell short of their objectives. Although they constitute almost 60% of the functioning universities they only contribute 34% of the ratio of the enrollment to universities. Moreover, they depleted the public universities from their staff as they are in some, using the staff from the public universities.
- A major concern is the attrition rate among doctors. According to Goodel et al (Global Health Action 2016) through modeling technique they estimate that approximately 56% of all medical students enrolled between 2011-2020 will not be practicing in Tanzania by 2025. Add to these shortages in manpower, there is inequality in distribution of physicians in the country. While 34% of the

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population are urban, they enjoy the services of 60% of the total number of physicians in the country.

The facts outlined in this report argues in favour of increasing the number of universities particularly those who intend to provide medical and health education.

The encouraging facts in pursuing this goal are:

- Tanzania is a stable country with high level of security.
- There is a mature political system which solved the diversities in the population (tribes, religion, regions, etc…) in an exemplary way.
- The People are friendly who live in a large county (980,000 sq. kilometer) with diverse weather, open to the sea and economically growing.
- The good connections Tanzania has with the west and the African solidarity especially within East African country makes any good university functioning in Tanzania will benefit from extensive relationships regionally and internationally.
- There is a well-structured Ministry of Education: (MoEST) which oversees the establishments, and running of educational institutes including universities.
- There is a Higher Education Council namely Tanzania Commission for Universities (TCU) which is responsible of approving and supervising these institutes.
- Higher Education Accreditation Council responsible of the quality control and ensure competency.
- Higher Education Students Loans Board (HESLB) providing loans to the needy students to pay their tuition fees.

Given the large population of Tanzania which is around 60 million and the dier need for well educated university graduates especially medical, it is timely to establish a new giant university to bridge the gap between the current and needed population in health workforce. Moreover, the great shortage in the faculty staff in Tanzania universities can only be repaired by provision of postgraduate degrees. The UMST with a long history in both under and graduate education can do a good job towards reaching the MoEST goals in education.

Tanzania, being a stable country with a high level of security will attract students from Africa particularly East Africa where the movement of population is free within these countries.

Drawing on the excellent reputation UMST (Sudan) has in Europe and the USA and Arab countries, students will also be drawn from these various countries which will increase the diversity of students leading to a rich academic and social university environment.

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Business Plan, outline

Organizational Overview

The University to be established in Dar es Salaam Tanzania will bear the name of the University of Medical Sciences and Technology Tanzania – hereby referred to as UMST Tanzania. The new technologically – focused school of medical sciences will immediately be positioned to bring new national corporate, and foundation support into the region for innovative multidisciplinary research involving patients, scientific research, and advanced technology-driven solutions.

UMST Tanzania will be actively engaged in technology and innovations for medicine in areas such as material sciences, computer sciences, imaging and sensors, and bioinstrumentation. It will start with 6 faculties:

» Faculty of Medicine
» Faculty of Dentistry
» Faculty of Pharmacy
» Faculty of Medical Laboratory Sciences
» Faculty of Nursing Sciences
» Faculty of Biomedical Engineering

Postgraduate degrees will be offered in specialization as they are needed in Tanzania. For instance, specialization in Public Health, Family Medicine, Research Methodology, Anatomy, Physiology, Biochemistry, Internal Medicine, Surgery, Obstetrics/Gynecology, and Pediatrics are in short supply in Tanzania.

USMT Tanzania is intended to be a full-fledged university in due time with 14 faculties and 15 postgraduate diploma, master as well as Ph.D. degrees. However, it will not restrict the expansion to medical studies only education as the word “Technology” will cover engineering, computer and IT as well as Business Administration and Law.

The first 6 faculties are linked in goals and share a lot in their curricula and staff and graduates represent what is known now as a medical team who collectively and individually contribute to the diagnosis and treatment of patients and prevent the occurrence of diseases in the community and help in engineering services of medical equipment. The duration of study of each faculty will be as follows:

» Medicine	5 years
» Dentistry	5 years
» Pharmacy	5 years
» Medical Laboratory	4 years
» Nursing	4 years
» Biomedical Engineering	4 years

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The curriculae have been prepared and ready to be implemented. The degrees to be offered are as follows:

» Medicine	Bachelor of Medicine & Surgery
» Dentistry	Bachelor of Dental Surgery
» Pharmacy	Bachelor of Pharmacy (with honor)
» Medical Laboratory	Bachelor of Science (general)
» Nursing	Bachelor of Science (general)
» Biomedical Engineering	Bachelor of Science (with honor)

Each academic year will have 2 semesters covering 14 weeks each (teaching and assessment period), and 12 weeks of teaching and 2 weeks of assessment. The teaching in each faculty will follow a hybrid system (semester system with credit hour basis).Students who obtain the certificate of high secondary school (Tanzania) or equivalent will be admitted on a competitive basis.

On the day of opening the University, construction of a resident teaching hospital will commence and it is anticipated that by the time the clinical training is required the hospital will be ready. This will add great opportunities to get the highly specialized teachers in the hospital to provide medical care to the patients at an affordable cost. This will be a win-win situation both for the students and for the patients. The hospital which will include advanced medical, diagnostic and treatment, will offer in-service training for all healthcare needs in Tanzania.

UMST-Tanzania will be established as a private for-profit university open to helping poor distinguished students by offering scholarships to students from less privileged areas and citizens This will be done according to a pre-announced guidelines and operate with transparency and fairness. The UMST will accept going in PPP with the government of Tanzania or other organization who are willing to support the students (financially).

The new university will be a comprehensive research-intensive university; hence it will draw on new and extraordinary opportunities for collaboration with other Schools to infuse technology based healthcare in education and research missions. For instance, it could partner with technology-based firms and investors to develop customized technology-based solutions for healthcare delivery for the disabled and growing elderly population, young children or maternity treatment in Tanzania.

Value of the Link of the UMST (Tanzania to Sudan)

The curricula will be the same as UMST Sudan. This will facilitate exchange of faculty and experts between the two universities. Moreover, exchange of students will enrich the training programmes of both universities. The Tanzania students will be exposed to a high-tech training in UMST Sudan.

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As the UMST Tanzania will spring from a strong sound base in Sudan, and with the know-how and experience in operating university affairs, the cost fees for students will be affordable at a rate of US$ 5.5,000 per student (Medicine).

UMST is inheriting a long and rich experience from the mother university UMST in Sudan. UMST Sudan was the first private university in Sudan to offer faculty in medicine and medically allied specialties. In 2021, it celebrated 25 years of excellent services with graduates working all over the world including the USA, Europe, Middle East and Africa, and enjoys a good reputation amongst academic fraternity as well as students. It is affiliated to a number of medical centers and institutes in Sudan, as well as hospitals. The founders of UMST Sudan have introduced several new technologies in medical diagnosis covering all new modalities in Sudan i.e. ultrasound (1982), Computerized Tomography (CT) 1990, MRI (1995) and led the private-hospital services in Sudan to access them. In Addition, the institution has continuously contributed to corporate social responsibility (CSR) activities i.e. Charity medical services by establishing a general teaching hospital for poor people – operating either free or at low cost.

UMST Sudan is consistently ranked among the top universities in Africa and the Arab World, and it has a long tradition of interdisciplinary collaboration and integration of technology across disciplines, as exemplified in interdisciplinary research centers in Africa. The new technologically - focused School of Medicine based in Tanzania will immediately be positioned to bring new national, corporate, and foundation support into the country and the region for innovative multidisciplinary research involving patients, scientific research, and advanced technology-driven solutions.

UMST Sudan is linked to specialization boards in Sudan and the Arab board. This will open doors to train Tanzania doctors to get expertise training and high specialization in disciplines such as cardiology, nephrology, and intensive care. UMST Sudan is currently running over 18 postgraduate specialization degrees from diplomas, master degree to Ph.D.

Corporate and Project Leadership and Ownership

The promoters' leadership and experience will form a solid foundation for UMST Tanzania. They bring on board industry maturity that combines experience acquired over the 50 years. Moreover the recognition and accreditation bestowed on their work at UMST Sudan and other extensive work globally will be passed to the new Tanzania University.

The link will be of a parent to child with exchange of teachers and utilization of all the knowledge which was acquired by parent to university during a quarter of a decade. The external relationships of the mother university will be fully utilized by and benefiting the new one.

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In order to transfer these principles and values to UMST Tanzania, the promoters of this project are committed to:

- » Innovating teaching and learning methodology, and ensure an exceptional undergraduate experience and rigorous graduate environment.
- » Re-imagining how it operates and functions.
- » Defending the values UMST to the Tanzania people.
- » Leading a University that understands diversity as critical to achieving excellence.
- » Aiming to meet the global standards of education in the 21st century.

The main promoters who will be driving the success of this project are:

Prof. Mamoun Mohamed Ali Homeida

Prof Mamoun Mohamed Ali Homeida has over 40 years' experience in medical sciences technology, and brings on board several memberships of professional societies and committees and has published several journals. Prof Homeida has participated in many WHO TDR Committees as Consultant, notably for Filarias, Implementation Research and Community Directed Intervention.

He is a former Director of the Onchocerciasis Control Programme in Sudan and the Chair of the Technical Consultative Committee of the African Program of Onchocerciasis in Ouagadougou, Burkina Faso. He has specialized teaching, examining and training in gastrointestinal endoscopy, abdominal ultrasonography and clinical pharmacology.

Prof Homeida has researched morbidity of schistosomiasis mansoni using ultrasound and the impact of praziquantel therapy in these morbidities. He is a renowned researcher with over 100 publications. His experience as a clinician saw him introduce modern diagnostic technology to private medicine in Sudan i.e. Ultrasound, CT scan and MRI.

His extensive knowledge and experience in the industry will be of immense value to UMST Tanzania.

Dr. Mounkaila Noma

Dr. Noma is a Niger national and is currently the Coordinator of High Diploma of Research Methodologyand Biostatistics of Graduate College since 2015. He has a doctorate degree in Biostatistics Epidemiology inTulane School of Public Health and Tropical Medicine, New Orleans, Louisina, USA and another doctorate degree in Doctorat d'Etat en Médecine spécialisé en chirurgie Pédiatriqueen at the Faculté des Sciences de la Santé, Université de Niamey, Niger and Faculté de Médecine, Université Paris Descartes, France. He also hasDiploma in Project Management and Evaluation at the Management Training Development Institute of Washington, D.C., U.S.A.

Dr. Mounkaila, a Retired Staff of World Health Organization (June 2014) as Chief of the Epidemiology and Vector Elimination Unit (EVE) of WHO/African Programme for Onchocerciasis Control (APOC) covering initially 19 countries, 30 African countries. Since 2015 he joined the University of Medical Sciences and Technology (UMST).

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Dr. Elhafiz Mohamed Ali Humeida

Dr. Humeida is currently the Vice–President of UMST Sudan and an associate Professor, and he brings on board over 30 years teaching experience in medical sciences. He holds a PH.D in Physics from Hull University, UK and has teaching experience in Sudan and Saudi Arabia.

Dr. Humeida has published more than 10 international journals.

Prof. Wadie Mohamed Yasin Elmadhoun

Prof. Elmadhoun is currently the Dean, Faculty of Medicine, University of Medical Science and Technology, and also a professor, head of department of pathology.

He specializes is Clinical pathology, Histopathology, Cytology and Microbiology practice.

He has examining and research supervision experience for post graduates and Masters level at University of Gezira, as well as Sudan Medical Specialization Board. He serves on the Sudanese Association of Pathologists and the Sudanese Society of Medical Educationists. He has 47 publications in his name.

Dr. Suzan Homeida

Dr. Suzan is an experienced Senior Consultant Hematologist with clinical and laboratory experience in Khartoum, Sudan and an assistant Professor at UMST–Sudan. She worked in UK for 10 years and developed excellent relationship with major medical manufacturing companies; particularly in the medical laboratory. She is also qualified as a businesswoman holding an MBA from Liverpool University, UK.

Mission and Vision Statements

As a new medical university created in partnership with the Government of Tanzania (GoR), the community and built on the foundation of a top medical university, UMST Tanzania aims to redefine the academic health environment. UMST Tanzania will have the same Mission and Vision as UMST Sudan. The staff will be selected on excellence, experience in higher education and dedication to the mission and vision of the university which are:

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Mission

"UMST aims to develop competent and socially responsible professionals and lifelong learners in an environment that promotes excellence in the academic core processes of teaching, learning, and research and community service. Our mission is to provide timely, relevant and transformable academic programs responsive to the needs of our local, national and global communities that keep pace with the rapidly changing world"

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Vision

"To create a brilliant and bright future for UMST from which the students, faculty, staff, the nation and the world will benefit. UMST values excellence, quality and service. UMST continuously seeks to foster innovation and creativity".

Strategic Partners

The scale of this project is far beyond the capacity of any single institution to accomplish – it will depend on a collaborative effort among many strategic partners:

1. **UMST:** The project promoter and implementing partner for every aspect of the project, to include most of the infrastructure build-out and overseeing and performing the building construction. They will require the highest standards of quality and professionalism from UMST parent institution in this process and will reciprocate with its own high levels of professionalism in the conduct of all the business in ensuring that they establish an excellent academic institution with value to the country and the economy.
2. **Technical Advisors:** A range of advisors have been engaged to-date and will be critical partners throughout execution of the project. These technical experts have played an important role in bringing the project to its current stage but will need to rise to an even higher level to deliver final detailed designs, faculties etc., in a way that achieves the vision of the project.
3. **Ministry of Education, Science and Technology (MoEST) and the Tanzania Commission for Universities (TCU):**
   MoESt and TCU are the approving authority and it is vital to collaborate with them and work towards achieving the overall goals and vision of these organizations.
   The input and guidance of MoEST and TCU is vital in readjusting the curriculae to meet and fulfill the vision of the country.
   Collaboration with existing universities and organizations promoting education in the country will be sought and their ideas will be incorporated in any policy adopted by the university.
4. **Ministry of Health:** Complementing Tanzania's Ministry of Health System's approach to the delivery of medical care is UMST Tanzania's long-term commitment to medical education and research. Through its residency programs in Medicine, Nursing, Pharmacy and Laboratory Sciences, UMST trains physicians in an integrated healthcare delivery system that prepares physicians for practicing medicine in a quality-driven, technologically-advanced, innovative, and efficient environment.
5. **Investors:**UMST Tanzania has the financial capabilities to cover the cost of the project, however it will make the project open to interested investors. A diverse range of partners may be necessary to accomplish such a large project using a variety of financial instruments: debt, traditional equity, etc. It will be important for these investors to understand the triple-bottom-line vision of the project, but their first lens will be to ensure the project is economically viable in order generate the required return.

