OPERATIONS MANAGEMENT PRACTICES AND FIT-FOR-PURPOSE GRADUATES: A CASE OF AGA KHAN UNIVERSITY

BY
JOYCE WANGU MWANGI
D61/60177/2013

RESEARCH PROJECT PRESENTED IN PARTIAL FULFILMENT OF THE REQUIREMENTS FOR THE AWARD OF DEGREE OF MASTER OF BUSINESS ADMINISTRATION FACULTY OF BUSINESS AND MANAGEMENT SCIENCES - UNIVERSITY OF NAIROBI

2023

DECLARATION

I declare that this is research project is my original work and that it has not been presented for the award of degree in any other university.
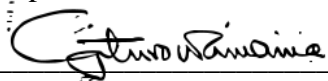
March 29, 2023

Signature _____ Date _____

Joyce Wangu Mwangi D61/60177/2013

This research project has been submitted for examination with my approval as the university supervisor.

Signature _____ Date: March 30, 2023

Prof. Gituro Wainaina

Department of Management Science and Project Planning

This research project has been submitted for examination with my approval as the university moderator.

Signature _____ Date _____12/04/2023_____

Prof. X. N. Iraki

Department of Management Science and Project Planning

This research project has been submitted for examination with my approval as the head of department.

Signature _____ Date _____

Dr. Thomas Ombati

Chairman - Department of Management Science and Project Planning

DEDICATION

This research work is dedicated to higher education professionals and those that they collaborate with in their quest to make a genuine impact in the running of tertiary institutions such as public and private universities, colleges, technical training institutes, and vocational schools.

May the information provided in this study shape the thinking and expertise of administrators, managers, and leaders of these institutions in Kenya, Africa and beyond.

ACKNOWLEDGEMENT

This project would not have been possible without the help of many people. Throughout the writing of this project, I have received a great deal of support and assistance. I would first like to thank my supervisor, Prof. Gituro Wainaina, whose expertise was valuable in narrowing down on the research topic and formulating the research questions and methodology. Your insightful feedback pushed me to sharpen my thinking and academic writing. I would also like to acknowledge and thank my boss, Dr. Rosalind Raddatz, who has guided and supported me through this process by reading my numerous revisions and helping make some sense of the confusion. Your resolve to see me complete this MBA enabled me to get here.

I am also extremely grateful to my thought partner and friend, Sir Ngure Githinji for his wise counsel, stimulating discussions and assistance as he too worked on his research project. In addition, and last but not least, I would like to say a special thank you to my family and close friends for their unwavering love, support and encouragement during this process and following up to ensure that I got the research project done.

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

ABBREVIATIONS

AKU	Aga Khan University
AKUHN	Aga Khan University Hospital Nairobi
BPR	Business Process Reengineering
BMI	Brain and Mind Institute
CoEWCH	Centre of Excellence in Women and Child Health
CLT	Collaborative Learning Theory
CUE	Commission for University Education
EAI	East Africa Institute
ELT	Experiential Learning Theory
ERP	Enterprise Resource Planning
GSMC	Graduate School of Media and Communications
HEIs	Higher Education Institutions
HELB	Higher Education Loans Board
IHD	Institute for Human Development
JIT	Just-In-Time
KCSE	Kenya Certificate of Secondary Education
KEPSA	Kenya Private Sector Alliance
KNBS	Kenya National Bureau of Statistics
KUCCPS	Kenya Universities and Colleges Central Placement Service
LIA	Letter of Interim Authority
LIWA	Linking Industry With Academia
MoE	Ministry of Education

SONAM	School of Nursing and Midwifery
TQM	Total Quality Management
UNESCO	United Nations Educational, Scientific and Cultural Organization
UK	United Kingdom

ABSTRACT

The ability of Kenyan universities to offer quality education and in turn churn out graduates who are employable by industry has often been put into question. Industry players have consistently complained about spending inordinate amounts of resources to reskill entry-level employees. The inability of most Higher Education Institutions (HEIs) to match the dynamic needs of the labour market is, therefore, seen as a hindrance to their contribution to Kenya's socio-economic development. While Kenyan industries struggle to find employable graduates, many graduates' 'tarmac' for long periods with few of them securing formal employment. Industries argue that graduates lack work-related capabilities, technical mastery and employability skills. The objective of this research was to assess the operations management practices at Aga Khan University (AKU) and the linkages between AKU and industries in Kenya. The specific operations management practices that were analysed were process design, quality control, performance measurement, work scheduling, and resource and facilities allocation while the linkages that were assessed were governance, curriculum development, teaching and learning, assessment, and research projects. The research was anchored on four theories collaborative learning theory, experiential learning theory, business process redesign/reengineering theory, and six sigma theory. The study adopted a mixed methods research design to collect and analyse both quantitative and qualitative data in response to the research objectives. The target population for the study was 2,290 elements comprising industry experts/practitioners, senior management, faculty, middle-level management, support services, students, and alumni. From this, the research selected a representative sample of 340 respondents. Data was collected using self-administered questionnaires and short structured interviews and was evaluated using descriptive and inferential statistics. The findings from the research revealed that operations management was well understood and well adopted in AKU. The research also found that university-industry collaborations had a positive influence on fit for purpose graduates in Kenya. The haphazard and inconsistent manner of implementing university-industry collaborations meant that the full benefits of such collaboration was not felt on the graduates and by extension in industry. The study recommended that AKU; creates awareness on the value of operations management practices and that of linkages with industry; review and amend the university policy on university-industry linkages; and set up a directorate of university-industry linkages or empower any existing structure to such a level. Doing so would ensure that the benefits of close and well-organized collaboration with industry are realized in turn producing fit for purpose graduates.

CHAPTER ONE: INTRODUCTION

1.1   Background of the Study

There was exponential growth in the number of universities in Kenya between 2009 and 2018 which saw the number of institutions rise from 18 fully-fledged universities in 2009 to 49 fully-fledged universities (31 public universities; 18 chartered private universities); six constituent university colleges affiliated to public universities; five private constituent university colleges; and 14 universities under Letter of Interim Authority (LIA) in 2018. In 2018, the number of public university campuses reduced from 168 to 111 which was relatively caused by the closure of campuses due to failure to meet accreditation requirements. That reduction, coupled with the decrease in the number of candidates scoring the minimum required university entry score of C+ and above in the Kenya Certificate Secondary Examination (KCSE) as well as the continuous quality assurance inspections and audits by the Commission for University Education (CUE), has led to the shutting down of several more campuses. (Kenya National Bureau of Statistics (KNBS) Economic Survey, 2019)

In addition, there was mass enrolment witnessed in 1992 occasioned by the education system change due to the overlapping of two cohorts graduating from high school at the same time. To manage this change back then, the government introduced a "double intake" strategy, leading to the creation of a private division in public universities dubbed Module II or "parallel" programmes. This strategy led to the increase of student enrolment from 40,570 in 1998/99, 72,551 in 2003/04, 100,649 in 2008/09 to 289,733 in 2013/14 and 433,245 in 2018/19 straining the available resources and increasing lecturer workload.

For three subsequent years starting 2017, student enrolment decreased in public universities while enrolment in private universities rose. According to KNBS, student enrolment in Kenyan public universities was likely to decrease by 4.7 percent from 433,245 in 2018/19 to 412,845 in 2019/20 while enrolment in private universities would increase by 12.1 percent to 96,628 by the end of 2020. Overall, Kenya's university student enrolment was forecasted to drop by 1.9 percent to 509,473 in the 2019/20 academic year from 519,462 in the 2018/19 academic year. The student enrolment data for public universities from 1980 to 2020 and that of private universities from 1995 to 2020 is shown in Appendix III and IV, respectively.

Starting from the 2016/2017 academic year, the government via the Kenya Universities and Colleges Central Placement Service (KUCCPS) lowered the degree cut off points. This made it possible for government-sponsored students to also apply to private universities of their choice. The eligibility to join either public or private universities and receive government funding has facilitated students from all over the country to receive quality higher education. Now, more than ever, learners in Kenya have greater access to university education.

With such a high number of universities and colleges in Kenya, the general expectation is that having an educated population would be a positive indicator for the country. However, quantitative expansion has mostly occurred at the expense of quality research, innovation, teaching and learning. Employers, both from public and private sectors, have raised concerns about the mismatch between the tertiary education offered by Higher Education

Institutions (HEIs) and the dynamic labour market's needs. Most graduates have been termed as 'half baked' meaning that they are not adequately prepared for the market and that their qualifications and skills do not match the industries' needs.

Private universities have attempted to boost collaboration with industry more so at the policy-making level where industry experts now sit on university councils. Adequate representation of industry in universities' governing and decision-making organs is the first step in closing the gap between industry and academia. Going forward, it is paramount that the policies enacted be operationalized and monitored for success in the various core educational aspects such as curriculum development; teaching and learning; assessment and evaluation; research and innovation, and faculty and student placement. This collaboration with industry is a team effort meaning university management, faculty, staff and students all have to be involved in the overall process of creating graduates who meet the diverse needs of industries and who have the appropriate levels of quality, dependability and flexibility in terms of technical mastery and work-related skills.