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Market Analysis

Overview of the African Medical Schools

Adequate numbers of appropriately qualified human resources for health (HRH) are a critical component of any effective health system, being associated with positive health outcomes. Many regions suffer from a shortfall of healthcare personnel. Africa represents 40% of the global shortfall, and the situation is critical in 36 of Africa's 54 countries (WHO Statistics, 2019). The Sub- 20 Saharan crisis is exacerbated by a disproportionately high rate of infectious diseases and the burden of emerging chronic non-communicable diseases. A major setback for the region has been the large numbers of highly trained doctors, nurses etc. educated in Sub-Saharan Africa countries, who have migrated outside the continent. In addition, until 2015 eight Sub-Saharan countries had no medical schools of their own, which necessitated dependence on expatriates and external training (Chen et al., 2018).

Medical schools in Africa are expanding, both in overall number and enrolments. In the past 20 years, at least 58 new medical schools have begun training doctors. However, medical school enrolments remain relatively small with most reporting first year enrolment at or below 100 students. These relatively small intakes suggest an area to build on existing capacity. Majority of the institutions are having mandates to expand, most often from Ministries of Education and Health. This expansion is critical for strengthening the healthcare workforce in the region, but it also presents significant challenges for medical schools and national health systems.

Medical schools in East Africa are also offering post-graduate training opportunities and programs. Increasing the number of residency posts will increase in-country training opportunities, boosting the number of specialists in the country and the pool of potential junior faculty to recruit from.

Growth has also placed a strain on medical school infrastructures. Majority of medical schools in the region with plans to expand indicate that they are unlikely to reach their goal enrolment numbers. Medical schools report inadequacies in a number of key physical resource areas, including skills and research labs, journals, student residences, and computers. Expansion further taxes these scarce resources. The most significant reported barriers to improving quality and increasing graduate numbers are insufficient physical infrastructure (labs, computers, teaching resources, and libraries) and faculty shortages. Faculty shortages include both basic science and clinical faculty, and this is attributed to shortages to salary and quality of life issues.

Some medical Schools such as Kenya's University of Nairobi School of medical sciences and the Makerere University in Uganda, have implemented a number of strategies to

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address inadequacies and barriers to expansion. Strategies generally focus on addressing insufficient physical infrastructure, increasing faculty numbers through recruitment and faculty development strategies, maximizing existing resources through the use of technology, and developing external partnerships both locally and on an international level to provide clinical teaching sites, donor support, and educational and research exchanges. A number of schools also report unique strategies such as establishing a graduate entry medical program e.g. UGHE in Rwanda and Muhimbili University of Health and Allied Sciences in Tanzania, increasing internally generated revenues through clinical services or the operation of a fitness center.

Medical Schools in the region have also enacted a number of strategies to improve medical doctor retention in their countries. The most common strategies include increasing salaries for faculty, establishing post-graduate medical education (PGME) programs, establishing community-based education, recruiting graduates as faculty, establishing career pathways, and strengthening research support for faculty. Additionally, faculty research, which is important for faculty retention, is significantly supported by funded research time for faculty members and strengthened institutional research tools (administrative and technical support, access to journals, and research and ethics committees).

Majority of medical schools in East Africa have focused recruitment of rural students and student preparatory programs- two strategies often used to improve access to medical education for rural students and improve overall rural retention of medical doctors. Over half of schools in the region report compulsory service requirements for graduates in their country. The logic behind this policy is that there is continent-wide evidence that the existence of compulsory service programs increases the likelihood of future rural general practice.

Despite strategies to address doctor retention in country and in rural areas, migration remains a significant issue in most of East Africa. On average, 27% of domestic graduates are likely to migrate out of their country within five years of graduation, most often to countries outside of Africa (WHO Statistics, 2019). A concerning is the number of medical schools reporting no specific school-level steps to address doctor retention.

There is also a rise of the private (for-profit and not-for-profit) medical schools and tuition costs for medical school. However, private medical schools also present a challenge to a healthcare system that has historically relied on public institutions for training. Issues of quality assurance and accreditation, relationships to government organizations, and cost will need to be investigated as these private institutions continue to grow. However, there are ways to manage these issues, for instance, medical schools in Tanzania are under private ownership, yet all schools (Public & Private) report accreditation by the national level Tanzania Commission for Universities. This is in sharp

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contrast to other countries that report inconsistent accrediting practices even among public schools.

Likely related to the growth of private medical schools are the increasing levels of tuition costs seen in East African and other African medical schools in general. Although costs may be seen as modest by international standards, this may not feel so for poorer students studying medicine in the region. An average tuition fee is around US$ 5,000 per year. Private medical schools are particularly dependent upon tuition fees for revenue. The increasing cost of medical schools may have unintended consequences, providing access to education only for wealthy students and minimizing the likelihood that graduates will remain in country or serve in poor or peripheral areas. Trends in tuition costs and the effects of these costs should be closely monitored and accounted for in strategies to address medical education capacity expansion and doctor retention.

Competitor Analysis

The shortfall in health workers in East Africa and Africa in general has been highlighted in depth in this business plan, however UMST Tanzania joining a competitive market in the region. There is intense competition for new medical sciences students and this section analyses the envisaged competition in the region. The criteria used in analyzing the competition are:

» Teaching infrastructure (lecture halls, laboratories, cadavers, and more).
» Lecturer-student ratio (you don't want to attend overcrowded classes).
» Quality of the faculty (Qualifications, experience, etc.)
» Governance
» Student affairs.
» Patient load in each school's teaching hospital. » Research and innovation and
» Compliance with the set medical and dental training teaching standards and other guidelines.

Institution	Country	Brief Description
Kenyatta University School of Medicine (KU)	Kenya	KU was one of the first accredited medical universities and has an excellent faculty of medicine. State of the art training infrastructure, superb student support, and good graduation rates make Kenyatta University Medical School a top choice.
Moi University School of Medicine (MUSOM)	Kenya	Moi University Medical School was hived from the Faculty of Health Sciences in 2005 and has grown in leaps and bounds to become one of the top 10 medical schools in Kenya. Indeed, the School later gave birth to the fast-growing School of Dentistry (SOD) and School of Nursing (SON). The most recent offshoot from MUSOM is the Institute of Biomedical Informatics

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		(IBMI). MUSOM's primary teaching Hospital is the popular Moi Teaching and Referral Hospital (MTRH).
Makerere University	Uganda	Makerere is one of the best Medical Institutes In Africa. The university was founded in 1992, was dependent at first, but later in the year 1970. It became an independent national university. Makerere University offers mainly 145 (140) degree programs, 135 master's degree programs and more 140 postgraduate programs leading to an officially recognized certificate throughout the World. This superior institution is home to a world-class medical school. it collaborates "The Feinberg School of Medicine" is a northwestern university that organizes a Therapeutic Exchange Program that helps students rotate and graduate in a variety of fields medical specialties such as family planning, pediatrics, cardiology, infectious diseases, trauma, and many others.
University of Nairobi Medical School	Kenya	The deeply-experienced faculty of health at the University of Nairobi Medical School has repeatedly won medical research awards and is among the leaders in medical innovations in Kenya. This, combined with the exposure students get from Kenyatta National Referral Hospital- UoN's School of Medicine designated teaching hospital- makes UoN a popular destination for surgery and dentistry students in Kenya. The school hosts an average of 120 international students each year. It is also known that there is a partnership with the international community, with an official bilateral agreement Cooperation with at least 20 universities and international institutions in the field of joint publication and publication of the research.
Mount Kenya University School of Medicine	Kenya	Overall, Mount Kenya University (MKU) School of Medicine scores highly in all the areas under consideration and has even beaten renowned public medical schools including Kenya's pioneer medical university, the University of Nairobi (UoN) in the past. Unsurprisingly, MKU has grown to become Kenya's largest private university. University Medical School runs the largest anatomy laboratory at Thika Level 5 Hospital in partnership with Kiambu county government.

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Maseno University Medical School	Kenya	Maseno is a top performing School of Medicine, and has been accredited by the Medical Practitioners and Dentists Board to train health practitioners and help bridge the ever-growing demand for medical professionals in Kenya.
Jomo Kenyatta University of Agriculture & Technology Medical School	Kenya	Jomo Kenyatta University of Agriculture and Technology (JKUAT)'s School of Medicine has been excelling in teaching and research in medical sciences for a couple of years now. The School is hosted by the School of Health sciences at JKUAT's Main campus in Juja and is well on the path to achieving its vision of becoming the best medical academic training center thanks to its wide network of local and global collaborators. For example, the school is currently partnering with KEMRI in teaching postgraduate trainees and research. It also runs a medical staff exchange program with the University of Wales in Cardiff (UWIC).
University of Dar es Salaam	Tanzania	The University of Dar es Salaam school of health sciences is entirely dedicated to provide knowledge excellence in biomedical education, basic and clinical research, quality patient care and service to improve the health of the citizens of Tanzania and beyond. It is one of the oldest and reputable institutions of higher education in Africa. It provides students a superlative education in the health sciences and provide scientific knowledge about existing and emerging diseases.
University of Addis Ababa	Ethiopia	The University of Addis Ababa started in 1950 with 30 students, but currently has about 50,000 students, of which 34,000 students are students, 13,000 graduate students, and 2,000 graduate students. The students are taught by more than 6,000 employees, academic staff and non-academic staff, whose academic staff is over 2,400, spread over 14 sites. A dozen people block these campuses School and eight research centers.
Kampala International University School of Health Sciences (KIU)	Uganda	The school is licensed to teach basic and postgraduate courses in human medicine, dentistry, pharmacy, and nursing. The KIU School of Health Sciences is recognized by the medical and dental regulatory agencies in Kenya, Tanzania, and Uganda. The faculties are from Uganda, Cuba, the Democratic Republic of the Congo, Nigeria, and the Philippines. The school's campus is located in the city of Ishaka in the district of Bushenyi in western Uganda, about 330 kilometers on the road southwest of Kampala, the largest city and capital of Uganda.
Muhimbili University of Health and Allied Sciences (MUHAS)	Tanzania	MUHAS is a successor to the Muhimbili University School of Health Sciences (MUCHS), which was a constituent School of the University of Dar es

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		Salaam. Over the years MUCHS has made significant achievements in terms of increased student enrollment and development of several new academic programmes. MUHAS offers a range of programmes in basic, clinical and allied health sciences.
University of Rwanda School of Medicine	Rwanda	University of Rwanda was formed in 2013 through the merger of previously independent public institutions of higher education, the largest of which was the National University of Rwanda. The university's head office is in Kigali. The university is composed of six independent, self-governing Schools. The school of medicine is organized into undergraduate and postgraduate programs. The number of enrolments and graduates from the school of medicine and allied health sciences has been increasing year on year. By 2019, the number of graduates from medical sciences programs had reached above 100. The school community is involved in different initiatives among them use of research for better understanding the healthcare provided and also to quantify the gap in health system, global health for understanding and managing healthcare equitably.
University of Global Health Equity (UGHE)	Rwanda	UGHE is a fully accredited Rwandan university that was launched in 2015. UGHE is a new kind of university focused on delivering the highest quality of healthcare by addressing the critical social and systemic forces causing inequities and inefficiencies in healthcare delivery. UGHE currently offers a Master of Science in Global Health Delivery (MGHD) with the following tracks: Gender and Reproductive Health, One Health and Health Services Management, a one-year, full-time degree program in Butaro, a rural town in Rwanda. UGHE also offers a Bachelor of Medicine, Bachelor of Surgery (MBBS) and Master of Science in Global Health Delivery (MGHD) dual-degree program (MBBS/MGHD).

Governance and Organizational Structure

In a bid, not to underestimate the complexity and enormity of commitment that venturing into a business of this magnitude entails, UMST Tanzania management has made it essential to have competent and professional management, staff and other key professionals, who know what they are doing and can plan and guide the company through all the trials and tribulations associated with a project of this scale. UMST Tanzania will rely heavily on people who have medical sciences training, teaching,

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evaluation and experience and depend on their expertise, guidance, recommendations and decisions.

UMST Tanzania will rely heavily on regulations both academic and non-academic which govern the academic achievements of the students and will lay clear the relationship between the university and its staff and the students. Such regulation and procedures have been drawn to be passed by the Board of Directors.

Strong leadership and clearly defined roles for governing and operating a leading university in the region as UMST Tanzania.

The board of directors will be composed of 5 members led by a chairperson, his/her deputy and a secretary. The board will sit on a quarterly basis but may sit regularly during the early stages of the operations. The board directors will have critical skills and abilities in the areas of medical sciences and technology, stakeholder relations, capital financing, marketing, and higher education operations management.

The board responsible for overseeing UMST Tanzani management will clearly have defined rules of conduct documented in a board charter and will ensure that they are followed. Board members shall remain focused on governance issues such as vision, strategy and direction, allowing the management and staff to focus on operational needs of UMST Tanzania. The board will provide the senior management with a mandate and clearly outlined expectations and evaluates performance against these expectations.

The UMST Tanzania will be run by leadership of the senior staff (Chancellor, Vice chancellor, Deputy vice chancellor for academic affairs). The board of Directors (designated by the owners) will constitute 30% females' members and will also include renowned Tanzania figures. The Senate is the supreme academic body responsible of all academic matters. The Dean is the director (head) of a faculty responsible for teaching, assessment of students and the execution of the curricula, and this includes:

Organizational Structure

The organizational below structure that will best fulfill the goals and guiding principles of the new School of Medicine. Figure 1 below represents this structure.

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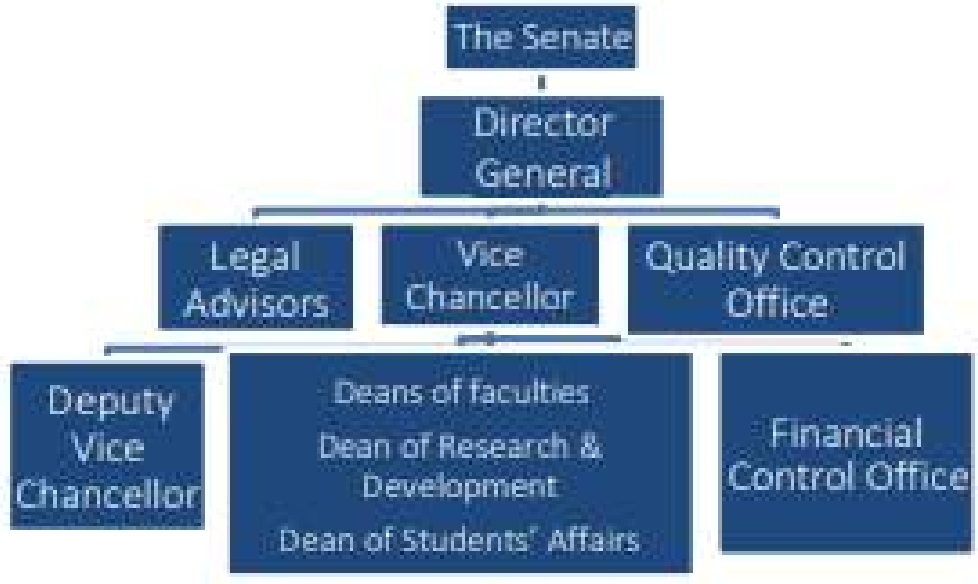

Figure 1: Organizational Structure

The UMST Tanzania will be run by leadership of the senior staff (Chancellor, Vice Chancellor, and Deputy Vice Chancellor for academic affairs). The Board of Directors (Designated by the OWNERS) will constitute 30% female members. The governance and structure outlined in this business plan enables the fulfillment of the goals of the new UMST Tanzania. It allows for the new School of Medicine to be accredited by accreditation bodies in country and outside, through UMST Sudan, and enables the degree to be conferred by the UMST Tanzania. These two benefits will allow the accreditation process for the new School of Medicine to proceed with fewer challenges than if the new College were a new entity with no links to UMST Sudan.