The HEIs through their role in providing the knowledge, skills and innovations required in a productive sector are recognized as essential contributors to economic development. University-industry linkages continue to be a major factor in the economic recovery strategy for creating wealth in Kenya. New knowledge and innovations generated in universities through research can assist industries in adopting modern processes and technologies. There is a need to create strong linkages between HEIs and the productive

sector, generally referred to as industry-academia linkages, to increase productivity and promote real and sustainable economic growth and social development.

This research work is based on the Business Process Redesign/Reengineering (BPR) theory which can be defined as the practice of changing and remodeling the way work is done by essentially recreating essential business processes to reduce costs and improve product output and quality. The BPR involves analyzing organizational workflows and establishing which processes are sub-par or inefficient then finding ways to either change or do away with them. In addition, BPR is often used as a change management strategy and in the case of HEIs, it can be used to redesign processes in administration, curriculum development, teaching and learning, assessment, and research.

1.1.1 Operations Management Practices

Operations management in any organization involves planning, organizing and supervising processes that transform inputs into outputs (Waters, 2002). This also includes making necessary adjustments or improvements within these processes to ensure efficiency and effectiveness, ultimately leading to maximization of outputs, thus, high-performance organizations. Operations management is multidisciplinary in nature, and the inputs to this management process include human resources, equipment, materials, and technology.

Operations management practices involve process design, improvement, and optimization as well as standards management. Further broken down, these practices include Enterprise Resource Planning (ERP), product and process design, capacity forecasting and regulation,

inventory management, for example Just-In-Time (JIT), project oversight and control, quality management, operations improvement, and enterprise risk management (Slack, Chambers & Johnston, 2010). In HEIs, operations management involves a considerable amount of energy and resources devoted to quality assurance, review, and processes (Crosling, Heagney & Thomas, 2009).

Over the years, student expectations and needs have grown while university operating budgets are, on the other hand, dwindling. Attracting funding opportunities, refining operational efficacy, and restructuring processes is therefore viewed as the silver bullet to long term viability of these HEIs. It is widely known that student experience should be at the centre of all learning models, and that faculty should be involved in coming up with creative but low-cost ways of integrating teaching and learning with what is happening in the real world. Simultaneously, while emphasizing that teaching theory is important in enabling learners to grasp conceptual knowledge, more focus and attention ought to be placed on imparting practical skills. With all these competing priorities and expectations, every university should have clear operations management practices to chart the way as it aims to achieve its mission and vision.

1.1.2 Private Universities in Kenya

Public universities are owned by the state and receive significant amounts of public resources from the national government to support, for example human capital, research, infrastructure. On the other hand, private universities are owned by an individual or private entity that the government has authorized to offer university education within the country.

In the past, private universities did not receive government funding, but in recent times, given that government-sponsored students are now being enrolled into these private institutions, they too are receiving state funds to meet tuition and other operational costs.

Kenya's Ministry of Education (MoE) oversees all universities, both public and private - all of which are established under the Universities Act, 2012. The Act, through individual institutional Acts of Parliament, provides for the establishment, accreditation, and governance of each university. The Universities Act was amended in 2014 and it now also provides for the development of university education in the country. A 2004 report on higher education in Kenya noted that due to the increasing demand for higher education which was necessitated by increased outflow of students from high schools, university education has rapidly expanded since.

According to Oketch (2009), Kenyan public universities continued to enroll students beyond their capacity to adequately finance and plan which ultimately led to fiscal challenges beyond their control because of the limited government capitation. Given the deteriorating quality of education and weak management practices to oversee processes in public universities, their counterparts – private universities emerged as a solid alternative to higher education in Kenya and were gaining ground. The privatization of university education was seen as an opportunity during this downward spiral of higher education quality because private universities were known to have higher quality standards. These standards included limiting class sizes thus ensuring that faculty-student ratios were ideal, adopting student-centered approaches in learning, and incorporating technology in

processes. Private universities were also more likely to attract corporate and philanthropy grant funding because of the underlying belief that these institutions were better managed.

1.1.3   Linkages Between Industry and Private Universities

The existence of universities and colleges is understood as necessary for a country's efforts to boost economic output, growth, and competitiveness (Bloom, Canning & Chan, 2014). Universities provide knowledge to industries as well as a pool from which firms can recruit skillful workers. These HEIs played and continue to play a vital role in Kenya's social-economic development and therefore, the education programmes offered by universities, the research conducted therein as well as innovations coming from them must be regularly reviewed for relevance and effectiveness.

Academia and industry have an interdependent relationship in that academia produces graduates who are absorbed by industry. Sometimes, research conducted in universities is taken up by industries and turned into products and services. On the other hand, industry often relies on academia for solutions to their problems. Industries depend on universities to offer programmes that churn out graduates whose skill-sets are aligned with their requirements. Most research topics also arise out of an interaction between the two and the outputs eventually benefit both players.

Academic institutions have persistently been criticized for failing to produce novel ideas and products that spur socio-economic growth and development. That Kenyan universities produce half-baked graduates is not an uncommon sentiment from industry players, partly

attributed to weak industry-academia linkages. These linkages must be strengthened through timely and deliberate exposure of students to industry to resolve the challenges in the country's innovation-development nexus. This will ultimately provide the much-needed experience to faculty and students who will establish what industry needs are, target teaching and learning towards these needs and eventually help solve some of the country's challenges.

In its study, "Expanding Tertiary Education for Well-Paid Jobs: Competitiveness and Shared Prosperity in Kenya," (Blom, Raza, Kiamba, Bayusuf, & Adil, 2016) the World Bank stated that Kenya's higher education must find the equilibrium between the country's economic needs and the academic qualifications of graduates. Further, the study stated that tertiary education must establish a balance between national priorities and graduates' professional qualifications. Given that most academics have little or no contact with industry, consortiums that bring faculty and industry experts together ought to be created. This enhanced collaboration should be aimed at futuristic training programmes, potential research agendas, student internships, and short-term residence of industry representatives in universities and vice versa. Though not much research has been undertaken on this with a focus on African universities, calls to enhance collaboration between industry and universities have been based on the premise of enhancing the performance of universities.

1.1.4 Fit-For-Purpose Graduate

In its September 2015 report dubbed "Kenya's Education Achievements and Challenges," the World Bank raised concerns on the quality of graduates graduating from universities

and colleges. The World Bank observed that Kenya's higher education was failing to produce graduates with knowledge and skills fundamental for the attainment of Vision 2030, which aims at transforming the country into a manufacturing, industry-filled, middle-income country which is geared towards a clean and secure environment and an elevated quality of life for all its citizens (Vision 2030).

Fit-for-purpose can be defined as, "the quality of an institution or facility being well equipped or well suited for its designated role purpose" (Oxford Dictionary). According to Taber, Akdemir and Gorman (2020), a fit-for-purpose approach aims to ensure that a system, policy or programme is designed and operationalized in a manner best suited to local and needs and contexts. It is widely known that while a student can learn technical skills in school or on the job, soft skills are more challenging to get right. Soft skills such as resilience, teamwork and adaptability are in high demand among employers. (Munene 2013).

Universities should educate and inspire students to engage with people and develop innovative ideas that generate sustainable solutions for local communities, civil society, businesses, and governments. They can do so by cultivating strong relationships with employers both private and public, understanding and interpreting what needs to be done, focusing on problem-solving through problem-based learning, carrying out research with a practical component in it and contributing to government ambitions. As the world becomes more complex and challenging, university graduates can and should play a central

role in moderating conversations as communities and industries look to build and develop themselves.

1.1.5 Aga Khan University

The AKU is a non-profit making, innovative, private university aiming to improve the quality of life of citizens in developing countries. The pioneering university instills values, knowledge and skills in leaders who go on to make a difference in their fellow citizens' lives. The AKU's key objective is to address widespread problems in the developing world through top-notch research while delivering excellent and world-class quality health care. The university, which was operating under a LIA when this research work began, received its Charter in June 2021. The AKU is renowned in East Africa and across Africa for offering quality higher education in the region with an aim of raising standards in the societies and countries in which it operates.

Since its establishment in 1983, the mission of AKU has remained unchanged. It aims to accelerate opportunities for future generations by developing human capacity, disseminating knowledge, and applying service. Towards the realisation of this mission, the university has mounted schools and colleges in Kenya where it offers mostly graduate and a few undergraduate programmes which improve the lives of millions of people through innovative research that is guided by high academic quality, and which is relevant to the context of its students.

The AKU's academic units in Kenya include the School of Nursing and Midwifery (SONAM), the Medical College and the Graduate School of Media and Communications (GSMC). The research units comprise the East Africa Institute (EAI) and the Institute for Human Development (IHD) as well as the relatively new, Centre of Excellence in Women and Child Health (CoEWCH) and the Brain and Mind Institute (BMI). The Aga Khan University Hospital, Nairobi (AKUHN) serves as a private teaching hospital for AKU's Medical College.

1.2   Problem Statement

According to the KNBS economic surveys, close to 40,000 and less than 3,000 students were enrolled for university education in the 1990/1991 academic year in public and private universities, respectively. Three decades later, in the 2020/21 academic year, the numbers grew to 500,000 and 100,000 students enrolled in public and private universities, respectively. Further, approximately 50,000 students graduate from Kenyan universities every year hopeful and eager to join the corporate world. Unfortunately, most fresh graduates tarmac for jobs for a long time and only a scanty percentage of them secure formal employment. Current data indicates that 80 percent of unemployed Kenyans are youths and 39 percent (almost 6 million) of Kenyan youth are unemployed.

Kenyan industries struggle to find suitable candidates to fill jobs and often accuse university graduates of being ill-prepared for the job market, terming them as 'half-baked'. Industries argue that these graduates lack basic work-related capabilities, technical mastery and employability skills which would force potential employers to shoulder the cost of

retraining and reskilling the graduates to enable them join and stay in the workforce. One of the causes of poorly trained graduates is that largely, university education tends to focus too much on theory forgetting that the job market demands both theoretical knowledge and practical skills, both of which are important to have and master in any field of work.

Institutions of higher learning are considered key players and major contributors to an economy. One of the objectives of Kenya's Vision 2030 is to transform the country into an industrialized and knowledge-based economy. Based on this, and to improve Kenya's socio-economic growth and attain global competitiveness, MoE has come up with a national policy framework to guide teaching. It is paramount that university education be geared towards the needs of businesses and industries. Developing effective linkages between academia and industry is important in ascertaining how best academic curricula can address industry requirements and demands by guiding on what universities should teach and focus on. It is essential to promote, fund and facilitate university-industry collaboration through conducive policies and frameworks especially within universities.

Through good operations management practices, university-industry linkages are likely to be more successful and therefore lead to the formulation of relevant university programmes, well-delivered curricula, increased funding for research and development to universities and ultimately, increased innovations and patented inventions as well as a properly trained workforce. The manufacturing industry defines quality as "fitness for purpose" and "conformance to specification". The former is determined during the design phase, while the latter concerns operational processes. Attempts to import these

terminologies into higher education have been made (Clark, 1996). This research seeks to help higher education stakeholders develop appropriate tools that respond to identified gaps by reengineering processes and workflows that align university education to industry requirements.

There are various local studies on the importance of industry-academia linkages. According to (Munyoki, Kibera & Ogutu, 2011), university-industry linkages address the issue of the bond between generators of ideas and users of the ideas. Njogah, Mang'eni and Gatumu (2017) suggested that synergies between HEIs and industries play a crucial role in safeguarding and leveraging extra resources for higher education, sponsoring innovation and technology transfer, and ensuring that graduates have the knowledge, competencies, expertise required to contribute to the workforce. (Kande, Kirira and Ngondi (2017) indicated that gone are the days where universities were considered as "ivory towers" only carrying out research just for the sake of producing knowledge. Although these studies gave abstract concepts on strengthening partnerships between industries and universities, there still seems to be inadequate consultation and collaboration between the two.

The research gap that this study sought to fill is on the practical implementation of the various proposed ideas which can be applied through various operations management practices in higher education processes. Specifically, this research paper aimed to answer the following research questions; which operations management practices can be applied effectively in universities; is there consultation, collaboration and partnership between

universities and industries; how can universities-industry linkages be created, and existing ones strengthened: and what is the effect of university-industry collaboration on graduates?

1.3   Objectives of the Study

This research work sought to assess the linkages between AKU and industries in Kenya and the specific objectives of the study were to:

(i)   Assess operations management practices at AKU

(ii)   Evaluate university-industry collaborations at AKU

(iii)   Establish the impact of university-industry collaborations on a fit-for-purpose graduate

1.4   Value of the Study

This study is of value to several key players in Kenya's higher education environment, such as the government through MoE and CUE, who will be able to identify gaps that exist during legislation and policy formulation. It will help these bodies appreciate the modalities of industry-academia linkages and the challenges that universities face during the implementation of policies that do not consider the needs and expectations of both industry and academia. From the findings and recommendations of this paper, the Kenyan government and HEIs in Kenya will be better placed to allocate resources and offer support that will incentivize key undertakings which link academia with industry and encourage industries and universities to collaborate.

Universities will benefit from this study because they will understand the importance of adequate representation of industry in their policy-making organs; council, senate, faculty, and boards to ensure that market-driven programmes are offered and that these have a more practical orientation. This study will be essential to university faculty members in assisting them to develop creative and innovative ways of teaching and learning where they design and deliver the curriculum in a way that is responsive to industry needs and aligned with national social-economic development goals. Students in universities will be able to understand and interpret the challenges that future employers and industries are facing using problem-based and experiential learning. Eventually, graduates will find a meaningful place in their communities where they can demonstrate their skills and abilities by offering solutions and solving problems, hence positively contributing to the future of their communities, countries and economies at large.

Industries will find this study useful because it seeks to unearth drivers of a strong bond between the job market and universities and how the two can collaborate to ensure businesses get competent (knowledgeable and skilled) labour ready for the world of work. The study will also emphasize the need for creativity in every aspect of teaching and learning processes, leading to learners and a workforce full of innovative ideas that will change how industries operate and perform. An organization littered with a workforce that focuses on innovation, continuous improvement and positive change is anchored towards success and well poised to achieve its objectives.

Elements of the Study	Stakeholders	Value of the Study
Governance	• Ministry of Education • Commission for University Education • Higher Education Institutions	• Law making and enacting • Higher Education policy formulation and implementation • Constituting governing bodies • University policy formulation and implementation
Curriculum Development	• Commission for University Education • Higher Education Institutions • Industry	• Programme design and development • Programme accreditation • Programme assessment and review • Market-driven programmes
Teaching and Learning	• Higher Education Institutions • Current and Future Students • Industry	• Pedagogy design and delivery • Faculty training and development • Collection of student and alumni feedback • Knowldegable and skilled workforce
Assessment	• Kenya National Examinations Council • Higher Education Institutions • Professional Bodies	• Setting effective and objective countiuous assessment tests and examinations • Moderation of tests, examinations and scores • Certification and registration of qualified personnel
Research and Development	• Industry • Higher Education Institutions	• Collaboration with higher eduaction institutions • Innovative solutions to problems • Research grants

CHAPTER TWO: LITERATURE REVIEW

2.1 Introduction

Review of existing literature generally covers contributions from other scholars and researchers. It presents; the abstract aspects, academic and theoretical framework on which industry-university linkages are based. Further, it selects literature on universities' attempts to link their output to inputs from industry and industries' involvement in university processes. A review of pragmatic research studies is thereafter laid out alongside the abstract framework linking operations management practices and linkages between industry and universities.

2.2 Theoretical Framework

Operations management deals with monitoring and controlling business operations and the production process to ensure prudent use of available resources. Operations management is a set of practices that organizations use to increase efficiency and effectiveness. The theory of operations management incorporates the approaches that organizations use to streamline production, processes and procedures which involves structuring and administering business practices. From McClay (2019), modern operations management comprises four main theories BPR, Lean Manufacturing, Reconfigurable Manufacturing Systems (RMS), and six sigma. This study, given the service nature of higher education, leans towards the BPR and six sigma theories. The study is also based on two learning theories; Collaborative Learning Theory (CLT) and Experiential Learning Theory (ELT), both of which reflect the kind of learning that ought to take place when there is effective and efficient collaboration between universities and industry.

2.2.1 Collaborative Learning Theory

The CLT is rooted in Vygotsky (1962), zone of proximal development where he stated that we learn through interactions and communications with others. This way, learners rely on one another to accomplish tasks that they otherwise would not be able to complete individually. Vygotsky (1962) suggested that learning takes place through the interactions students have with their peers, teachers, and other experts. Consequently, teachers can create a learning environment that maximizes the learners' ability to interact through discussion, collaboration, and feedback. Collaborative learning is key for developing critical thinking skills and it also implies that students retain more information when working in groups. The CLT involves peer-to-peer learning that fosters deeper thinking in the classroom, and it suggests that group learning helps students develop their higher-level thinking, oral communication, self-management, and leadership skills. Students also have the opportunity to build upon their leadership and organizational skills.

2.2.2 Experiential Learning Theory

The ELT was identified by Kolb (1984) and focuses on learning by doing. It proposes that experience is critical in the development of knowledge construction as learning occurs through discovery and active participation. Kolb (1984) argued that learning goes through a four-stage cycle concrete learning, reflective observation, abstract conceptualization, and active experimentation which learners can enter in any way and at any point. Using this theory, students are encouraged to learn through experiences that can help them retain information and recall facts. According to the theory, individuals demonstrate their

knowledge or the learning that occurred when they are able to apply abstract concepts to new situations.

2.2.3 Business Process Redesign/Reengineering Theory

The BPR is a business management theory pioneered by Davenport (1990). Its strategy concentrates on designing and examining workflows and organizational processes and procedures to significantly restructure the organization by designing processes from the ground up. The theory aims to support companies to rethink how they carry out their work to move their mission forward, advance customer service and compete effectively. Use of technology, the formation of functional teams and assessment of mission, goals and customer needs are at the heart of BPR.