Economic Impact

Medical education is a major driver of the economy especially if teaching hospital are also established as part of the university.

This impact will stem from the spending by the new School of Medicine on facilities, infrastructure and related research institutes on capital improvements and goods and services, as well as the spending of staff and faculty, the spending of medical trainees, and the spending (external to the institution) of visitors to UMST Tanzania. This impact is conservative in its projected spending related to capital expenditures needed to operate a medical school, such as equipment, clinical supplies, and non-salary-related expenditures for the medical school.

The economic benefits generated by the development of a new unique research-intensive School of Medicine in Tanzania extend beyond the direct impact of its operations. Benefits generated in the region as a result of UMST Tanzania establishment will include the attraction of highly paid professionals to support the growing healthcare and biomedical community. The improved healthcare services resulting from the new School

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of Medicine will also attract talented workers and retirees who value a strong healthcare system as part of their geographic location decisions. This in turn will help grow and sustain neighborhoods, schools, entertainment and recreation, transportation, retail, banking, and commercial opportunities that will serve as additional economic benefits for the region.

Curriculum & Admissions

Based on advice from the promoters experience at UMST Sudan, the curriculum and admissions plan will be a community-oriented, learner-centered, problem-based curriculum delivered throughout the "teaching health system." This approach meant that training would take place at health posts, clinics, hospitals, and elsewhere in the community. In crafting this approach, we considered a number of key factors, including Sudan's experience in designing and implementing a medical curriculum, as well as Tanzanian specific disease profile and needs, program structure and duration, and student entry requirements. The same system will apply to schools of dentistry, pharmacy, and nursing.

The schools' administrator will oversee the initial curriculum design and approval, support to determine staffing needs, and negotiate salary levels. They will guide the construction of the new building, identify satellite teaching sites, and identify optimum student enrolment numbers. The traditional medical school curriculum educates physicians through a discipline-based (anatomy, biochemistry, pharmacology, pediatrics, etc.) approach emphasizing memorization versus self-directed discovery. The UMST Tanzania's curriculum will be rooted in the convergence of medicine and technology, pharmacy, dentistry, computer sciences and quantitative sciences to teach in a form of an integrated system to develop problem-solving skills needed to be a successful physician, dentists, pharmacist.

The first of its kind, the curriculum for UMST Tanzania will build upon the success of UMST Sudan's top-rated science-based research programs and will integrate state-of-the-art technological innovations to train physician-engineers and physician-scientists engaged in biomedical research to improve care and outcomes. In addition, the curriculum will include interprofessional training and practice interfaces with other medical Schools and multiple partner educational institutions in Tanzania and region. The new university will be a leader in team-based education and service delivery.

The overall objective of the new UMST Tanzania's curriculum is to develop a revolutionary paradigm of medical educational pedagogy that realizes and formalizes the concept of "technology -Inspired teaching medical sciences and pharmacy". Specific objectives of this technology-based curriculum will be to teach medicine based on quantitative systems principles and to drive the shift of teaching to a quantitative and engineering-based discipline. The focus will be on the intersection of technology,

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biological sciences, and physical sciences, now taking place in medicine, pharmacy, and dentistry. Boundaries between the principles of technology - engineering, the physical sciences, and biology are being eliminated, and a new educational and research paradigm has emerged at this interface. A technological foundation is the most effective way to provide solutions to the significant healthcare challenges facing the region, state, and world.

The new School of Medicine, Dentistry, Pharmacy, Medical Laboratory, Nursing, and Biomedical Engineering will produce graduates who are trained in state-of-the-art technologies that have changed the practice of medicine, and who will define and develop the technologies of the future. They will know how to collect and analyze “big data”, from genomics to clinomics, to diagnose and treat patients.

While significant effort has been invested in designing the concepts of an innovative curriculum, it is important to note that the medical education program of the new UMST Tanzania must achieve the Tanzania Higher Education Council accreditation.

The following are the key common elements of the proposed curriculum for all degrees offered.

» All courses will be in modules, and a semester course will consist of three modules. There will be opportunities for courses and topics to space one or two modules also.
» These classes and moduleswill overlap and could be co-taught with other Bioengineering courses, and also could be offered to other engineering students as deemed appropriate.
» Approximately one-third of the class would be lecture-based and two-thirds would be lab modules,clinical, industryor project/discussion-based.
» The classes would be ‘flipped’ to provide knowledge-based content of the class through online and electronic venues. The lecture portion would be more analysis, problem solving, and project-based.
» Extra time will be utilized to further include math, statistics, probability, computing, and other engineering topics.
» Systems’ concepts will be integrated throughout all semesters, starting with the first semester.
» Engineering and technology will be integrated in every course
» Team-based design project learning will be integrated in every semester.
» Prevention, ethics, teamwork, and social and psychological experiences will be integrated into the curriculum. The project teams could be structured to include students from other appropriate disciplines.

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Interdisciplinary Elements of the Curriculum

Interdisciplinary educational experiences with depth and rigor can be integrated into the curriculum by new faculty that are trained across the disciplines of engineering, biology, and medicine, and are able to bridge the gap in a seamless manner. In addition, for some topics, the modules could be team-taught so that the students benefit from the experience of multiple instructors and expertise. Finally, within one course, the modules could each be taught by subject matter experts from different interdisciplinary backgrounds.

In addition to the faculty, it would also be beneficial to have some students from different backgrounds within the classes and project teams, to provide additional interactions and enriching experiences. Community service and outreach experiences will be an important part of the curriculum.

Faculty & Staffing Plan

Having adequate numbers of competent staff is a requirement for accreditation and is essential for establishing and sustaining any medical school. In addressing this, UMST Tanzania will consider the following criteria: minimum qualification requirements, numbers needed to teach, supply market, remuneration and benefits, faculty development, and capacity building.

Supply market, Minimum qualifications, and Numbers required

UMST Tanzania will deliberately set high qualification standards to attract the best staff and increase the likelihood of producing well-trained doctors. It will require non-clinical and clinical scientists to have at minimum a master degree, or equivalent in their area of specialization. The number of staff will be determined and related to the number of enrolled students in each faculty common subjects (e.g. Physiology, Anatomy) will have departments from which will serve all faculties.

Academic Staff

All academic staff will be Ph.D. holders (50%) or Master degree holders 50%. Academic staff member is a specialist in a particular subject. Some staff members will take administration responsibilities as Dean or Academic Affairs Office.

- The academic staff will be holding an academic status, professor, associate, or assistant professor, or if holding an MSc – he will be a lecturer.
- The Vice-chancellor will be a professor in his specialty and will teach a load of lectures that matches the duty of his administrative responsibility.
- The Deans of faculties will be equally specialists in their career and either professors or associate professor. They will also contribute to the teaching and academic responsibilities.
- The number of staff will match the number of students and the level of education. Teaching assistants will be recruited when necessary.

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As the academic years progress, the new staff will be recruited accordingly and in good time.

UMST Tanzania will have a full book that describes the terms of reference of each level and the duties of each staff member.

Curriculum: For each faculty is now prepared and will be presented if need be to any technical committee

Remuneration and benefits

Competitive salaries and benefits are a major requirement for attracting high-quality staff at medical schools. It is also generally accepted that academic salaries for clinicians are commonly higher than they are for other academic disciplines. Thus, in a bid to attract and help retain clinicians, UMST will negotiate a separate and enhanced salary structure with the Ministry of Education and Commission of Tanzania University. Table 5 below shows the average annual costs on faculty salaries in Tanzania.

Table 5: Average annual costs on faculty salaries in Tanzania

Average Salaries	
Faculty	**Annual Cost US $**
Full Professor	**36,000**
Associate Professor	**24,000**
Assistant Professor	**20,000**
Lecturer	**18,000**
Tutorial Assistant	**7,000**

Clinical allowances for the staff working in the teaching hospital will be added according to workload. Housing allowances will be considered.

Faculty development and capacity building

Recognizing the shortage of medical educators in Tanzania, UMST Tanzania will prioritize faculty development and capacity building from inception. Experience and training from the parent institution UMST Sudan will provide the necessary support in staff development and provide training under various specialties. With time UMST Tanzania will develop expertise to train internally.

Research

To support the research objectives of the new UMST Tanzania, faculty researchers will be required during start-up and growth years. Costs and revenues associated with these researchers are included in the financial plan section.

Research goals for the UMST include the following:

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The university will develop a top-tier world class research enterprise:

- Develop and grow a substantial and transformative research program at the intersection of engineering, the basic health sciences, applied health sciences (e.g., public health), and medicine.
- Develop and grow a substantial and transformative research program that leverages computing, big data, and mobile technologies to transform healthcare outcomes across the care continuum.
- Foster an open research model to bring in a diversity of disciplines and organizations to facilitate innovation and creativity.

To achieve this, the UMST will:

- Implement policies and put in place administrative support to facilitate interdisciplinary collaborations within the country, regional and international.
- Provide facilities to foster top-tier research.
- Develop data-sharing and access policies and procedures to foster top-tier research.
- Foster collaborative opportunities that can enrich and strengthen the research program and the eco-system for translational activities and entrepreneurship.

Facilities

The new UMST Tanzania will require significant educational space, clinical facilities, research resources, and infrastructure to realize its goals as outlined in this business plan. The University will leverage existing available space and resources to ensure that the six faculties are as cost-effective as possible. Additional opportunities for leveraging facilities and infrastructure will be identified on time.

In addition to the potential to leverage existing facilities and infrastructure at the new university, management will also have relationships with organizations throughout the region that will enable the new faculties to share resources for facilities and technologies that might be needed in the future, such as an expanded clinical training centers and Pharmaceutical factories. Although estimates of facility costs required to address the goals of the University are and included, the business plan have been purposefully conservative.

The university will be built on UMST owned plot of 50,000 sqm. located in Kigamboni, Dar es Salaam. The build area is 2,500 sqm. x 6 and will comprise of 1) subbasement 2) Ground floor + 4 as shown on table 6 below:

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Table 6: Built Area Details

No.		Size	No.
1.	Seminar rooms	6 x 9 m^2	4
2.	Staff offices	5 x 5 - 5 x 4	20
3.	Lecture theatre	14 x 18 m^2	1
4.	Computer labs	12 x 8	8
5.	Digital library with computer	14 x 25	2
6.	Library traditional (books)	14 x 25	1
7.	Cafeteria	252 m^2	1
8.	Labs (to be specified)	1440 m^2	2
9.	Lab (clinical skills mannequins)	18 x 9	1
10.	Labs to be specified	6 x 9	5
11.	Stores	6 x 13	7
12.	Electronic Lab	18 x 9	1
13.	Workshop Zero training	20 x 12	1
14.	Security offices	12 x 4	2

The facility will accommodate more than 3,000 students if given that each student needs 3 square meters space. However not all facilities will be occupied at the same time. Students will either be in the lecture theatres or Lab or Library or computer center or cafeteria. Thus the building will be able to accommodate 6 faculties with 500 students. However, the training of medical/nursing requires that the student be in the university main campus for solid 2 years then move to a training centers, hospitals /heath centers or a community, thus evacuating the main building for more students. The lecture theatres of various sizes and Labs of various sizes are more than adequate to six faculties.

In addition to the identified facilities and associated costs included in this business plan, there is also potential space available for the hospital/health center. When the medical/nursing students finish their first 2 years in campus they will find a hospital/heath center ready to accommodate them for clinical training. UMST Tanzania will own an outpatient clinical and diagnostic centers with all the updated high-tech facilities. It is going to be manned by 10 senior consultants who will be recruited as clinical teachers. The clinical teaching center will commence one year after the inauguration of the UMST and the building will have 4 lecture theatres and 5 seminar rooms to accommodate the clinical students who would have completed their pre-clinical 2 years in the main campus

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Accreditation of the medical and dental schools

Accreditation is the process leading to the granting of a definitive Operating Agreement to a private provider of higher education. UMST Tanzania must have a curriculum that is distinct and progressive in nature in order to attain accreditation from the Higher education accreditation council (HEAC). The following requirements do not define the specific curriculum for the UMST Tanzania, but rather outline the direction of medical education.

The Tanzania HEAC is the accrediting body for medical schools and other higher learning institutions. The proposed curriculum must meet rigorous standards to attract the finest students, ensure quality education, and be eligible to receive government funding for the students and institution.

Broad review of many aspects of a new medical/dental school is part of the accreditation process, which includes every aspect of the school's development from facilities to faculty. Educational readiness requires a strong foundation. If the comprehensive system review ensures a base for the medical school, the curriculum review represents the bricks and mortar that provide the structure for a student's educational success.

According to HEAC guidelines, the objectives for clinical education must include quantified criteria for the types of patients (real or simulated), the level of student responsibility, and the appropriate clinical settings needed for the objectives to be met. The objectives of the educational program must be made known to all medical students and to the faculty, residents, and others with direct responsibilities for medical student education.

The curriculum must include behavioral, socioeconomic, basic science, and clinical disciplines (e.g., anatomy, biochemistry, genetics, physiology, microbiology and immunology, pathology, pharmacology and therapeutics, and preventive medicine). The clinical instruction must cover organ systems. Multidisciplinary content in areas such as emergency medicine and geriatrics, and in the disciplines that support general medical practice, such as diagnostic imaging and clinical pathology, must be developed along with specific instruction in communications skills.

In order to attain these objectives, the medical college curriculum can be designed with the six competencies outlined by the HEAC, and be able to demonstrate that the quality of their awards will be of international standards will be able to use its university title if it:

» Delivers education across a broad range of subjects including science and technology at undergraduate and postgraduate levels including research degrees

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» Has, if it is a private provider, been awarded a definitive Operating Agreement and degree awarding powers
» Can demonstrate that its staff are engaged in research and regularly publish in peer reviewed journal.
» The name must reflect the specialist nature of the institution e.g. Public Health Institute.

Operational Strategy and Competitive Advantage

Educational strategies

UMST Tanzania will incorporate a student-centered education and learning leading to acquisition of maximum student responsibility towards his/her profession and the community. This will include community oriented and community based and community directed education that will allow students to appreciate:

» the value of being a useful member of the community
» the value of diversity
» the value of multi-ethnicity and to be emphatic, humane and fair

Lectures will train the students on research methods and by the end of the academic career the students develop a research proposal and write up a thesis which will constitute an important part of the assessment before graduation.