According to Sibhato and Singh (2012), BPR is the dramatic overhaul of organizations and in particular, their systems of administration and management. In addition to introducing the use of technology, this overhaul also has an impact on the responsibility of employees, the measurement of their performance as well as incentive systems. It integrates stakeholders and gets a better way of doing things, thus improving organizational performance. Porter, 1990 opined that higher education's performance is critical for the competitiveness of nations which can then be used to emphasize that the assessment of BPR implementation in universities and identification of success factors is therefore important. Given the specific characteristics and complex nature of HEIs, this research adds to the existing body on knowledge of business process redesign in universities by assessing its applicability. As higher education evolves, there is need for enhanced

adeptness in administrative services, flexibility in the programmes offered and redesigning of teaching and learning. If the 'traditional' methods are no longer effective in contemporary universities, then HEIs must determine new and improved ways of achieving meaningful success (Allen & Fifield, 1999).

Business reengineering is viewed as an ideal means of ensuring that universities adjust to the fluctuating demands being continuously placed on them, especially because it cuts across various functions in the institutions. The pressure to change is driven by several factors including pressure from industry, the changing student profile, technology advancements and increased competition. Improvement in governance, administration, management, teaching and learning, assessment as well as research is therefore essential and require immense buy-in from the people involved for the objectives of the proposed redesign to be achieved.

2.2.4   Six Sigma Theory

Six sigma is a method focusing on quality which was broadly viewed as a tool kit for process improvement introduced by Smith (1980) while working at Motorola. Accordingly Jack Welch who was the Chief Executive Officer of General Electric from 1981 to 2000, made six sigma theory central to business strategy at General Electric. The theory is a quality programme that lowers costs, enhances leadership skills in management, and ultimately improves customer experience. Six sigma introduced a set of empirical and statistical quality management methods that follow a defined sequence of steps seeking to improve process output quality through removal of the causes of defects. In actual sense,

the theory strives for operational excellence and near perfection. According to Mehrabi (2012), the factors that influence the success of six sigma projects include; project control and management, a change in organizational culture, management involvement, organizational commitment and employee learning and development.

For six sigma, which is quickly becoming a driving force for many organizations, especially those that are technology and project-driven to work, continuous refining of organizational culture is key. Successful implementation would demand management involvement and organizational commitment as well as organizational culture change and continuous training. It is important to understand any obstacles to this and avert the same through requisite coaching, mentorship, and training. It is also important to keep in mind that for HEIs, the quality of education is more important to the customers of universities such as students, sponsors (parents and guardians), organizations where graduates get employment, and industries in which they serve and impact. The emphasis of well-defined administrative functions and support activities is because these help to ensure that the academic delivery process meets its objectives using the available resources.

The quality of education is broadly seen to refer to the extent to which a particular education system can more often than not achieve the largely accepted goals of education which revolve around the attainment of knowledge and development of skills (Fuller, 1994). Further, in many parts of the world, the development of relevant employment skills and attitudes is seen as one of the key goals of advancing education. To raise the quality of education, six sigma focuses on improving people, processes, and products. This will

involve developing skills, capability and problem solving among students, staff and faculty. It also means removing unnecessary variability, improving stability and matching processes to customer needs while at the same time, ensuring that products (learners/graduates) are designed to meet customer (industry) requirements.

2.3   Empirical Literature Review

Many researchers in Kenya and across the globe have sought to enhance the areas of study associated to the state of university education and HEIs. Several of them have researched on the governing laws and enacted policies, the oversight of accreditation and regulatory bodies, the various roles played by faculty and learners, and the importance of reforms in higher education. The overriding factor in the studies has been the significance of enhancing the quality of education offered in HEIs which is seen as a major driving force of a country's economic and social fabric, and in turn the general well-being of its population.   Ideally, the skills and competencies acquired while going through the university education process ought to prepare learners adequately to meet the requirements of the respective industries they choose to join.

Muema (2020) looked at leadership and policy for reforms and change in higher education - an assessment of the juakalization phenomenon of Kenyan public universities. The research explored the relationship between leaders' self-perception and the perception of their followers with regard to leadership effectiveness in managing the performance of universities during the juakalization phenomenon. The findings indicated that university vice-chancellors frequently utilized effective leadership practices and that their followers

were aware of effective leadership behavior. However, all indications point to the dilution of quality higher education and three conclusions arise from the study findings; first, leaders and followers must produce change; second, the desired change ought to be transformational; and third, the leader-follower relationship must produce quality products, because leading is about practice and transformation.

Maobe, and Peng (2020) studied reforms in Kenya's system of higher education, focusing on opportunities and improvement. The paper cited that Kenya's higher education has had developments, including reforms to advance standards and quality. The study's objective was to recommend solutions to the underlying challenges encountered by higher education; inadequate resources, the mismatch between graduate skills and industry needs, budget deficits, and university expansions, which all do injustice to the significance of higher education. The study analyzed the role of financial sustainability using a critical review in determining its influence in the quality, relevance, and improvement of higher education in Kenya. It concluded with recommendations on policy adjustments towards options, reforms in higher education and developments in the sector, all aimed at strengthening the quality of education in Kenya.

A study conducted by the EAI of AKU in 2019 found very little partnership or synchronization between potential employers and learning institutions. Based on feedback from employers, majority of the entry-level youth, lack relevant knowledge, skills, and competencies for the workplace. Further, it was established that these skill gaps and mismatches are either occasioned by the lack of access to tertiary education or the inability

of these institutions to provide the practical and soft skills required in the current job market. Therefore, it was seen as necessary that this research paper influences suitable modifications to prevailing policy and practice to ingrain systematic engagement between HEIs and industry.

A 2019 World Bank policy report on improving higher education performance in Kenya sought to explore a variety of possibilities for the planning and implementation of sustainable higher education in the country. Ideally, this would be through higher education financing strategies, improving the value and significance of existing HEIs and programmes, and leveraging modern technology to achieve quantitative expansion and quality improvement. This selection of focus areas was informed by the strategic priorities articulated by Kenya's government. The study states that the country's higher education is full of contrasts; where on one hand, several of its universities are among the top 100 African institutions recognized as hotbeds of innovation, while on the other hand, the same universities are in a dismal financial state. Generally, quantifiable expansion is seen to have taken place at the expense of excellence. The report noted that quite often, the establishment of majority of the public universities responds more to political concerns than the actual demand for academic programmes to spur economic and social development. The looming 'cash crisis' is a legitimate concern that could hurt public universities' quality of programmes. Still, given the government's competing priorities, it is difficult to continuously increase the percentage of public resources apportioned to the country's public universities.

Mense, Lemoine, Garretson and Richardson (2018) reported that higher education has been forced into a new world of transformation by globalization, and that this new world of change is enveloped in uncertainty and unpredictability, shaped by the world's integrated economy, guided by enhanced technology and a global knowledge network, all of which are driven by forces beyond the control of HEIs. Based on predictions by futurists, education systems of the future will be significantly different from those we have today. Forecasts indicate that advanced approaches to the delivery of education will also increase and that these will be utilized more efficiently and effectively due to technology and telecommunications. Traditionally, HEIs have created knowledge in the form of human resources, research, and scholarship. Most recently, the same universities have been dared to tap into the growing need for adult and lifelong learning. The demand, necessity, and yearning for higher education keeps growing and therefore continuously urging universities to make major modifications driven by technology and globalization.

According to Lemoine, Jenkins and Richardson (2017), the worldwide higher education scene is experiencing numerous challenges, and this impacts the performance and practicality of education everywhere in the world. Higher education is seen as the key driver for improving fiscal conditions of citizens in any nation. Simultaneously, technology has impacted universities' ability to respond to perceived difficulties such as new blended and virtual learning models, increased and rapid communication proficiency, and new learning demands presented by a technologically driven world. Globalization is seen as the force that brings together the virtual economy and also one that serves to allow wider knowledge sharing and use. Globally, education continues to progress and advance,

ensuring that leaders are consistently reminded to be aware of the critical work of global higher education: to create, exchange and implement knowledge in the global marketplace.

British Council carried out a study in 2015 on the shape of global higher education and released a guiding framework for policies on international engagement. The study identified areas of international higher education which are sustained by national governments and attempted to draw contrasts and comparisons between several countries' education policies. The three areas identified where governments are able to provide supporting environments to HEIs to enhance collaboration include the openness of the education systems and government commitment to internationalization, a regulatory environment and quality assurance mechanisms, and equitable access and sustainable development policies. The key aspects researched were the agility and movement of students and faculty, academic research funding, and recognition of international qualifications. However, the study neither assessed the enforcement of these aspects nor analyzed their effect on the performance of the respective higher education systems.