UMST relies heavily on regulations both academic and non-academic which govern the academic achievements of the students and lay – clear the relationship between the university and its staff and the students. Such regulation and procedures have been drawn to be passed by the Board of Directors.

The final year examination will be attended by external examiners from outside the country examiners. They provide a good calibration to students' academic standard, will reevaluate the curricula, and methods of teaching and methods of assessment.

Students Support System

All students will be given support to improve their Language skills particularly English Language, using new modalities of teaching foreign languages. The supervision of the academic progress of the students will be closely supervised by the staff. Each member of staff acting as academic supervisors will be assigned not more than 3 students to guide and advise them. The academic supervisors will help solve the students' disabilities early on and guide him/her through achieving a better standard.

Methods of Teaching

» Interactive Lectures.
» Supervised bedside teaching on mannequin and patients where appropriate.
» Practical training in the labs, hospital pharmacies, or drug industry (factory).
» Small group discussion.

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» Problem solving tutorials.
» Seminars and assignment prepared by students.
» Field visits to communities, factories, homes, development schemes.
» Development of research proposals and carryout research.

Methods of Evaluation

Each semester will be allocated 2 weeks of assessment which include:

» Best of five and Extended Matching Questions
» Laboratory experiment testing (lab, technology, pharmacy)
» OSCE and PACES.
» Research thesis.

Students' extra-curricular activities

The university deems it essential and important to develop the students recreational and sports abilities including:

» Football soccer
» Basketball and volleyball
» tennis and tennis table » Swimming
» Gymnastic
» Music – all types
» Singing

Clubs of students interested in each will be formed and each will be assigned a teacher/trainer facilities for each activity will be provided by the university and training will be encouraged free of charge, competition for excellence will be done.

Students' recruitment pool

Since the UMST education is based on excellence and high standard, it is expected that students will come from variety of countries. It is expected that 60% will be from Tanzania and 40% will be international students (Africa, and the Arab World mainly).

Similarly the faculty of pharmacy and laboratory technology needs are high.

Competitive advantage

Given the above competitor analysis conducted in the market analysis section, the aim of UMST Tanzania is to ensure that they build a commercial higher learning institution in Tanzania and the region, that will be able to provide quality, effective and excellent medical and clinical training; and be the preferred medical school of sciences and technology local and international students and lecturers. With this in mind, UMST Tanzania will set forth strategies and exhibit competencies that will allow them to favourably compete against the competitors and give them the advantage required. These competencies will include:

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Medical Knowledge

Residents of UMST Tanzania will demonstrate knowledge about established and evolving biomedical, clinical, and cognate (e.g., epidemiological and social-behavioral) sciences and the application of this knowledge to patient care. They will be expected to: 52 » Demonstrate an investigatory and analytic thinking approach to clinical situations. » Know and apply the basic and clinically supportive sciences which are appropriate to their discipline.

Practice-Based Learning and Improvement

Residents of UMST Tanzania will be able to investigate and evaluate their patient care practices, appraise and assimilate scientific evidence, and improve their patient care practices. They will be expected to: » Analyze practice experience and perform practice-based improvement activities using a systematic methodology. » Locate, appraise, and assimilate evidence from scientific studies related to their patients' health problems. » Obtain and use information about his or her population of patients and the larger population from which their patients are drawn. » Apply knowledge of study designs and statistical methods to the appraisal of clinical studies and other information on diagnostic and therapeutic effectiveness. » Use information technology to manage information, access online medical information; and support his or her own education. » Facilitate the learning of students and other healthcare professionals.

Interpersonal and Communication skills

Residents of UMST Tanzania shall demonstrate interpersonal and communication skills that result in effective information exchange and teaming with students, patients, their patients' families, and professional associates. Residents shall: » Create and sustain a therapeutic and ethically sound relationship with patients. » Use effective listening skills and elicit and provide information using effective nonverbal, explanatory, questioning, and writing skills. » Work effectively with others as a member or leader of a healthcare team or other professional group.

Professionalism

Residents at UMST Tanzania shall demonstrate a commitment to carrying out professional responsibilities, adherence to ethical principles, and sensitivity to a diverse patient population. They will demonstrate respect, compassion, and integrity; a responsiveness to the needs of patients and society that supersedes self-interest; accountability to patients, society, and the profession; and a commitment to excellence and ongoing professional development.

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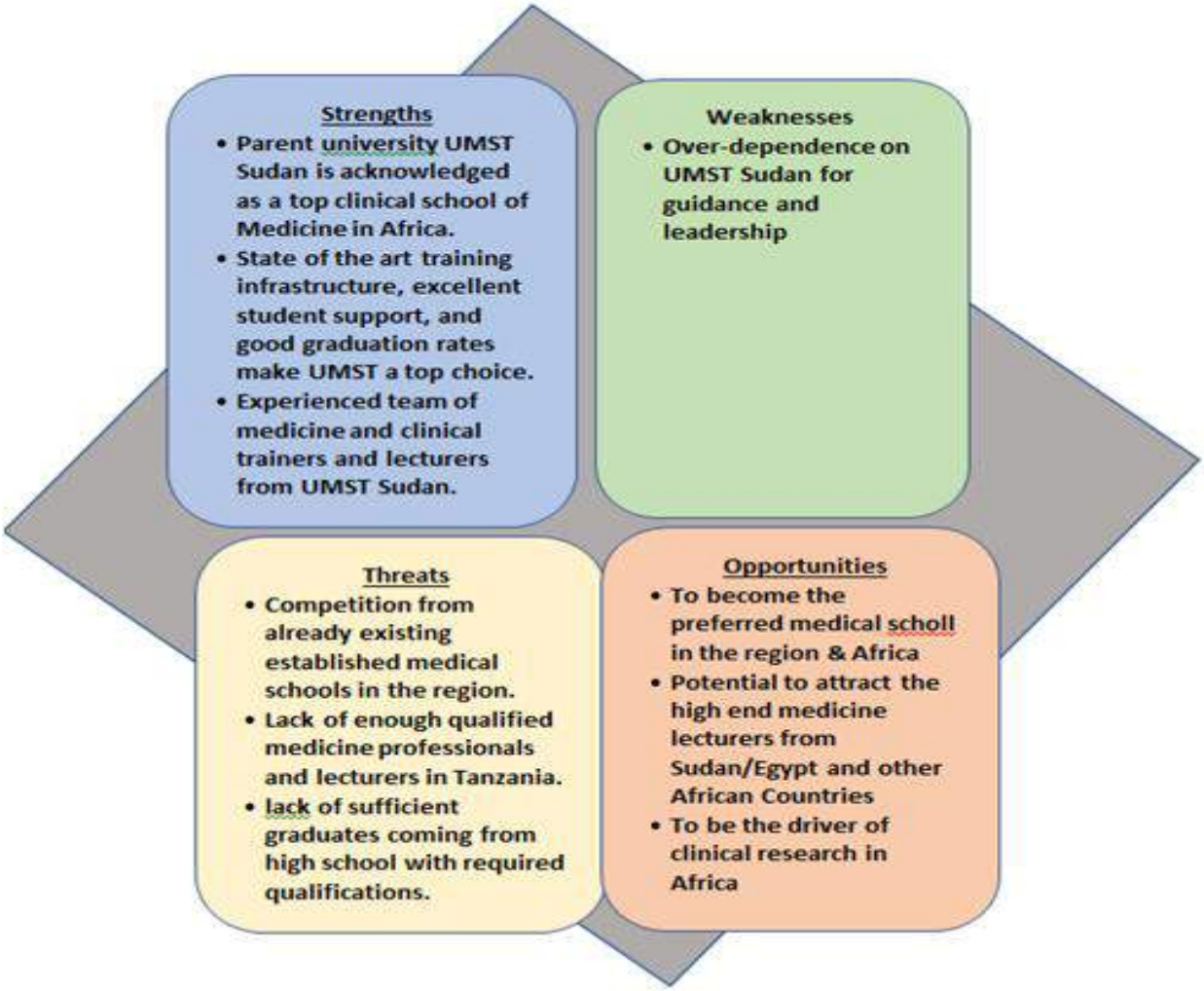
SWOT: Strengths / Weaknesses / Opportunities / Threats



Financial Plan

Introduction

The University of Medical Sciences and Technology in Tanzania (UMST Tanzania) is a newly to be established schools of medical sciences, born out of the initiative from the promoters parent institution UMST Sudan.

As it is well detailed in this financial plan the project is financially viable, and below are some pecuniary highlights:

» Potential increase in revenue from an estimated US$1.5million in 2023 to US$35 million by 2031 from mainly tuition fees. This growth is aggressive, but can be achieved if efforts are focused on the development of high-quality facilities and amenities, maximizing service offering and hiring experienced staff.

» EBIT, driven by operational efficiency, to increase from US$ -0.485million in Year 2022 to over US$19.7 million in Year 2031

» Net income to grow from US$ -0.132 Million in 2022 to US$13 million in 2031 representing a change in the net loss margin in Year 1, to profitability in Year 10.

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Assumptions

Financial projections built for the purpose of project, are based on the following key assumptions in addition to those outlined throughout different sections of this project proposal:

Financial year assumptions

The first year of this plan will be reflected as 2023, and subsequent years as 2023, 2025, etc. or as Year 1, Year 2, Year 3, etc. Construction is assumed to take place and be completed by 2022 allowing 2023 be the first 1 year of operations. That's when income and costs of operations start to being recorded.

Currency

Currency used in this proposal is United States Dollar denoted US$.

Revenue

Assumptions Like any other higher educational institution, the primary source of revenue are tuition fees, together with grants and state funding price. Details of revenue streams are as follow:

Tuition fees

UMST Tanzania is offering 6 faculties and charging tuition fees for East African and other International students at US$ 6,000 (Medicine and Dental), US$ 4,000 (Pharmacy), US$ 3,000 (Biomedical Engineering), US$ 2,000 (Lab technology), US$ 1,5000 (Nurses) respectively for all faculties, as the primary source of income. Revenue from tuition fees is a function of student's numbers and fees rates.

In the first year of the plan, tuition revenue will generate more than US$1.5 million growing to US$35 million by year 10. An increase of number of faculties to 15).

Direct costs are mainly lecturer costs (salaries) and they range from US$ 1.1 million in 2022 to US$14.5 million by 2031. Included are the average annual salaries for Professors/Lecturers and their assistants and increasing at 6% annually.

Investment Requirements

In order to finance the construction of the university campus and acquire planned necessary infrastructure, equipment, furniture and accreditation, a driving force behind projections, UMST Tanzania requires an investment US$20.3 million to complete plus a working capital requirement of US$2 million in 2023. The investment estimates are based on the current architectural design, infrastructure and outfitting needs of the university campus. It does not include other assets purchases that will take place throughout the life cycle of the business which will be financed by the business itself.

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Financing Strategy

In order to realize this project, UMST Tanzania promoters are seeking to finance the investment required mainly through equity if there is any short in finance a loan can be drawn from a bank or shares offered to partners. The required debt amount determined later will be financed by banker for which a letter of guarantee has been secured.

The following are the assumptions attached to the debt financing if required, for the project:

- » The total value of debt investment required over the phases is assumed to be US$10.1 million
- » The term of the loan is 7 years per phase. Interests and principal payments have been accounted in the proforma profit and loss and cash flow respectively.
- » The project will be making monthly repayments with an interest rate of 7% compounded for each payment.
- » The amortization schedule used is declining balance method with a monthly repayment of US$80,000.

General and administrative expenses

Estimates for general and administrative expenses used market prices and experience of the project promoter, construction engineers and consultant to the project. Those expenses as shown in the income statement, are expenditures that pertain to operations rather than to expenses that can be directly related to the services. These expenses occur independently of service offerings.

For the purpose of this model, expenses included are audit fee, marketing, bad debt provision, bank charges, credit card commission, , fuel, security company, information systems, consultant and professionals, insurance, legal expenses, postage, stationery and printing, staff recruitment, staff training, subscriptions, telephone and communication, travel – local, travel – international, salary and benefits attributable to corporate management and general staff, maintenance and repairs and power and heating costs.

Depreciation Expense

In addition to general expenses to be covered in the proforma profit and loss statement, depreciation amounts have also been computed based on a straight Line method.

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UMST Tanzania – Income Statement

	1	2	3	4	5	6	7	8	9
Year	2023	2024	2025	2026	2027	2028	2029	2030	2031
Revenue									
Tuition	4,703,348	9,395,350	15,647,226	21,604,668	26,375,954	29,983,399	32,445,941	34,068,238	35,771,650
Other	1,000,000	700,000	-	-	-	-	-	-	-
	5,703,348	10,095,350	15,647,226	21,604,668	26,375,954	29,983,399	32,445,941	34,068,238	35,771,650
Cost of sales									
Lecturers costs	3,052,176	5,670,613	8,446,157	10,190,633	11,454,658	12,141,938	12,870,454	13,642,681	14,461,242
Total Cost of sales	3,052,176	5,670,613	8,446,157	10,190,633	11,454,658	12,141,938	12,870,454	13,642,681	14,461,242
Gross Profit	2,651,172	4,424,736	7,201,069	11,414,035	14,921,296	17,841,461	19,575,487	20,425,557	21,310,408
GP Margin	*46%*	*44%*	*46%*	*53%*	*57%*	*60%*	*60%*	*60%*	*60%*
General expenses									
Admin and General	532,646	672,756	816,544	824,384	832,301	840,294	848,364	856,512	864,739
Salaries for general staff	546,425	562,187	578,404	595,089	612,255	629,916	648,087	666,782	686,016
Total General expenses	1,079,071	1,234,943	1,394,948	1,419,473	1,444,556	1,470,210	1,496,451	1,523,294	1,550,755
Operating Profit/EBITDA	1,572,101	3,189,794	5,806,121	9,994,561	13,476,740	16,371,251	18,079,036	18,902,263	19,759,653
Interest on investment	704,294	936,950	1,121,454	942,992	714,328	488,435	277,512	124,695	19,759,653
Depreciation	1,000,494	1,425,740	1,850,987	1,658,987	1,400,987	1,250,987	1,100,987	1,100,987	1,100,987
Profit before tax / EBT	(132,686)	827,103	2,833,679	7,443,582	11,361,425	14,631,828	16,700,537	17,676,580	18,625,495
Taxable earnings	(132,686)	827,103	2,833,679	7,443,582	11,361,425	14,631,828	16,700,537	17,676,580	18,625,495
Income Tax	-	248,131	850,104	2,233,075	3,408,427	4,389,548	5,010,161	5,302,974	558,649
Net (Loss) Profit	(132,686)	578,972	1,983,576	5,210,507	7,952,996	10,242,278	11,690,373	12,373,602	13,037,842
Dividends	-		-	-	1	2	3	4	5
Retained Earnings	(132,686)	578,972	1,983,576	5,210,507	1,983,576	5,210,507	11,690,373	12,373,602	13,037,842

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UMST Tanzania – Balance Sheet