Munene (2013) on new Kenyan higher education reforms indicated that in the era of massification, guaranteeing quality of education to stakeholders presents a daunting policy challenge. The 2012 Universities Act, enacted into the country's higher education law sought to level the playing field by enforcing quality in both public universities and private universities. Public universities have functioned as self-regulating entities from the onset while their private counterparts are subject to strict regulatory control by various accreditation bodies such as CUE. The new law acknowledged that while the private

institutions have matured, public universities had begun to show signs of quality decline and deterioration. The research paper points out that though Kenya encompassed the neoliberal principles of privatization and marketization as strategies for the development of HEIs in the 1990s, the previous laws and policies failed to keep up with evolving trends.

As outlined by David (2011), higher education the world over is in crisis and has been responding to economic, social, and political changes and challenges. Given the developments in these sectors, as well as the expansion of the knowledge economy and diversity, equality and social justice in universal labour markets, research on international higher education has been challenging. Envisioning the 'University of the Future' requires a foremost focus on innovative approaches. Modern research in this area has been on the equal opportunities and connections between educational expansion, occupation opportunities and social mobility. Laws, practices, and policies enacted to guide higher education have so far been questionable. Researchers also grapple with identifying the impact of the expansion of education on economic and social disproportions with most of the evidence showing that economic inequalities are reinforced by education. In contrast, social aspects such as gender inequality are mostly ignored. The paper concludes that if we are to imagine a different and sustainable social-cultural future of pedagogy and practice in HEIs of the 21st century, faculty, experts, and legislators should maintain the high expectations of learners and recognize the diversity of their requirements, principles, and individualities - which are distinct.

According to (Oanda, Chege & Wesonga, 2008), African universities were at inception categorized by configurations that heavily relied on compliance with educational models of their colonial powers. Over the years, the need for growth and expansion has seen a determination to change these perspectives to a clearly defined mission of universities as problem-solving research institutions. Subsequently, this has presented difficulties for the universities as they focus their missions of being community problem-solving organs. Furthermore, their presence and contribution on a global scale have also been tested in the sense that for a university to be relevant in the era of globalization, it must aim to survive as a global entity. The mandate and success of universities are scrutinized based on their ability to perform three functions teaching and learning, researching and generating new knowledge, and rendering public or community service. Universities are places for intellectual encounters and excitement as well as spaces for the discovery and exploration of new concepts. Still, the regional–global relevance clash persists as a factor that influences higher education practice.

According to Gichaga, Kaane and Wainaina (2005), university-industry collaborations will continue to be a major economic rescue strategy for Kenya's employment, opportunity, and wealth creation. The study looked into certain critical elements to establish the nature and extent of university linkages with industry such as; governance, curriculum, student sponsorship, teaching and learning, industrial attachment, research and development, physical infrastructure and consultancies.

Allen and Fifield (1999) researched re-engineering amendments in higher education and how these have been used as a strategy for change management in the UK. By adopting a case study approach to assess the applicability of BPR to HEIs, the paper highlights the re-engineering of administrative services as well as tentative attempts to redesign teaching and learning. It concludes that organizational culture and the structure of HEIs limits the degree of change sought from BPR given that these institutions do not support radical change but would rather a carefully planned incremental process improvement. While BPR techniques would be useful in coordinating administrative services, human resources change is critical for sufficient efficiency gains. The summary of the above empirical literature review is shown in Table 2.1 below.

Evidently, all over the world, universities are seen as key resources in innovation, competitiveness and problem-solving research institutions for many issues affecting the countries in which they operate. Previous research has also outlined the forces behind the changes witnessed in our world today such as globalization and technology which are demanding a shift in the relationship between governments and universities and that between industries and universities. Productive sectors would greatly benefit from incentivized and continuous collaboration between government, industries, and universities. Though the papers have outlined various suggestions on industry-university linkages and the various synergies that can be achieved from these, there is a gap in how various university processes will be altered to support the same.

Focusing on AKU which is a renowned university both globally and regionally, the objective of this research paper was to enhance the existing body of literature and knowledge while at the same time giving recommendations that aim at improving the effectiveness of university-industry collaborations. Through an appropriate research design, data was collected and analyzed showing what AKU as a private university has successfully implemented, the challenges it has faced and the strategies it plans to use going forward to strengthen linkages between the university and industries. Therefore, this paper seeks to present concrete steps of how existing and proposed partnerships and effective collaboration between private universities and industries can be implemented through well-known operations management concepts.

Table 2.1   Summary of Empirical Review

Author(s)	Study	Objectives	Methodology	Findings
Muema (2020)	Leadership and Policy for Reforms and Change in Higher Education	Explore leaders' self-perception and followers' perception on effective performance management.	Case study of a public university.	Vice Chancellors utilize effective leadership practices and their followers recognize their effectiveness. The quality of education is diluted and there is need for transformational change in order to produce quality products.
Maobe et al. (2020)	Higher Education Reforms in Kenya: Options and Development	Propose solutions in line with financial sustainability and the importance and excellence of higher education.	Collection of secondary data and use of government reports. Use of critical review analysis of the two issues.	That existing government policies require to be adjusted to include a universities-industries collaboration mandate if the recommended reforms are to achieve meaningful progress towards bolstering quality education in Kenya.
The World Bank (2019)	Improving Higher Education Performance in Kenya: A Policy Report	Explore options for the design and implementation of sustainable higher education financing. Improve quality and relevance of HEIs and academic programmes. Leverage technology to achieve quantitative expansion and quality improvement.	Review of existing documents on various scopes of higher education and the latest developments on the sector's global scene.	Due to the financing limitations by the government, universities have to leverage technology to deliver quality education and also diversify their sources of income to enable them to meet increasing demands by stakeholders, who include industries.
Munene (2013)	New Higher Education Reforms in Kenya	Assess policy issues encountered in the pursuit of quality education in the era of massification.	Assessment of government reports and analysis of published statistics.	Private universities have made strides in closing the skills gap. However, public universities given their high enrollment numbers are lagging and need to be innovative in coming up with ways to keep up with emerging trends.
Oanda et al. (2008)	Privatization and Private Higher Education in Kenya:	Address the implications and receptiveness of private higher education to increasing access and	Use of descriptive surveys and inferential statistics.	Though universities borrowed heavily from the higher education systems and policies of the colonialists, they must evolve with the times and change the way they operate

	Implications for Access, Equity and Knowledge Production	equity in comparison to the traditional research function of universities.		to ensure they offer localized solutions to the regions they seek to serve.
Mense et al. (2018)	The Development of Global Higher Education in a World of Transformation	Identify the significant changes that HEIs should make in a world driven by globalization and technology.	Adopted descriptive survey and inferential statistics for analysis of data.	For universities to remain relevant, they have to make significant changes and be innovative with the teaching and learning processes all of which should be driven by technology and globalization.
Lemoine et al. (2017)	Global Higher Education: Development and Implications	Assess the impact of globalization on performance and application of higher education throughout the world.	Used a descriptive survey and inferential statistics for data analysis.	Leaders of governments and HEIs should appreciate the core mission of universities which is to create, exchange and implement knowledge in the global market place.
David (2011)	Overview of Researching Global Higher Education: Challenge, Change or Crisis	Provide contemporary sociology research that allows for the imagination of a new socio-cultural future of teaching and practical learning in 21st century universities.	Literature review and comparing and contrasting research evidence from sampled countries.	In order to achieve a new social-cultural future of pedagogy and practice in contemporary universities, faculty, experts and legislators ought to maintain high learner expectations identifying the full range of their cultures, identities and needs.
Ilieva and Peak (2016)	The Shape of Global Higher Education: National Policies Framework for International Engagement	Identify parts of international higher education which are supported by governments and draw comparisons between policies in various countries.	Extensive literature review, desk research and exploration of academic literature. Used an index-based methodology for policy evaluation.	To enhance collaboration, it is key that emphasis is put on; mobility of students and faculty, funding of academic research and recognition of international qualifications.
Allen and Fifield (1999)	Re-engineering Change in Higher Education	Determine how organizational culture in HEIs influences the implementation of BPR.	Case study approach involving an empirical analysis investigating a modern phenomenon in its real-life context.	Instead of the obliteration of existing processes or radical re-design, business process improvement would be more ideal in that slight modifications are made to meet individual department requirements.

2.4   Conceptual Framework

To gain a comprehensive understanding of the academia-industry phenomenon, Figure 2.1 below shows the conceptual framework and provides the explanation of the key concepts and how they relate to the envisaged end product. For every student enrolling to university, the parent or sponsor sending them there, as well as the future employer looking to hire them upon completion of their studies, the common indicator of success is that this student should be eventually fit-for-purpose.

To get to this point, there are various factors within the teaching and learning environment, which if successfully implemented, will lead to some level of success thereby producing learners who are knowledgeable and skilled to join and contribute to the productive workforce.