Year	1 2023	2 2024	3 2025	4 2026	5 2027	6 2028	7 2029	8 2030	9 2031
NON CURRENT ASSETS									
Land	640,000	640,000	640,000	640,000	640,000	640,000	640,000	640,000	640,000
Buildings	26,698,937	35,048,090	33,947,103	32,846,115	31,745,128	30,644,141	29,543,154	28,442,167	27,341,180
IT equipment	225,000	225,000	-	-	-	-	-	-	-
Motor vehicles	281,250	312,500	187,500	93,750	31,250	-	-	-	-
Land and other equipment	450,000	500,000	300,000	150,000	50,000	-	-	-	-
University furniture	618,750	687,500	412,500	206,250	68,750	-	-	-	-
	28,913,937	**37,413,090**	**35,487,103**	**33,936,115**	**32,535,128**	**31,284,141**	**30,183,154**	**29,082,167**	**27,981,180**
CURRENT ASSETS									
Account receivables	773,153	1,544,441	2,572,147	3,551,452	4,335,773	4,928,778	5,333,579	5,600,258	5,880,271
Prepayments	-	-	-	-	-	-	-	-	-
Other receivables	-	-	-	-	-	-	-	-	-
Tax related assets	-	-	-	-	-	-	-	-	-
Cash and bank balances	389,673	303,741	1,116,744	4,495,975	10,258,686	17,984,033	27,951,784	39,683,906	52,885,745
	1,162,826	**1,848,182**	**3,688,890**	**8,047,427**	**14,594,459**	**22,912,811**	**33,285,363**	**42,284,164**	**58,766,017**
TOTAL ASSETS	**30,076,763**	**39,261,271**	**39,250,993**	**41,983,542**	**47,129,588**	**54,196,952**	**63,468,517**	**74,366,331**	**86,747,196**
FINANCED BY									
Share capital	10,235,150	21,197,596	21,197,596	21,197,596	21,197,596	21,197,596	21,197,596	21,197,596	21,197,596
Revaluation reserve	-	-	-	-	-	-	-	-	-
Retained earnings	(1,468,724)	-889,752	1,093,824	6,304,331	14,257,328	24,499,608	36,189,984	48,563,590	61,601,437
	14,766,426	**20,307,844**	**22,291,420**	**27,501,927**	**35,454,924**	**45,697,204**	**57,387,580**	**69,761,186**	**82,799,033**
NON CURRENT LIABILITIES									
Long term loan	14,291,674	17,250,687	14,532,999	11,618,849	8,494,035	5,143,328	2,538,412	865,589	0
Total Financing	**14,291,674**	**17,250,687**	**14,532,999**	**11,618,849**	**8,494,035**	**5,143,328**	**2,538,412**	**865,589**	**0**
CURRENT LIABILITIES									
Account payables	1,018,664	1,702,740	2,426,574	2,862,766	3,180,628	3,356,420	3,542,525	3,739,556	3,948,164
Other payables	-	-	-	-	-	-	-	-	-
Tax payable	-	-	-	-	-	-	-	-	-
	1,018,664	**1,702,740**	**2,426,574**	**2,862,766**	**3,180,628**	**3,356,420**	**3,542,525**	**3,739,556**	**3,948,164**
TOTAL EQUITY AND LIABILITIES	**30,076,763**	**39,261,271**	**39,250,993**	**41,983,542**	**47,129,588**	**54,196,952**	**63,468,517**	**74,366,331**	**86,747,196**

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UMST Tanzania – Cash Flow Statement

Year	1 2023	2 2024	3 2025	4 2026	5 2027	6 2028	7 2029	8 2030	9 2031
Cash Flows from operating activities:									
Net Income	(132,686)	578,972	1,983,576	5,210,507	7,952,997	10,242,280	11,690,376	12,373,606	13,037,847
Adjustments to reconcile net income to net cash provided by operating activities									
Depreciation and amortization	1,000,494	1,425,740	1,850,987	1,625,987	1,400,987	1,250,987	1,100,987	1,100,987	1,100,987
Changes in current assets and liabilities:									
Change in account receivables	(515,005)	(771,288)	(1,027,706)	(979,306)	(784,321)	(593,005)	(404,801)	(266,679)	(280,013)
Change in prepayments	-	-	-	-	-	-	-	-	-
Change in other receivables	-	-	-	-	-	-	-	-	-
Change in tax receivables	-	-	-	-	-	-	-	-	-
Change in accounts payable	511,798	684,076	723,834	436,192	317,862	175,792	186,105	197,031	208,608
Change in other payables	-	-	-	-	-	-	-	-	-
Change in tax payable	-	-	-	-	-	-	-	-	-
Net cash provided by operating activities	**864,600**	**1,917,501**	**3,530,691**	**6,293,381**	**8,887,526**	**11,076,054**	**12,572,666**	**13,404,945**	**14,067,429**
Cash flows from investing activities:									
PPE	(9,924,893)	(9,924,893)	-	-	-	-	-	-	-
Other sales and additions	-	-	-	-	-	-	-	-	-
Net cash (used in) investing activities	**(9,924,893)**	**(9,924,893)**	-	-	-	-	-	-	-
Cash flows from financing activities:									
Net Proceeds from borrowings	4,962,446	4,962,446	-	-	-	-	-	-	-
Payment of debt	(1,337,330)	(2,003,433)	(2,717,688)	(2,914,150)	(3,124,814)	(3,350,707)	(2,604,915)	(1,672,823)	(865,589)
Capital injected	4,962,446	4,962,446	-	-	-	-	-	-	-
Cash dividends paid	-	-	-	-	-	-	-	-	-
Net cash (used in) financing activities	**8,587,563**	**7,921,460**	**(2,717,688)**	**(2,914,150)**	**(3,124,814)**	**(3,350,707)**	**(2,604,915)**	**(1,672,823)**	**(865,589)**
Effect of exchange rate chages on cash	-	-							
Net increase (decrease in cash and cash equivalents	**(472,730)**	**(85,932)**	**813,003**	**3,379,231**	**5,672,711**	**7,725,347**	**9,967,751**	**11,732,122**	**13,201,840**
Cash at the beginning	862,403	389,673	303,741	1,116,744	4,495,975	10,258,686	17,984,033	27,951,784	39,683,906
Cash at the end	389,673	303,741	1,116,744	4,495,975	10,258,686	17,984,033	27,951,784	39,683,906	52,885,745

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UMST Tanzania – Ratio Analysis

UMST Rwanda Ratio Analysis						
Currency in US$						
		1	2	3	4	5
Profitability ratios						
	Revenue	1,570,400	5,703,348	10,095,350	15,647,226	21,604,668
	% growth		263.2%	77.0%	55.0%	38.1%
	Gross profit	372,800	2,651,172	4,424,736	7,201,069	11,414,035
	% margin	24%	46%	44%	46%	53%
	EBITDA	(485,222)	1,572,101	3,189,794	5,806,121	9,994,561
	% margin	-30.9%	27.6%	31.6%	37.1%	46.3%
	% growth		-424.0%	102.9%	82.0%	72.1%
	EBIT	(1,686,607)	(836,980)	(109,847)	1,712,225	6,518,589
	% margin	-107.4%	-14.7%	-1.1%	10.9%	30.2%
	% growth		-50.4%	-86.9%	-1658.7%	280.7%
	Net income	(1,336,038)	(132,686)	578,972	1,983,576	5,210,507
	% margin	-85.1%	-2.3%	5.7%	12.7%	24.1%
	% growth		-90.1%	-536.3%	242.6%	162.7%
	Return on Equity	-13.4%	-0.9%	2.9%	8.9%	18.9%
Interest coverage						
	Interest expense	350,569	704,294	936,950	1,121,454	924,992
	Capital expenditures	10,564,893	9,924,893	9,924,893	9,924,893	-
	EBITDAR	(485,222)	1,572,101	3,189,794	5,806,121	9,994,561
	EBIT / interest expense	-4.8x	-1.2x	-0.1x	1.5x	7.0x
	EBITDA / interest expense	-1.4x	2.2x	3.4x	5.2x	10.8x
	EBITDA - capital expenditures / interest exp	-31.5x	-11.9x	-7.2x	-3.7x	10.8x
	EBITDAR / interest expense	0.0x	0.0x	0.0x	0.0x	0.0x
	EBITDAR / net interest expense					
Capitalization*						
	EBIT	(1,686,607)	(836,980)	(109,847)	1,712,225	6,518,589
	Taxes	-	-	248,131	850,104	2,233,075
	Total debt	11,173,423	15,310,337	18,953,427	16,959,573	14,481,615
	Total shareholders' equity	9,936,666	14,766,426	20,307,844	22,291,420	27,501,927
	Total capitalization	21,110,089	30,076,763	39,261,271	39,250,993	41,983,542
	Return on invested capital	-8.0%	-2.8%	-0.9%	2.2%	10.2%
	*all recorded at book value					
	Total debt / total capitalization	0.5x	0.5x	0.5x	0.4x	0.3x
	Total debt / EBITDA	-23.0x	9.7x	5.9x	2.9x	1.4x
	Total adjusted debt / EBITDAR	0.0x	0.0x	0.0x	0.0x	0.0x
Liquidity						
	Cash	862,403	389,673	303,741	1,116,744	4,495,975
	Accounts receivable	-	-	-	-	-
	Quick assets	862,403	389,673	303,741	1,116,744	4,495,975
	Inventory	-	-	-	-	-
	Current assets	1,120,550	1,162,826	1,848,182	3,688,890	8,047,427
	PP&E, net	19,989,538	28,913,937	37,413,090	35,562,103	33,936,115
	Total assets	21,110,089	30,076,763	39,261,271	39,250,993	41,983,542
	Accounts payable	506,866	1,018,664	1,702,740	2,426,574	2,862,766
	Current liabilities	506,866	1,018,664	1,702,740	2,426,574	2,862,766
	Working capital	613,685	144,162	145,442	1,262,316	5,184,661
	Current ratio	2.2x	1.1x	1.1x	1.5x	2.8x
	Quick ratio	1.7x	0.4x	0.2x	0.5x	1.6x
Activity						
	Accounts receivable (collection period)	60.0	60.0	60.0	60.0	60.0
	Accounts payable (days outstanding)	90.0	90.0	90.0	90.0	90.0
	Net fixed asset turnover	0.1x	0.2x	0.3x	0.4x	0.6x
	Asset turnover	0.1x	0.2x	0.3x	0.4x	0.5x

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Appendices

Brief on the United Republic of Tanzania

Brief on the United Republic of Tanzania

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BACKGROUND

Shortly after achieving independence from Britain in the early 1960s, Tanganyika and Zanzibar merged to form the United Republic of Tanzania in 1964. In 1995, the country held its first democratic elections since the 1970s. Zanzibar maintains semi-autonomy and participates in national elections; popular political opposition on the isles led to four contentious elections since 1995 [1].

Located in Eastern Africa, Tanzania, bordered by the Indian Ocean has three of the largest lakes of the continent, which are namely Lake Victoria (the world's second-largest freshwater lake) in the north, Lake Tanganyika (the world's second deepest) in the west, and Lake Nyasa (Lake Malawi) in the southwest. Figure 1 revealed the administrative levels 1 (regions) of the country and its international boundaries with eight countries namely Uganda and Kenya in the North, Rwanda, Burundi, the Democratic Republic of Congo in West, Zambia and Malawi in South West and Mozambique in South.

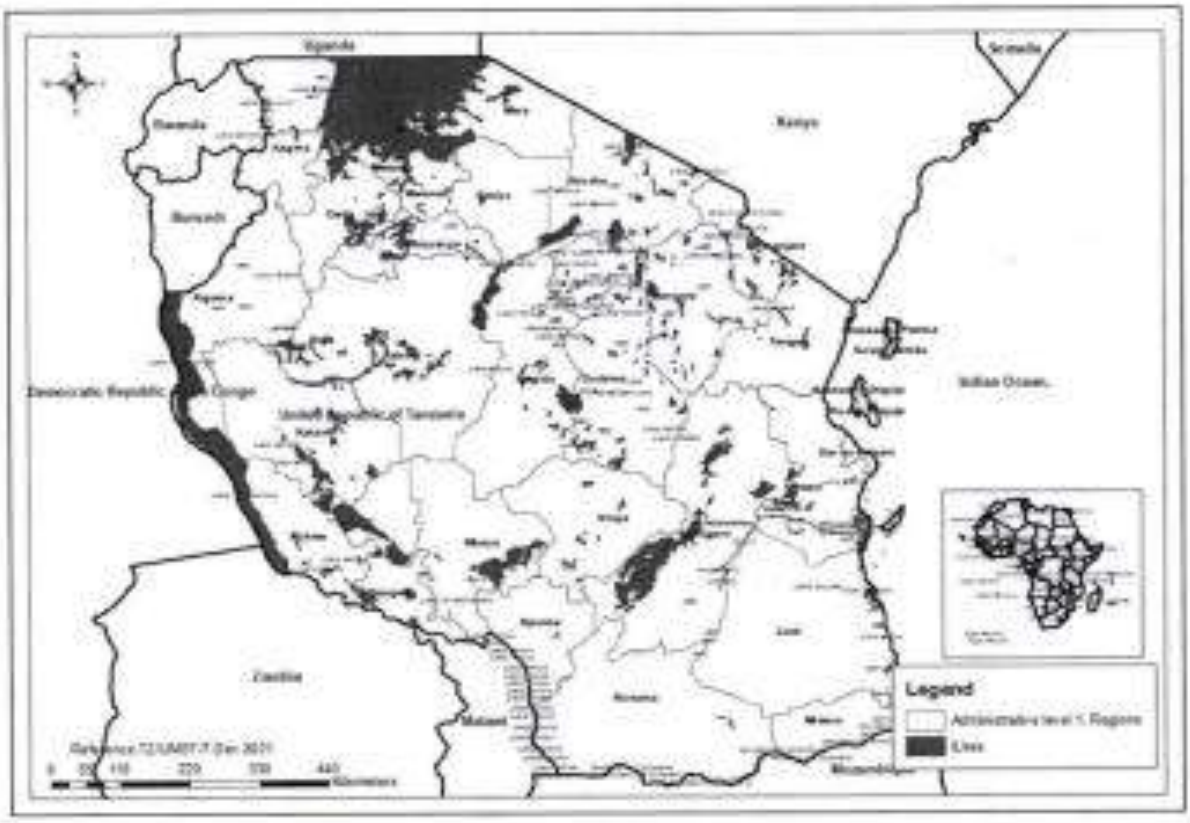

Figure 1: Administrative divisions of Tanzania

The United Republic of Tanzania covers a land square of 947,300 km^2 with an estimated total population of **58.0 million in 2019**, projected to be 61.5 million in 2021 and 63.4 million in 2022 to reach by 2030, **79.2 million people**, based on annual growth rate 3.0%. 34.5% of the population are urban; the median age of the population is 18.0 years and 31.1% of the country population are aged 15-64 years. [2].