Figure 2.1   Conceptual Framework

Independent Variable   Dependent Variable
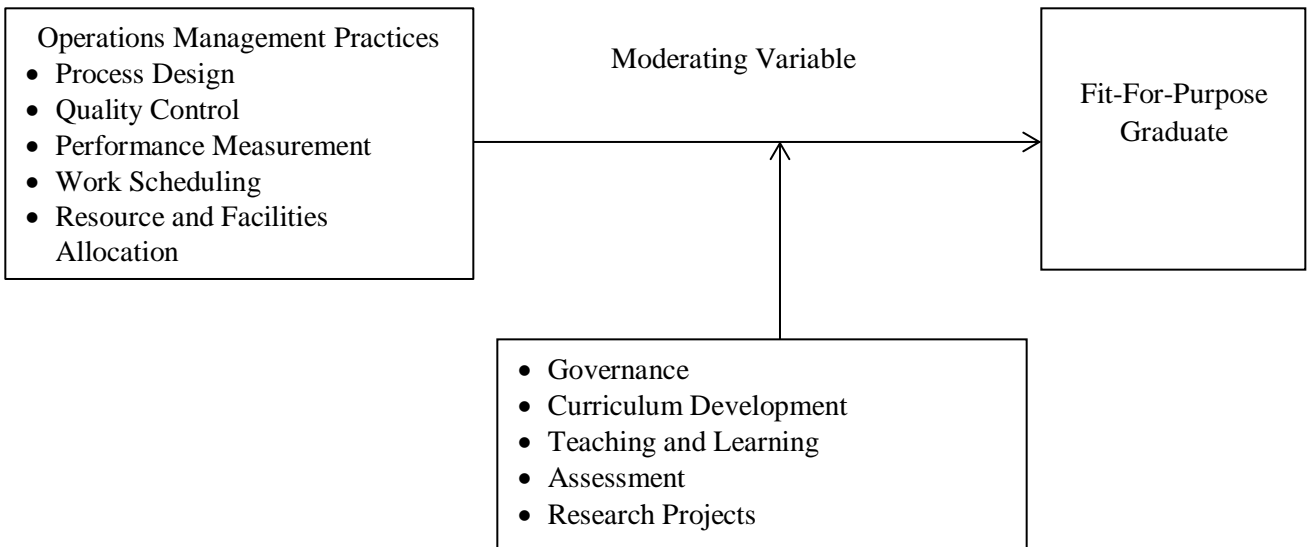
CHAPTER THREE: RESEARCH METHODOLOGY

3.1 Introduction

This chapter summarizes the research methodology covering specific processes and techniques that were used to classify, select, process, and analyse the data and information surrounding this study. It entails the practical research methods used to evaluate the validity and reliability as well as research design, population of the study, sampling techniques, sample size, and data collection, analysis, and presentation.

3.2 Research Design

This study adopted a mixed methods research design to collect and analyse both quantitative and qualitative data in response to the research objectives. In a study such as this one, it is important to acquire data and make meaningful comparisons. Employing a mixed-methods approach was useful because it reflected the participants' points of view and highlighted any existing contradictions in qualitative and quantitative findings based on each participant's unique experience. The first stage of the research work was the site selection design, which is AKU and after that, sampling was done to select participants, which was then followed by data and information collection using a questionnaire. The last three stages were data analysis and interpretation, the findings, conclusion and recommendations.

Quantitative data was collected through issuing online questionnaires that were distributed to 334 participants including 208 alumni, 74 students and 52 members of faculty and staff. Qualitative data was obtained by conducting structured interviews with three senior

members of AKU leadership staff from the various entities and units, both academic and support. Additionally, three experts or practitioners in medicine, nursing, and media as well as a representative from the Kenya Private Sector Alliance (KEPSA) were interviewed for qualitative data.

3.3 Population of Study

Mugenda and Mugenda (2013) described the target population as the whole group of objects or individuals under which a researcher is keen on making and generalizing conclusions. The population of the study, therefore, refers to collection of organizations or individuals that are the central focus of a research study and is the entire pool from which a statistical sample is drawn. In this case, the population was the various academic entities and research units at AKU, namely Medical College, SONAM, GSMC, EAI and IHD. The study population also comprised of students, alumni, technical and administrative support units such as; academic administration, quality assurance, registrar's office, university library, human resources and finance. Representatives from industry also formed part of the study respondents. The analysis of the target population is shown in Table 3.1 below.

Table 3.1   Breakdown of Target Population

Category	Number
Industry experts/practitioners	20
Senior management	20
Faculty	200
Middle-level management	50
Support services	100
Students	500
Alumni	1,400
Total	2,290

3.4 Sampling Procedure and Sample Size Determination

Keeping in mind that the target population has varying characteristics and using Krejcie and Morgan (1970) table, the sample size of this study was 340 which was proportionately sub-divided as shown in Table 3.2 below.

Table 3.2   Proportionate Sample Size

Category	Number
Industry experts/practitioners	3
Senior management	3
Faculty	30
Middle-level management	7
Support services	15
Students	74
Alumni	208
Total	340

3.5 Operationalization of Variables

As outlined in the conceptual framework, the output variable and what every academic programme aims to achieve is a "fit-for-propose" graduate. Using this as a measure of success, the input variables were translated into questions to design a questionnaire which was then used as an instrument to collect primary quantitative data. Respondents were expected to give answers in the form of levels or ratings, therefore ensuring that these were measurable and comparable. The operationalization of the variables is as shown in Table 3.3 below.

Table 3.3   Operationalization of the Variables

Variables	Operational Definition	Type of Scale
Curriculum development	• Establish whether market surveys are an integral part of the process. • Ascertain how course outlines and curricula are developed. • Describe how confident faculty members are with the policy and process.	Interval

Teaching	• Compare the number of industry practitioners to that of academics who have been appointed as faculty members.	Ratio
Learning	• Assess how much control students have over the process and how their practical industry experiences have been incorporated into the process.	Interval
Assessment	• Find out the level of involvement of industry experts in the setting, reviewing, marking and moderation of both continuous assessment tests and final examinations.	Interval
Research projects	• Calculate the percentage of research funding obtained from local industry. • Obtain the number of industry practitioners who have been contracted to co-supervise research projects. • Number of research papers	Ratio
Operations management practices	• Establish which key operations management practices are in place. • Determine how effective the operations management practices are and which ones need to be redesigned and enhanced.	Ratio
Fit-for-purpose graduate	• Establish the programme completion rate and average completion time. • Obtain the number of graduates who transition to leadership roles upon programme completion. • Assess exit reports and describe graduate satisfaction.	Ratio

3.6   Data Collection

For this study, primary data was collected through questionnaires and interviews. Since each approach has its pros and cons, combining several data collection techniques ensures that the information collected is rich and reliable for statistical analysis. The questionnaire (see Appendix II) was developed and used as the primary data collection tool for this study. It uses Likert scales to ensure that in-depth yet comprehensive data is captured. The questionnaire was administered via the Google Forms platform to 340 participants. The structured interviews that were conducted face-to-face with three members of senior leadership at AKU, three industry practitioners and one KEPSA representative, gathered

information that allows for flexibility thus allowing respondents to give their views on what was working, what was not, and what recommendations they have to drive effective industry-academia collaboration.

3.7   Data Validity and Reliability

Validity is the degree to which the data collected represents the variable as it was intended. It shows how sound the research is and is applied to both the research design and methods, ensuring that the findings truly represent the phenomenon that is being measured. To ensure that the questionnaire in use collected valid data, the questions were clear and measurable with proper scales developed to assess the responses. A pilot test was also undertaken, and the questionnaire was revised accordingly based on the feedback received.

Reliability is the magnitude to which the tool used arrives at the same results over multiple trials. Specifically, it refers to the consistency of a measure across time, across items and researchers. Structured interviews ensured that the same set of questions were asked to those selected from senior management guaranteeing that the data collected was comparable hence reliable. This concept was applied during the interviews seeing to it that how the questions were framed was similar, thus ensuring that each conversation with the various respondents revolved around the same aspects so as to streamline the feedback obtained.

The study used Cronbach's alpha which is often considered as a scale for reliability and is the most common measure of internal consistency assessing the relationship between sets

of items in a group. Cronbach (1951) designed a formula to help researchers tell whether the research tests formulated would accurately measure the variables of interest. The recommended threshold for a reliable research instrument is an alpha value of 0.7 and above (Crobanch &Meehl, 1955) and is the one that will be used in this study.

3.8   Data Analysis

The study employed both qualitative and quantitative data analysis approaches. Descriptive statistics helped in analyzing information required for the research objectives. Frequency distribution tables and percentages were the data presentation tools used in order to ease interpretation. Additionally, presentation of qualitative data was subdivided according to the various categories. Table 3.4 below shows the summary of objectives, data collected, methods and analysis used.

Table 3.4   Summary of Objectives, Data Collected, Analysis and Interpretations

Objectives	Data Collected	Method	Analyses
Asses operations management practices at AKU.	Information on the university's operational processes in relation to industry collaboration.	Structured interviews with senior leadership.	Descriptive analysis.
Evaluate university-industry collaborations at AKU.	Data from AKU customers on the extent to which the university collaborates with industry.	Detailed questionnaire on the elements as outlined in section 3.5	Charts, graphs and descriptive analysis.
Establish the impact of university-industry collaborations on a fit-for-purpose graduate.	Information and data on the components and drivers of successful graduates in industry.	Structured interviews with senior leadership and industry experts/practitioners.	Charts, graphs and descriptive analysis.

3.9   Ethical Considerations

Ethics is a key consideration when conducting research, especially because human subjects are involved. Issues are bound to come up during interactions such as in-depth interviews,

focus groups, surveys, and observation. The most important ethical issues to have in mind when conducting research such as this one are informed consent, confidentiality, respect for anonymity and respect for privacy. It is paramount therefore, that ethical considerations be incorporated when conducting research.

Participation in this research was voluntary, and respondents had the right to pull out of the study at any phase if they so wished. It was ensured that all the respondents received sufficient information about the research topic to give them some level of assurance and understanding about the implications of taking part in it. All the interviews and discussions were objective and the need for the respondents' privacy and anonymity was respected.

At the onset, written permission was got from AKU's Research and Ethics Committee, which is an internal institutional review body accredited by the National Commission for Science, Technology, and Innovation (NACOSTI). Thereafter, permission was sought from the selected respondents, thus ensuring that they were willingly taking part in the study. Thereafter, respondents were cautiously engaged by way of circulating the introductory letter, giving them a brief account of the research study, explaining how the information obtained was going to be used, and informing them of their right to decline to fill out the questionnaire.

CHAPTER FOUR: DATA ANALYSIS AND INTERPRETATION

4.1   Introduction

As outlined in Chapter One, the general objective of this study was to assess the level of collaboration and partnership between industry and universities in Kenya and to evaluate the impact of the collaboration on university graduates. Specifically, this study evaluated operations management practices at AKU and how these support the level of linkage between theory and practice. In addition, this research established the impact of university-industry collaboration on AKU graduates and determined the characteristics of fit-for-purpose graduates who are ready and well equipped to join the world of work.

In this chapter, the data gathered from questionnaires and information from interviews is presented and analyzed. Semi-structured interviews were conducted with six senior leadership staff of AKU, one representative from KEPSA and three representatives of industry each from different fields, that is media, nursing, and medicine. The questionnaire (Appendix II) was circulated online to AKU faculty, staff, students, and alumni. Prior to their participation, each respondent was made aware of the purpose, significance, and objectives of the study. They were also assured that their responses would be confidential and will be used only for academic purposes.

4.2   Response Rates

Out of the 334 questionnaires that were circulated, 227 had been returned by the respondents at the end of the three-week period. Upon sorting, 14 were found to be incomplete and/or incorrectly filled which would interfere with the analysis of the findings.

The research therefore ended up with 213 questionnaires which were complete and thus met the requirements for analysis. This number represents an effective response rate of 63.7 percent. In social sciences, a response rate of 50 percent and over is acceptable when using questionnaires (Baruch and Holton, 2008). The response rate met this threshold and could therefore yield sufficient information for analysis that could be used to derive conclusions and make recommendations.

4.3   Demographics of Respondents

The questionnaire sought information and data from a target population of varying characteristics. As the research aimed to be all encompassing, the 213 respondents were drawn from various categories and summary statistics on gender; age; highest level of education; college/school/institute/department represented; and category of respondent as shown in Table 4.1 below.

As Table 4.1 below shows, the percentage of female respondents was 68.3 percent compared to 31.7 percent of their male counterparts. There was a significantly higher ratio of female to male respondents which could indicate that there are more women in AKU hence a higher probability that women will respond to research studies and/or a bias toward the female perspectives in this research.

From Table 4.1 below, the largest grouping of the respondents was between 31 and 40 years at 48.8 percent, those between 41 and 50 years followed at 31.7 percent while those between 21 and 30 years and over 51 years were 12.2 percent and 7.3 percent, respectively.

The respondents who were 40 years and below constituted 61 percent and those 50 years and below were 92.7 percent. The mean/average age of the respondents was 38.8 years.

Regarding the highest level of education, 23 percent of the respondents had attained a doctorate, 38 percent had attained a master's degree, 26.8 percent a bachelor's degree and 12.2 percent a diploma. This indicates that the respondents are highly educated with 87.8 percent having at least a university undergraduate degree and 61 percent having obtained a post graduate qualification (see Table 4.1 below). However, this is unsurprising as AKU is an institution of higher learning offering only undergraduate degree programmes and above. Thus, the staff and alumni are like to be in possession of higher academic qualifications and the data supports this.

Table 4.1 below shows that SONAM and GSMC had the largest number of respondents with 39 percent each for a total of 78 percent. This was followed by the Medical College at 17.1 percent and the research institutes and administrative units making up 4.8 percent. The SONAM is the oldest school in AKU and thus would be expected to have the greatest number of respondents, whereas GSMC has a relatively vibrant community that supports research studies which is reflected in the number of respondents. The faculty and students at the medical college double up as clinical employees of AKUHN leaving little time to participate in research studies. The two research institutes are relatively new and have few staff and faculty thus would be expected to have a smaller representation as was the case.

Additionally, as shown in Table 4.1 below, the percentage of student respondents was highest at 39.7 percent with staff pooling at 34.9 percent, alumni at 19 percent and faculty at 6.3 percent.

Table 4.1   Summary of Social-Demographics of the Respondents

Variable	Socio-Demographic	Frequency	Percent
Gender	Female	145	68.3
	Male	68	31.7
Age (Years)	20 - 30	26	12.2
	31 - 40	104	48.8
	41 – 50	68	31.7
	51 and above	16	7.3
Highest level of education	College diploma	26	12.2
	Bachelor's degree	57	26.8
	Master's degree	81	38.0
	Doctorate	49	23.0
College/School/Institute/Department	SONAM	83	29.0
	Medical college	36	17.1
	GSMC	83	39.0
	BMI and IHD	5	2.4
	Administrative support	5	2.4
Category of respondent	Student	85	39.7
	Faculty	14	6.3
	Staff	74	34.9
	Graduate/Alumna	41	19.0

4.4   Operations Management Practices

The purpose of this section was to assess operations management practices at AKU. To do this, operations management definitions; operations management practices in AKU; curriculum development and operations management; teaching and learning, operations management; and continuous assessments and examinations, and operations management; and research and operations management are discussed below.

4.4.1 Operations Management Definitions

The most acceptable and suitable definition of operations management to the respondents was 'the area of management concerned with designing and controlling the production process and redesigning of business operations in the production of goods and services', with 80.5 percent of the respondents selecting this option as shown in Table 4.2 below. 'The administration of business practices to create the highest level of efficiency possible within an organization' was also an acceptable definition of operations management as this was selected by 51.2 percent of the respondents. This is an indication that majority of the respondents understood the meaning of operations management.

Table 4.2   Operations Management Definitions

Definitions	Selected		Not Selected	
	Frequency	Percent	Frequency	Percent
Process of engaging in commercial, industrial or professional activities	31	14.6	182	85.4
Area of management concerned with designing and controlling production process and redesigning of business operations in production of goods and services	171	80.5	42	19.5
Conversion of materials and labour into goods and services	26	12.2	187	87.8
Administration of business practices to create the highest level of efficiency possible within an organization	109	51.2	104	48.8

This was supported by the responses from the interviewees who described operations management in a university as academic operations, meaning the business of delivering tertiary education from admission of students all the way to graduation. They described it as the day-to-day activities that enhance the effectiveness of an institution and the proper leadership and harmonization of these activities to ensure the university achieves its

mission and vision. Further, they described operations management as what needs to be done to achieve strategic objectives citing that every department has its own set of operations.

Additionally, the interviewees defined operations management as the various components in a university that affect the achievement of the universal objectives of universities which are teaching, research and community service. The practices were broadly outlined to be student recruitment and admission, faculty and staff management, facilities management, as well as curriculum development, teaching, learning, assessment, and graduation. In general, there was an underlying agreement that planning, organizing, and coordinating were crucial to the success of operations management practices in universities.

4.4.2   Operations Management Practices in Aga Khan University

Operations management practices was the independent variable and consisted of process design, quality control, performance management, work scheduling, and facilities allocation. The moderating variable was broken down into governance, curriculum development, teaching and learning, assessment and examination, and research.

From Table 4.3 below, over 80 percent of the respondents indicated that quality control, performance management and work scheduling had been adopted at AKU. Adoption of facilities allocation and process design were indicated at 65.9 percent and 56.1 percent, respectively. The highest practice that was perceived to have been adopted at AKU was quality control at 97.6 percent. The variation of over 20 percent between the three highest

adopted practices and the two lowest should be a cause for concern at AKU. The university

should seek to discover why such a disparity exists. Further, the university should borrow

from quality control practices and improve the other areas to the same level.

Table 4.3   Operations Management Practices Adopted in Aga Khan University

Operations Management Practices	Selected		Not Selected	
	Frequency	Percent	Frequency	Percent
Process design	119	56.1	94	43.9
Quality control	208	97.6	5	2.4
Performance measurement	182	85.4	31	14.6
Work scheduling	171	80.5	42	19.5
Facilities allocation	140	65.9	73	34.1

As Table 4.4 below shows, over 90 percent of the respondents rated the effectiveness of

governance; teaching and learning; research and development; quality assurance; industry

collaboration and partnerships; and community service at 3 and above. However, only 61.1

percent rated the effectiveness of community service at 3 and above. Effectiveness of

governance had a mean of 3.81; teaching and learning had a mean of 4.00; research and

development had a mean of 3.71; quality assurance had a mean of 3.85; industry

collaboration and partnerships had a mean of 3.54; and community had a mean of 2.96.