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As at 2019, the gross national income (GNI) per capita was 2,600 PPP $ leading the country at HDI rank of 163 [2]. Tanzania has achieved high growth rates based on its vast natural resource wealth and tourism with a GDP growth in 2009-17 averaging 6%-7% per year. Dar es Salaam used fiscal stimulus measures and easier monetary policies to lessen the impact of the global recession. Tanzania has **largely completed its transition to a market economy**, though the government retains a presence in sectors such as telecommunications, banking, energy, and mining. The economy depends on agriculture, which accounts for slightly less than one-quarter of GDP and employs about 65% of the work force, although gold production in recent years has increased to about 35% of exports. All lands in Tanzania are **owned by the government, which can lease land for up to 99 years**. Proposed reforms to allow for land ownership, particularly foreign and ownership remain unpopular. The financial sector in Tanzania has expanded in recent years and foreign owned banks account for about 40% of the industry banking total assets. Competition among foreign commercial banks has resulted in significant improvements in the efficiency and quality of financial services, though interest rates are still relatively high, reflecting high fraud risk. Banking reforms have helped increase private-sector growth and investment. The government has developed an ambitious development agenda focused on creating a better business environment through improved infrastructure, access to financing, and education, but **implementing budgets remains challenging for the government** [1,2].

Regarding the communication, as at 2020, with 127,094 total subscriptions for fixed telephone lines and 39,953,860 total subscriptions for mobile cellular telephone, the country ranked worldwide **135th for fixed telephone lines and 36th for mobile cellular telephone**. With **6,822,754 internet users, the country holds the world rank of 62**. On the international level, the telephone system used SEAS fiber-optic submarine cable system linking East Africa with the Middle East and since 2019 two satellite earth stations (2 Intelsat, 1 Indian Ocean, 1 Atlantic Ocean) [1].

According to the 2019 statistics of the Ministry of Works and Transport [3], Tanzania Airport Authority (TAA) is mandated to own, operate, develop and maintain 59 aerodromes in Tanzania Mainland, which are used by 17 foreign air carriers operating to Tanzania at a weekly frequency ranging from 1 to 35. Emirates, Royal Dutch Air (KL), Qatar Airways (QR) and Turkish Air (TK) have weekly, seven flights to Tanzania. Tanzania Mainland has a system of Sea and Lake Ports serving the Tanzania hinterland and the land linked countries of Zambia, Democratic Republic of Congo (DRC), Rwanda, Burundi, Malawi, Uganda and Zimbabwe. Three main ports along the Indian Ocean are Dar es Salaam and Tanga (Mainland) and Mtwara (Zanzibar). The total road network in Tanzania is 89,204 km classified as National Roads (Regional) which is 36,258 Km and District Roads, 52,946 Km (Collector, Feeder and Urban roads).

The **socio-linguistic** (ethnic groups) divisions enable to identify on the mainland African 99% (of which 95% are Bantu consisting of more than 130 tribes), other 1% (consisting of Asian, European, and Arab). The cosmopolitan Zanzibar hosts Arab, African, mixed Arab and African. The languages used are Kiswahili or Swahili (official), Kiunguja (name for Swahili in Zanzibar), English (official, primary language of commerce, administration, and higher education), Arabic (widely spoken in Zanzibar), and many local languages. While Zanzibar is almost entirely Muslim, on the mainland, the religions are Christian 61.4%, Muslim 35.2%, folk religion 1.8%, other 0.2%, unaffiliated 1.4% [1].

EDUCATION

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infrastructure and academic staff

Tanzania has 84 Higher Learning Institutions (HLI) providing higher education resulting to PhD, Masters, Postgraduate Diploma, Undergraduate, Diploma and Certificates. There are 41 public institutions of higher learning and 43 privates. Of the 84 HLI, 59.5% (50/84) are classified as university, University Colleges or University Campuses Centres and Institutes (table 1).

Table 1: Distribution by region of the universities, university colleges, and University Campuses, Centres and Institute. Data source Education sector performance report (2018/2019) Tanzania Mainland

	High learning institution			
Region	**Public**	**Private**	**Total**	**% private**
Arusha	1	3	4	75.0
Bagamoyo		1	1	100.0
Dar es Salaam	6	8	14	57.1
Dodoma	1	1	2	50.0
Iringa	1	2	3	66.7
Mbeya	3	2	5	40.0
Morogoro	2	3	5	60.0
Moshi	1	4	5	80.0
Mtwara		1	1	100.0
Musoma	1		1	0.0
Mwanza		2	2	100.0
Rukwa	1		1	0.0
Tabora		1	1	100.0
Tanga		1	1	100.0
Zanzibar	2	2	4	50.0
Total	**19**	**31**	**50**	**62.0**

As at 2018, of 8,307 staff of Tanzania universities, University Colleges and university campus and Institutes, the holders of masters, PhDs and Bachelors were respectively 47.7%, 26.7% and 21.1% (table 2). This led the Ministry to **appeal for adequate academic staff in higher learning institutions** and for a need to develop and upgrade more staff to suit the teaching requirements [4].

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Table 2: Number of academic staff by level of education in 2018 [4]

Level of education	University	University College	University campus & Institutes	Total	%[1]
Masters	3,231	542	189	3,962	47.7
Doctorate	1,927	208	62	2,197	26.4
Bachelor	1,389	293	72	1,754	21.1
Ord. Diploma	140	31	0	171	2.1
Certificate	88	18	5	111	1.3
Secondary	54	0	0	54	0.7
Primary	40	0	0	40	0.5
Adv. Diploma	14	4	0	18	0.2
Total	**6,883**	**1,096**	**328**	**8,307**	**100.0**

1. Calculated as total number of academic staff by education level over the total academic staff x 100.

Students

Academic performance by award and gender

As at 2018-2019, 41,889 students graduated from various academic awards (figure 2), out whom 37.4% were females (table 3).

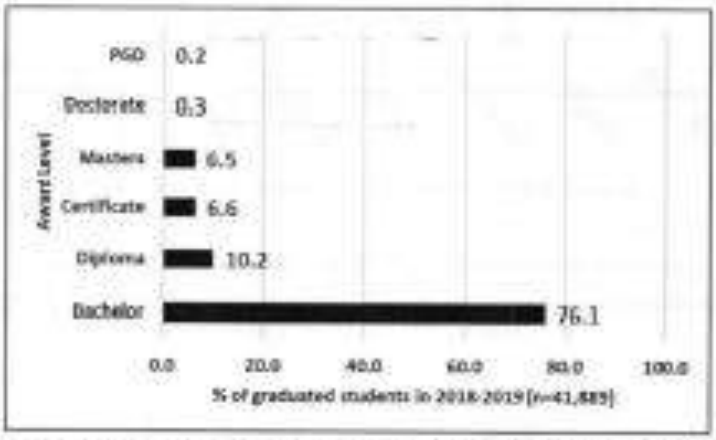

Figure 2: Distribution of the 41,889 students graduate by award level (%) in in 2018-2019

Table 3: Distribution of 2018-2019 graduated students Graduated by Award Level and gender (data source [4]

	Gender of the graduate students				
Award Level	Male	%	Female	%	TOTAL
Bachelor	20,903	65.5	10,995	34.5	31,898
Diploma	2,279	53.4	1,985	46.6	4,264
Certificate	1,344	48.4	1,430	51.6	2,774
Masters	1,546	56.7	1,181	43.3	2,727
Doctorate	91	67.9	43	32.1	134
PGD	52	61.9	32	38.1	84
Total	**26,215**	**62.6**	**15,666**	**37.4**	**41,889**

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Trend of Enrolment of students in Tanzania

Figure 3 compared the number of students enrolled in Tanzania universities from 2007 to 2014. In general, during the seven years, the number of enrolments increased from 77,546 students in 2007/2008 to 218,959 in 2013/2014. The enrolment was higher in public universities than in private ones. In the overall during these seven years. 30.5% of the enrolment occurred in privates and the remaining 69.5% were in public universities (figure 3). Tanzania has experienced a commendable achievement in terms of access to high learning in the recent past, however, the enrolment has not been steady, it experienced fluctuations over the years as displayed the figure 4 for the five years (2014/15 - 2018/19).

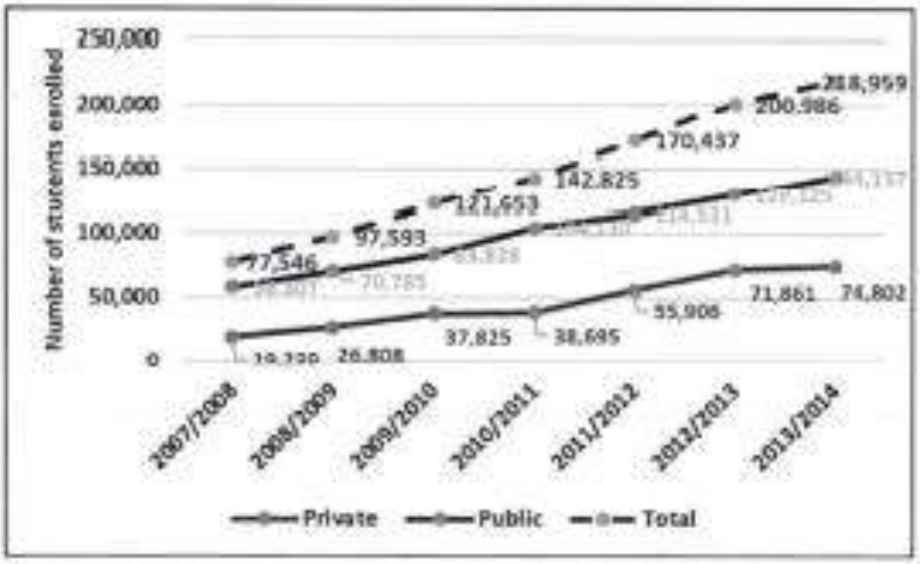

Figure 3: Enrolment trend in Universities and University Colleges 2007/08–2013/14 (data source (5))

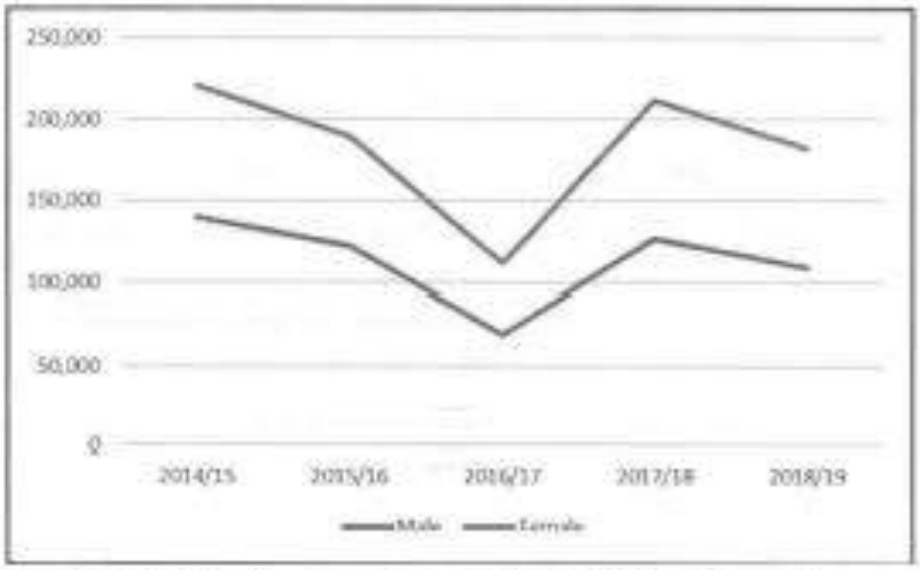

Figure 4: Enrolment in Higher Education by gender, 2014/15 – 2017/18 – Credit to [4]

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Financing of education in Tanzania

Quality education is critical to the development of a nation. For Tanzania to become a middle income, semi-industrialized country, a good education that prepares a competent workforce with knowledge and skills is vital. In order to achieve this objective, the Tanzanian Government in collaboration with stakeholders continued to strengthen the education and training sector through various strategies and financing options. In this framework, **the government allocated 20.9% of the 2019 total Government budget to the education sector**. The Public-private partnerships (PPPs) in education increased 64.5% the enrolment of students in universities and contributed to reduce the gender in particular in private universities with 40.0%-42.0% females students enrolled in private universities compared to 32.0%-34.0% of female students in public universities [4,5].

Fees Structure 2021-2022

At the beginning of the academic year, all students will be required to produce evidence of sponsorship, otherwise, they will be expected to pay full tuition and University fees by the beginning of the semester before they can be permitted to use the University facilities. All payments must be receipted.

Table 4: **Fee Structure 2021-2022 for Tanzania national and no Tanzania (US $ for noTanzania, Tanzania the two currency accepted) data extracted from [6].**

Cluster	Degree/Programme	TSH	USD
1	BA in Heritage Management, Music, Art and Design, Theatre Arts, Film and Television Language Studies, Literature, Philosophy and Ethics, Anthropology, History, Statistics, Psychology, Bachelor of Arts with Education, Bachelor of Education in Art	1,000,000	2,100
	Development Studies, Kiswahili	1,000,000	2,100
2	BEd in Adult & Community Education, Commerce, Early Childhood Education, Psychology, Physical Education and Sports.	1,000,000	2,100
	BSc in Geomatics, Quantity Surveying	1,100,000	2,700
3	BA in Archaeology, Geography and Environmental Studies, Economics, Political Science and Public Administration, Sociology, Economics & Statistics, Bachelor of Social Work, BA Library and Information Studies	1,100,000	2,700
	BA in Journalism, Mass Communication, Public Relations and Advertising	1,100,000	2,700
	Bachelor of Education (BEed) in Science, BSc with Education	1,300,000	2,700
	BCommerce (except Accounting)	1,300,000	2,700
	B.Sc. Marine Sciences, B.Sc. Biomedical Engineering	1,300,000	2,700
	BA in Law Enforcement	1,300,000	2,700
4	BCommerce (Accounting)		
5	BSc in Electronic Science and Communication, BSc in Computer Science, BSc in Computer Engineering and Information Technology, and BSc in Telecommunication Engineering, B.Sc. with Computer Science, BSc in Business Information Technology, BSc in Electronics	1,500,000	3,500
	Doctor of Medicine	1,800,000	5,672

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Medical School graduates in Tanzania

In Tanzania, medical school is a school within a university or can be an independent university dealing with health related courses only affiliated with a large sized hospital. **Medical education lasts for 5 years** after which the student graduates with an undergraduate (MD) degree. This is followed by a mandatory 12-month full-time internship at an approved hospital after which one applies for registration with the Medical Council of Tanzania (MCT) if they intend to practice medicine in the country. The first two years of medical school cover the Bio medical sciences or simply basic (pre-clinical) sciences while the last three years are focused on the clinical sciences. There are no medical school entry examinations or interviews and admission is based on students' performance in the high school exit examination (Advanced Certificate of Secondary Education Examination - ACSEE) [7].

As of 2015/16, twelve medical school total an admission capacity of 1680 students, which represents an increase of 103.6% compared to the academic year 2011/12 (825 students) as revealed table 5.

Table 5: Medical schools in Tanzania and their admission capacities approved by the Tanzania Commission for Universities for the academic years 2011/12 and 2015/16 adapated from [8]

SN	Medical schools	Type	Location	Year of first admission	Medical student admission capacity	
					2011/12	2015/16
1	Muhimbili University of Health and Allied Sciences	Public	Dar es Salaam	1963	200	225
2	International Medical and Technological University	Private	Dar es Salaam	1997	180	180
3	Kilimanjaro Christian Medical College, Tumaini University	Private	Moshi	1997	100	170
4	Hubert Kairuki Memorial University	Private	Dar es Salaam	1998	50	175
5	Catholic University of Health and Allied Sciences	Private	Mwanza	2003	125	185
6	University of Dodoma College of Health Sciences	Public	Dodoma	2009	120	175
7	St. Francis University College of Health and Allied Sciences,	Private	Ifakara/Morogoro	2010	50	120
8	Kampala International University	Private	Dar es Salaam	2012		100
9	State University of Zanzibar	Public	Zanzibar	2013		50
10	Archbishop James University College	Private	Songea	2015		100
11	University of Dar es Salaam	Public	Dar es Salaam	2015		100
12	St. Joseph College of Health Sciences	Private	Dar es Salaam	2015		100
	Total				**825**	**1680**

Figure 5 reveals the trend of the graduates from medical schools of Tanzania.

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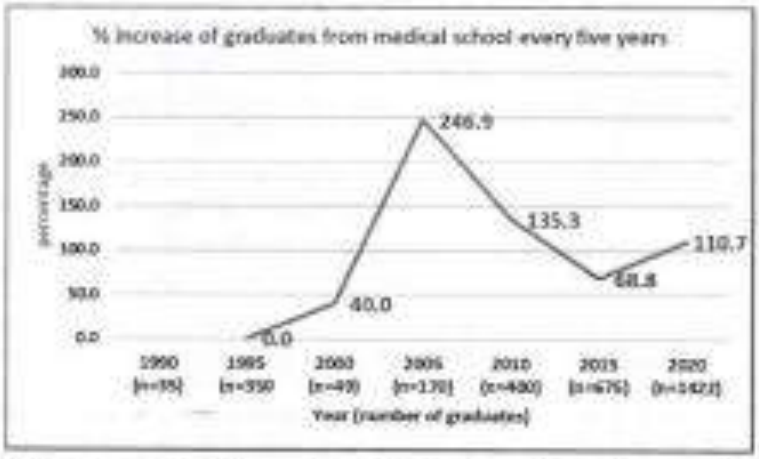

Figure 5: Trend of the number of students graduated from medical schools in Tanzania data sources from Alex J. Goodell et al [9].

In a country in great need of physicians, 0.31 physicians/10,000 individuals countrywide, Alex J. Goodell et al. [9] pointed out that approximately 56% of all medical school students enrolled between 2011 and 2020 will not be practicing medicine in Tanzania in 2025, despite their model forecasts an increase in the physician-to-population ratio to 1.4 per 10,000 by 2025. They recommended increasing the absorption of recent graduates into the public sector and/or developing a rural training track to ameliorate physician attrition in the most underserved areas. They concluded that Tanzania is making significant investments in the training of physicians. Without linking these doctors to employment and ensuring their retention, the majority of this investment in medical education will be jeopardized.

Charles A. Mkony et al. [8] reviewed through the Internet documents of seven medical schools in Tanzania with the objective to describe the availability of faculty in medical schools in Tanzania concluded that universities were not recruiting faculty at the same rate that they were admitting students, and there was an imbalance in the distribution of faculty across disciplines. The suggested that Tanzanian universities, the government, donors, and international partners commit resources to develop, recruit, and retain new faculty in order promote quality educational experience for doctors of tomorrow.

WORKFORCE AND HEALTH PROFILE OF TANZANIA

According the 2021 WHO statistics [10], the global healthy expectancy at birth and healthy life expectancy at birth in Tanzania of respectively 67.3 years and 58.5 years were respectively higher than the 64.5 years and 56.0 years of the WHO African region (table 6). However, the maternal mortality ratio per 100,000 live births of 524/100,000 live births was 2.5 times higher the global maternal mortality ratio of 211/100,000 live births. In each 1000 live births, 20 neonates were lost and the under-five mortality rate/1000 live births was reported at 2019 to be 50/1000 live births. During the decade 2011-2020, just more than half (64.0%) of the births were attended by skilled health personnel compared to 65.0% of WHO AFRO countries and 81.0% of WHO EMRO countries. In the overall, the United Republic of Tanzania needs to accelerate the reduction of neonatal mortality, under-5 mortality and the maternal mortality as recommended by the sustainable development goal 3 (SDG 3) [11].

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The health system of the United Republic Tanzania is burden by various health conditions. The probability of dying in Tanzania from any of cardiovascular disease, cancer, diabetes, chronic respiratory disease between age 30 and exact age 70 years was estimated at 17.4% which is 19.5% higher than the probability of dying of any of CVD, Cancer, diabetes, CRD in WHO AFRO countries (20.8%). 46.7% [27,086,592/ 58,006,000] of Tanzania population were need of interventions against NTDs as at 2019; road traffic accidents took live of 31 Tanzania out 1000 (table 6) while the incidence of tuberculosis and malaria were at 2019 respectively 237/100,000population and 111.2/1000 population. 1.46 new HIV infections was diagnosed in every 1000 uninfected population as of 2019. The WHO reported [10] that 25.0% of the country population used safety managed sanitation services and they were 48.0% who used hand washing facilities with soap and water as of 2017.

In the last decade (2010-2019), the density of medical doctors, nursing and midwifery personnel, dentists and pharmacist remained low ranging from 0.1/10,000 population (dentists and pharmacists) to 5.8/10,000 (nursing and midwifery personnel). The country suffered of a lack of medical doctors whose density was estimated at 0.6/10,000 population.

Table 6: Summary of Tanzania health indicators. Data source World health statistics 2021 [10]

Health Indicators	Tanzania	WHO AFRO	EMRO	Global
Population 2019				
Male	28,981,000	545,008,000	367,791,000	3,870,732,000
Female	29,025,000	546,751,000	344,485,000	3,805,840,000
Total	58,006,000	1,091,759,000	712,276,000	7,676,572,000
Life expectancy at birth (years) 2019				
Male	65.4	62.4	68.3	70.8
Female	69.3	66.6	71.3	75.3
Total	67.3	64.5	69.7	73.3
Healthy life expectancy at birth (years), 2019				
Male	57.6	55.0	60.2	62.5
Female	59.3	57.1	60.7	64.9
Total	58.5	56.0	60.4	63.7
Maternal mortality ratio /100,000 live births, 2017	524	525	164	211
Under five mortality rate/1000 live births, 2019	50	74	46	38
Neonatal mortality rate/1000 live births, 2019	20	27	25	17
Proportion (%) of births attended by skilled health personnel, 2011-2020	64.0	65.0	81.0	83.0
New HIV infections/1000 uninfected population, 2019	1.46	0.94	0.07	0.22
Tuberculosis incidence/100,000 population 2019	237	226	114	130
Malaria incidence/1000 population 2019	111.2	225.2	10.4	56.8
Reported number of people requiring interventions against NTDs, 2019	27,086,592	390,380,426	77,874,457	1,743,075,551
Probability of dying (%)from any of CVD, Cancer, diabetes, CRD between age 30 and exact age 70, 2019	17.4	20.8	24.5	17.8
Road traffic mortality rate/100,000 population 2019	31.1	27.2	17.8	16.7
Density of medical doctors/10,000 population, 2010-2019	0.6	2.8	10.9	17.5
Density of nursing and midwifery personnel s/10,000 population, 2010-2020	5.8	10.3	16.4	39.0
Density of dentists /10,000 population, 2010-2019	0.1	-	-	-
Density of pharmacist /10,000 population, 2010-2019	0.1	-	-	-
Proportion of population (%) using safety managed sanitation services, 2017	25.0	20.0	-	
Proportion of population (%) using hand washing facilities with soap and water, 2017	48.0	28.0	66.0	

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CV of Prof. Mamoun Homeida,Chairman of Board of Trustee UMST (Sudan)

PERSONAL DATA

Name Mamoun Mohamed Ali Homeida
Nationality Sudanese
Marital Status Married with six children

QUALIFICATIONS

1970 MBBS (Khartoum)
1974 Membership of the RoyalCollege of Physicians (MRCP) Eire
1975 Membership of the RoyalCollege of Surgeons (MRCS) England
1975 Licentiate of the Royal College of Physicians (LRCP) England
1978 Educational Council for Foreign Medical Graduates (ECFMG) USA
1979 Doctor of Medicine (MD) Bristol, England
1986 **Fellowship of the RoyalCollege of Physicians (FRCP) London**

PROFESSIONAL LICENCES

1972 – present Full Registration with Sudan Medical Council and the British Medical Council.

MEMBERSHIP OF PROFESSIONAL SOCIETIES AND SCIENTIFIC COMMITTEES

- A member, Community Directed Intervention (TDR, WHO BLII) for 4 years.
- A member of the Filariasis Task Force (TDR WHO) for 4 years.
- A member, Chairman Technical Consultative Committee (TCC) African Programme of Onchocerciasis Programme (APOC) (1996 -1999) (2004-2014).
- President of the Sudanese Association of Physicians 2 years.
- Secretary (1984 - 1990) and a member (1980 - present) of the Sudanese Association of Gastroenterology.
- Member of STAG NTD WHO for 4 years.
- President of ABRAR (NGO) for War Victims (1999 –2012).
- Honorary member, American Society of Tropical Medicine and Hygiene since 1997.
- Member, Chairman WHO - NTD Stag Working Group on Monitoring Drug Efficacy.
- Chairman of Onchocerciasis Elimination Mapping, Project Advisory Group by Sightsavers and funded by Bill and Melinda Gates Foundation which has started in Feb 2018.

WORK EXPERIENCE AND SPECIALIZED TRAINING

March 1970 – March 1971 House Officer, Khartoum Teaching Hospital, Sudan.

April 1971-Dec. 1972	Senior House Officer and Registrar in Medicine Professional Unit: Department of Medicine, University of Khartoum.
June 1973 – Dec. 1975	Medical Registrar Bristol Royal Infirmary (England).
Jan 1976 - Jan 1979	Honorary Senior Registrar, Department of Medicine, Bristol Royal Infirmary.
1979 - 1983	Lecturer in Medicine, Department of Medicine, University of Khartoum.

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July 1983 – July 1987	Associate Professor, Department of Medicine, University of Khartoum.
July 1987 – 1996	Professor of Medicine, Department of Medicine, University of Khartoum.
June 1990 – Nov. 1992	Director, Soba University Hospital, University of Khartoum.
1992 – 1994	Vice Chancellor, University of Khartoum, Sudan.
Jan. 1996 – present	Chairman, The University of Medical Sciences and Technology, Khartoum, Sudan

SPECIALIZED TRAINING

Gastrointestinal Endoscopy
Abdominal Ultrasonography
Clinical Pharmacology

TEACHING AND EXAMINATION EXPERIENCE

- Involved in teaching of undergraduate and postgraduate medical students in Bristol University (UK).
- KhartoumUniversity (Sudan) 1978 – present.
- University of Medical Sciences and Technology 1996 – present
- Examiner in MBBS, Khartoum, Gezira (universities in Sudan) SultanGabousUniversity (Oman)
- Examiner in Postgraduate MD and PhD by research (University of Khartoum, University of Gezira).

COLLABORATIVE RESEARCH PROGRAMMES AND GRANTS AWARDED

1. MichiganStateUniversity – Sudan Parasitology Project. A-15 Years collaborative research programme funded by the National Institute of Health, WashingtonD.C., through MichiganStateUniversity to study Malaria Schistosomiasis, Leishmaniasis, and Onchocerciasis. The project established and advanced research laboratory in Khartoum under the adminsitration of Medical Research Council, Sudan. Total Publications from the Project to date.: 80 Original papers. Position: Senior Scientist and Senior Collaborator in the Project. Head of Schistosomiasis and Onchocerciasis group.
   Total budget **5,000,000 US Dollars**
2. A study in ethnic and racial factors in drug metabolism in Sudan: A study with antipyrine. Author and Principal investigator: **Mamoun M. A. Homeida** Medical Research Council Sudan (1979-1980).
   Total Award **7,600Sudanese Pounds**
3. A study on portal vein measurements using ultrasound techniques as a determinant of bilharzial portal hypertension. Author and Principal Investigator**:** **Mamoun M. A. Homeida**. Co-investigators: Abdel Rahman El Tayeb. Faculty of Medical Research Board (1980-1981).
   Total Award **6,800 Sudanese Pounds**
4. The evaluation of ultrasound as a tool for assessing morbidity in patients with schistosomiasis. Author and Principal Investigator: **Mamoun M. A. Homeida**.

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Co-investigators: Bashir Arbab, Shakir Zein Ibrahim, Isam M. A. A/Salam, J. L. Bennett. Edna McConnell Clark Foundation Grant No. 2850090 (1984-1986).
Total Award **76,000 US Dollars**

5. Impact of Chemotherapy on the development of Symmers'fibrosis within the Gezira region of Sudan. Principal Investigator: **Mamoun M. A. Homeida**. Co-investigators: J. L. Bennett, T. Nash, Asim Dafalla, Suad Suliman, Isam El Toum. Edna McConnell Clark Foundation Grant No. 01686.
   Total Award **17,000 US Dollars**
6. Immunological characterization of host response to schistosoma mansoni in occupationally exposed labourers in Sudan and the influence of therapy on immune parameters. Principal Investigator and Author: Hashim Warsama Ghalib. Co-investigators: **Mamoun M. A. Homeida,** Suad M. Suliman. The programme is Science and Technology Cooperation (PSTC), Agency.
   Total Award **118,750 US Dollars**
7. An open study of the safety and tolerance of Ivermectin in Sudanese males infected with Onchocerciasis volvulus. Author and Principal Investigator: **Mamoun M. A. Homeida**. Co-investigators: Hadi El Sheikh, Hashim W. Ghalib, Suad Suliman, James L. Bennett. Supported by WHO Onchocerciasis Chemotherapy Project) Grant No. 87004 and National Institute of HealthUSA (1987-1988).
   Total Award **30,000 US Dollars**
8. A double blind study on the value of long acting proranolol (Inderal L. A.) in reducing episodes of bilharzial variceal bleeding. Author and Principal Investigator: **Mamoun M. A. Homeida**. Co-Investigators: Beshir Arbab, Samia Awooda, Mahasen Shaheen. Supported by Imperial Chemical Industries (ICI) (1984-1988).
   Total Award **10,000 Sterling Pounds**
9. The Health problems particularly sexually transited diseases in vagrant children of the streets of Khartoum. Principal Investigator: **Mamoun M. A. Homeida**. Co-Investigators: Hashim W. Galib, Suad Suliman, Hamad El Tourabi, Omer Zayed. Supported by UNICEF (1985-1988).
   Total Award **25,000 US Dollars**
10. Morbidity of Schistosomiasis mansoni infection. Effect of treatment annully vs. biennially in Gezira, Sudan.
    TDR (WHO) Grant (1988 – 1994) **90,000 US Dollars**
11. Multidisease Chemotherapy PAQ and Albendazole in the treatment of S. mansoni infection, Geohelminth infection in Sudan.
    TDR (WHO) Grant **73,000 US Dollars**
12. Long-term effect of PZQ therapy on morbidity due to schistosoma mansoni infection.
    TDR (WHO) Grant (1994-1995) **23,000 US Dollars**
13. School- based health delivery: the missing children: A preliminary Study.
    WHO grant **37,000 US Dollars**
14. The Economic Impact of Onchocercal skin disease in Eastern Sudan: ID No. 950849 TDR/UNDP/World Bank/WHO- TDR Special Programme for Research and Training in Topical Diseases.
    TDR (WHO) Grant (1995) **49,700 US Dollars**

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15. Safety, Tolerability and Pharmacokinetic studies on the combination therapy: ID No. A30281 UNICEF/UNDP/World Bank/WHO- TDR Special Programme for Research and Training in Topical Diseases.
    TDR (WHO) Grant (2006) **74,475 US Dollars**

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1. "Delayed response to oral bumetanide given after a meal"; British Journal of Clinical Pharmacology 1976; 2: 969; **Homeida MMA**. Hunder K., Roberts.
2. "Diuretics and Potassium"; Lancet 1976; ii: 1413; **Homeida MMA,** Staddon G., walters G, Read A.E.
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14. "**Sodium Depletion-Pr**obenecid-Study Of Factors Influencing Relationship Of Furosemide Kinetics And Dynamics In Man" Clinical Research. 1977;25(3):A268. Ra Branch, Cr Roberts**, M Homeida**
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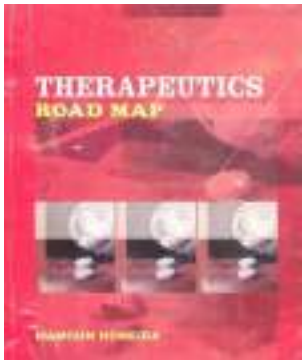
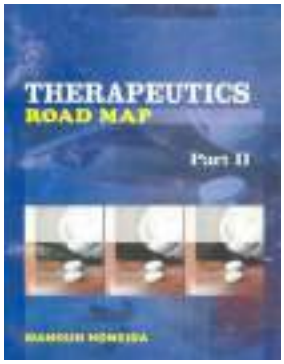
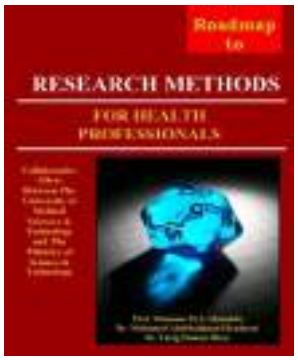
BOOKS

- Therapeutics Road Map Part I &2
- Research Methods
- Clinical Manual







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CV of Dr. Mounkaila Noma who helped in preparation of this report

Curriculum Vitae Dr. Mounkaila Noma

PERSONAL DETAILS

Full Name : Mounkaila Noma
Nationality: Niger
Date of Birth: 12 May 1956
Marital Status: Married

Reference

MD, MSPH, Biostatistics
Retired Staff of World Health Organization
Reference Number: 000144029 (UN pension)
Reference Number: S070578 (WHO)
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PROFILE

My career has led me to specialize increasingly in the management of complex multi-cultural projects and their staffs at national levels. I have experience in strategic forward-planning; operating within the tight financial disciplines imposed by ambitious budgets which I have helped to plan; methodical administration to deadlines (not to speak of crisis management where necessary); and the application of modern leadership methods (through staff motivation and involvement in both decision-making and target-setting, clarity in communication, and easy personal inter-relations). My own cosmopolitan background and analytical interests in other cultures, together with a command of French and English languages, have also left me confident in handling negotiations that require the reconciliation of different national approaches.

Skills Base

- Familiarity with both the scientific and the fund raising worlds
- Proven capacity to negotiate with research groups and African governments (country visits, meetings of West African Health Organization, African Development Bank)

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- Tested management techniques in the context of implementation of a community-directed intervention for controlling then eliminating onchocerciasis
- Proven leadership and human management skills
- Budget design and monitoring
- Time-efficient, systematic working methodology
- Rapid adaptability to new problem-solving and new locations
- Languages: French and English
- Proficient with SPSS, SAS, BMDP, SURFER, ATLAS GIS, ARCVIEW, ARCGIS, HEALTHMAPPER, BERKLY MADONNA

PROFESSIONAL CAREER

June 2014 – Present **Retired from World Health Organization African Programme for Onchocerciasis**

The World Health Organization African Programme for Onchocerciasis Control (APOC)
Chief of the Epidemiology and Vector Elimination Unit (EVE)
June 2006 – June 2014

Brief description of duties and responsibilities:

Collaborate in the design of Onchocerciasis elimination in all Africa. Coordinate and participate in the epidemiological evaluations for shrinking the map of onchocerciasis in Africa (31 countries). Coordinates the activities related to the long-term impact assessment of APOC operations. Coordinate the elimination of the vectors of onchocerciasis in four isolated foci in Uganda, Equatorial Guinea and Tanzania. Coordinate the assessment onchocerciasis distribution in the scope of APOC Programme (20 countries) and estimation of the population at risk of the disease and determination of the ultimate treatment goal by country. Coordinate the implementation of the rapid assessment procedure of Loa loa (RAPLOA) beyond ivermectin mass distribution areas to enhance Lymphatic Filariasis and Onchocerciasis elimination. Focal point the African Onchocerciasis Control Programme with the Annual meeting of the West African Health Ministers, Mectizan Donation Programme/Merck and Co.Inc. Representative of WHO/APOC to The Carter Center review meetings. Assist APOC Director in organizing all the statutory meetings of the Programme, Representative of WHO/APOC to West Africa Health Organization. Involved in fund raising for WHO/APOC and other WHO entities.

Key achievements:

Elimination of Onchocerciasis epidemiological threshold reached in countries (Burundi, Chad, Malawi, Senegal, Mali, and Niger) and by 2025 onchocerciasis will be eliminated in at least 27 endemic countries. Baseline and the subsequent studies of long-term impact assessment of APOC operations enable to determine the health impact of APOC operations and potential of Community-directed intervention to eliminate preventive mass chemotherapy neglected tropical diseases (PCT NTDs). The Programme objectives regarding onchocerciasis control (annual treatment objectives by country) is known, the estimates and parameters available enable the Programme Director to design a strategic plan for funds mobilization to enable the programme to operate up to 2015 and beyond with enough resources and to reorient APOC funded projects towards sustainability. The

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vector of Onchocerciasis eliminated in isolated foci of Equatorial Guinea, Uganda and Tanzania.

Chief add interim of the Epidemiology and Vector Elimination Unit (EVE)
January 2000 – June 2001

Brief description of duties and responsibilities:

Coordinate the implementation of Rapid epidemiological assessment of Loa Loa in all ivermectin distribution areas to assess the risk of occurrence of severe adverse events drug related. Design and set up a decision-making oriented information system. Implementing Rapid epidemiological mapping of onchocerciasis (REMO) in all APOC countries to assess the prevalence of the disease and to define the areas eligible for ivermectin distribution. Conduct capacity building in geographical information system and data analysis to reinforce APOC participating countries in the use of data for planning, monitoring and decision-making. Coordinate and supervise vector elimination activities in the scope of APOC Programme. Assist APOC Director in organizing all the statutory meetings of the Programme. Contribute to the Updating of WHO/APOC Programme Document and its approval.

Key achievements:

The epidemiological status of onchocerciasis in all the 19 APOC countries (stable and unstable) is known. Rapid epidemiological assessment of Loa loa implemented in implementing in areas suspected to be co-endemic for Onchocerciasis and Loiasis of Nigeria, Cameroon, Ethiopia, Congo, Democratic Republic of Congo. The number of Community-directed treatment with ivermectin projects to be put in place of controlling onchocerciasis as a public health problem is known and their related five-year budget is estimated. Vector elimination in Itwara focus reached. Ground larviciding implemented in Mpamba Nukusi and Tukuyu focus and combined with aerial larviciding in Bioko Island (Equatorial Guinea). Assist APOC Director in restructuring WHO/APOC Programme, Programme Headquaters location, strengthening APOC human ressources. Focal Technical staff were allocated to post conflict countries (Angola, Democratic Republic of Congo, South Sudan, and Liberia).

Chief Unit of Epidemiology and Biostatistics (EBIS)
February 1997 – December1999

Brief description of duties and responsibilities:

Transfer of capacity in statistics and epidemiology to APOC countries; Assist APOC countries to elaborate and implement community-directed treatment with ivermectin projects; provide reliable estimates to APOC Programme Manager and the unit of Social sciences for monitoring and evaluation the Programme activities; Define and implement the procedures for rapid mapping of onchocerciasis (REMO) in APOC countries; Coordinate the implementation of the long-term impact assessment of APOC operations; Coordinate the development of the predictive map to determine countries at risk for occurrence of severe adverse events because of Loa loa; Assist the Programme Director in organizing donors'visits or meetings; participate in all the statutory meetings of the Programme.

Key achievements:

Community-directed projects are being implemented in Nigeria, Cameroon, Chad, Central African Republic, Democratic Republic of Congo, Sudan, Tanzania, Uganda and Malawi.Baseline data collection of the long-term impact assessment of operations was completed. The predictive map are available and revealed countries where environmental conditions provide habitat for the vector of Loiasis (Cameroon, Nigeria,

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Congo, Democratic Republic of Congo, Gabon, Equatorial Guinea, Ethiopia, Nigeria and Sudan-southern sector). The African Development Bank join WHO/APOC donors.

Ministry of Public Health. Niger

National Director of the Health Information System (DSNIS)

May 1995 – January1997

Brief description of duties and responsibilities:

Coordinate and promote the use of the Health information system as a tool for policy making country wide; Monitoring the geographical coverage and performance of health structures; coordinate the epidemiological surveillance country wide; Coordinatethe management of epidemic diseases and early management of epidemics; Assist national, international organizations and non-governmental organizations in collecting and analyzing of appropriate data for implementation of health projects in the country. Coordinate and assist the international and bilateral organizations and accredited diplomatic Organizations in the use of scientific evidence based data for planning and promoting the health sector. Representative of the Ministry of Health in the Cabinet of the Premier Minister for early warning and management of disasters including famine.

Key achievements:

The health information system (SNIS) was widely accepted in the country and was decentralized in all the districts. The Health Information system play a key role in the development the National and districts health plans related budget. National Health Statistics are weekly and quarterly reported.

Deputy National Director of the Health Information System (DSNIS)

January 1993 – May 1995

Brief description of duties and responsibilities:

Decentralize the National Health information system countrywide; building capacities in public health and disease surveillance; computerized the Ministry of health and regional public health offices; capacitate public and private health facilities in collecting and reporting health related information. Lecturer in the Department of Public Health of the Faculty of Medicine of the University of Niamey.

Key achievements:

Weekly epidemiological report system established for epidemic diseases. National Health Statistics established with routinely update databases for generating indicators. Disease surveillance unit was set up and was functional in all the eight regions of the country. Biostatistics were adopted in the curriculum of medical students from the sixth year.

Physician in the National Hospital of Niamey

December 1987 – April 1989

Brief description of duties and responsibilities:

At the national hospital of the capital city, in pediatrics I was responsible of providing health care to children aged two years and below as well as participating in running the center of rehabilitation of malnourished children. I was also lecturer in the nursing school.

Key achievements:

Contribution to save lives of children in emergency, acute and chronic conditions developed and standardized the treatment of NOMA (*Cancrum oris*)

Regional Hospital of Diffa

September 1986 – December 1987

Brief description of duties and responsibilities:

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At the regional hospital of Diffa, Chief medical doctor, I was responsible of the technical coordination of all activities of the hospital. I was also the Regional Director of Mobile Medicine.

Key achievements:

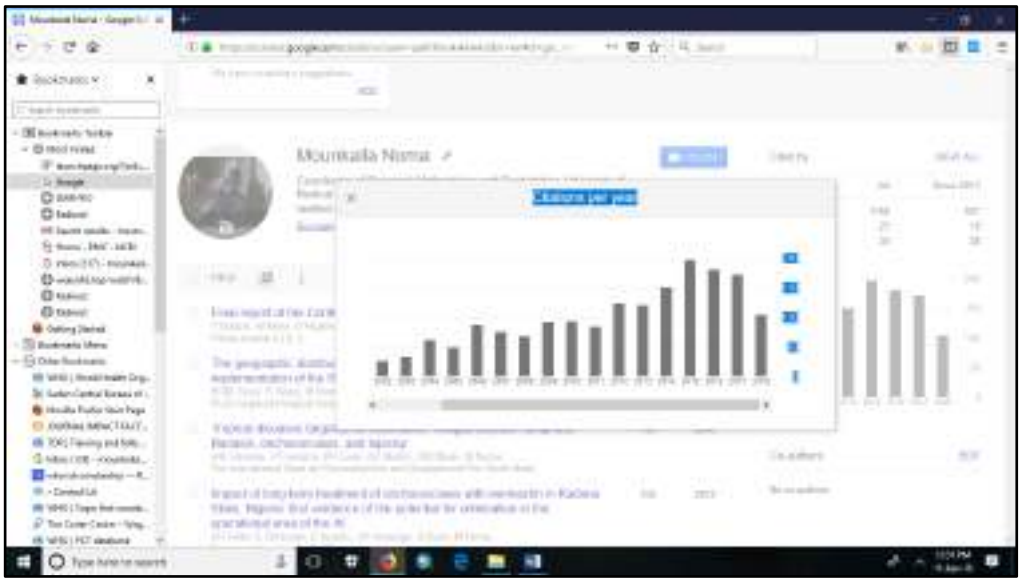
Drug supply and management had improved. Laboratories and radiology were strengthened. Hospital hygiene and sanitation were improved and had a significant impact of the mortality rate of the department of surgery.

EDUCATION

Year	Name of Education Institution	Degree / Diploma	Title of degree/diploma and description of studies
1991 1992	Management Training and Development Institute of Washington, D.C., USA	Diploma	Project Management and Evaluation
1990 1994	Tulane School of Public Health and Tropical Medicine, New Orleans, Louisina, USA	Doctorates	Biostatistics Epidemiology
1974 1986	Faculté des Sciences de la Santé, Université de Niamey, Niger and Faculté de Médecine, Université Paris Descartes, France	Doctorate	Doctorat d'Etat en Médecine spécialisé en chirurgie Pédiatrique

PUBLICATIONS AUTHORED

Articles available in Google Scholar.



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