This disparity in the rating for community service should be an area of note for AKU. The

AKU should investigate the reasons the respondents rated community service lower than

the rest of the areas.

Table 4.4   Effectiveness of Aga Khan University in Operations Management

Effectiveness Rate	1		2		3		4		5	
	Frequency	Percent	Frequency	Percent	Frequency	Percent	Frequency	Percent	Frequency	Percent
Governance	0	0.0	16	7.3	52	24.4	109	51.2	36	17.1
Teaching and learning	5	2.4	5	2.4	47	22.0	88	41.5	68	31.7
Research and development	10	4.9	10	4.9	62	29.3	78	36.6	52	24.4
Quality assurance	5	2.4	16	7.3	57	26.8	62	29.3	73	34.1
Industry collaboration and partnerships	5	2.4	10	4.9	94	43.9	62	29.3	42	19.5
Community service	10	4.9	73	34.1	62	29.3	47	22.0	21	9.8

4.4.3 Curriculum Development and Operations Management

Of the programmes offered at AKU, degree programmes based on market research were the most prevalent programmes with 87.8 percent of the respondents selecting this option, followed by credit granting short courses based on market research at 43.9 percent, and then traditional degree programmes at 34.1 percent see Table 4.5 below. This was an indication that respondents recognized the value of basing programmes on market research and not just traditional educational programmes.

Table 4.5 Academic Programmes Offered at Aga Khan University

Programmes Offered	Selected		Not Selected		Total	
	Frequency	Percent	Frequency	Percent	Frequency	Percent
Traditional degree	73	34.1	140	65.9	213	100.0
Degree based on market research	187	87.8	26	12.2	213	100.0
Credit granting short courses based on market research	94	43.9	119	56.1	213	100.0

As Table 4.6 below indicates, the percentage of respondents who acknowledged that AKU had a curriculum development policy and process was 82.9 percent while 17.1 percent did not know or felt AKU did not have such a policy or process.

Table 4.6 Curriculum Development Policy and Process in Aga Khan University

Curriculum Development Policy and Process	Frequency	Percent
No	10	4.9
I don't know	26	12.2
Yes	177	82.9
Total	213	100.0

In contrast to 82.9 percent of respondents knowing the existence of a curriculum development policy and process, only 24.4 percent, as Table 4.7 below shows, had been involved in the curriculum development process while 75.6 percent have not. Awareness

of operations management practices is an important step in operations management. However, AKU should seek to involve more stakeholders in the curriculum development process.

Table 4.7   Involvement in the Curriculum Development Process

Been Involved	Frequency	Percent
No	161	75.6
Yes	52	24.4
Total	213	100.0

From Table 4.8 below, all respondents recognized the importance, role and responsibilities of the various structures, departments, and offices in the approval process of programmes. The most important stakeholder in the approval of programmes was CUE with 70.7 percent recognition. The least important stakeholder by recognition was the dean's committee at 56.1 percent. However, a significant number of respondents did not recognize the importance of the various structures, departments, and offices with a range of between 29.3 percent and 43.9 percent unaware that these structures, departments, and offices played a role in programme approval. The AKU should determine if creating further awareness and involvement of these is necessary for improvement of operations management practices.

Table 4.8   Approval of Programmes at Aga Khan University Before Launch

Approval	Selected		Not Selected		Total	
	Frequency	Percent	Frequency	Percent	Frequency	Percent
Faculty/departmental boards	135	63.4	78	36.6	213	100.0
Deans committee	119	56.1	94	43.9	213	100.0
Senate/academic council	140	65.9	73	34.1	213	100.0
Commission for University Education	151	70.7	62	29.3	213	100.0
Professional regulatory bodies	135	63.4	78	36.6	213	100.0

4.4.4 Teaching and Learning, and Operations Management

When asked about the proportion of part time academic staff, 60.9 percent of the respondents did not know the proportion (58.5 percent) or thought there were none (2.4 percent). The remaining 39.1 percent thought the proportion was below 30 percent (29.3 percent) or over 30 percent (9.8 percent). It can be concluded that there is a general lack of awareness on the proportion of part time staff with 58.5 percent having declared that they did not know. Table 4.9 below summarizes this information.

Table 4.9   Proportion of Part Time Academic Staff

Part Time Academic Staff	Frequency	Percent
None	5	2.4
I don't know	125	58.5
Below 30 percent	62	29.3
Over 30 percent	21	9.8
Total	213	100.0

4.4.5 Continuous Assessments and Examinations, and Operations Management

As Table 4.10 below shows, overall, 95.1 percent of the respondents felt that practical assessments and examinations were part of the learning experience to an average and high extent with 80.5 percent of the respondents selecting a high extent. This indicated a very high satisfaction in incorporating practical assessments and examinations as part of learning experience.

Table 4.10   Practical Assessments and Examinations as Part of Learning Experience

Practical Assessments and Examinations	Frequency	Percent
I don't know	5	2.4
Low extent	5	2.4
Average extent	31	14.6
High extent	171	80.5
Total	213	100.0

4.4.6 Research and Operations Management

From Table 4.11 below, 53.7 percent of respondents did not know the number of active research institutes in AKU. Of those who knew, 39 percent thought they were 1-5 and 7.3 percent thought they were 6-10. This indicates that majority of the respondents are unaware of the structures in place to conduct formal research in AKU.

Table 4.11   Active Research Institutes and Centres in Aga Khan University

Active Research Institutes and Centres	Frequency	Percent
I don't know	114	53.7
1-5	83	39.0
6-10	16	7.3
More than 10	0	0.0
Total	213	100.0

4.5   University-Industry Linkages

The purpose of this section was to assess linkages with industry at various levels in AKU. To do this, views on linkages were collected in governance, curriculum development, teaching and learning, continuous assessment and examinations, and research which are outlined and discussed below.

4.5.1   Linkages

Linkages were described as knowledge transfer opportunities between universities and industries and vice versa which led to the closing of training gaps since university programmes and courses therein are then designed to meet market needs. The two, university and industry, are seen to be complementary in that universities train the workforce for industries and industries rely on universities for creating solutions to problems. Since universities teach, generate knowledge, and carry out research,

respondents said that it would be ideal if they maintained a good relationship with industries so that each is aware of what the other is doing. This involvement of experts and professionals in the business of education was described as both formal and informal. Formally, linkages were seen to be created through internships, attachments, partnerships, and exchange programmes with industry. Informally, it was noted that faculty and students use their personal and professional experiences with industry during teaching and assessment.

When asked if they were confident about the level of collaboration between universities and industries in Kenya, over 80 percent of the interviewees said that the country still had a long way to go. It was stated that each player would have to be intentional about these partnerships because for a long time, the two had operated in silos with universities earning the title, "ivory towers". Policy level conversations and solutions-based research were highlighted to bring universities and industry together in mutually beneficial partnerships. Vocational degrees issued jointly by universities and industries upon acquisition of practical skills were also fronted as a solution in closing the gap between theory and practice.

4.5.2   Governance and University Linkages

Governance and university linkages covered industry representation in governing organs, industry representation at the programmes level, and industry's involvement among those appointed at senior level leadership at AKU. Table 4.12 below shows the industry representation in governance, faculty boards and leadership.

As shown in Table 4.12 below, 56.1 percent of the respondents agreed that industry is represented in the governing organs such as council and senate while 41.5 percent said that industry is represented in the boards and committees of academic programmes and 53.7 percent indicated that industry opinion was sought in the running of university affairs at leadership level. Only two of the three parameters crossed the 50 percent threshold regarding the participation of industry – an indication that respondents were significantly uninformed on this aspect.

Table 4.12   Industry Representation in Governance, Faculty Boards and Leadership

Category	Response	Frequency	Percent
Representation in governing organs	No	5	2.4
	I don't know	88	41.5
	Yes	120	56.1
	Total	213	100.0
Representation in faculty boards	Disagree	10	4.9
	Neutral	114	53.7
	Agree	88	41.5
	Total	213	100.0
Involvement in university leadership	No	16	7.3
	I don't know	83	39.0
	Yes	114	53.7
	Total	213	100.0

4.5.3   Curriculum Development and University Linkages

Curriculum development and university linkages covered how the opinion of industry was sought for academic and operational processes and whether the views of industry and professional bodies were sought during the development of new degree programmes. It also assessed if industry practitioners and experts were involved in the curriculum development process and whether respondents thought that industry had a role to play in the development of curricula in universities – see Table 4.13 below.

Table 4.13 below shows that 46.3 percent of the respondents answered that the opinion of industry is sought and incorporated through market surveys, 51.2 percent through advisory committees, 46.3 percent through joint workshops, 36.6 percent through focus group discussions, and 14.6 percent did not know. All the parameters, except for advisory committees, fell below the 50 percent threshold on how AKU seeks industry input on academic and operational processes. This could be an indication that the respondents largely felt that the methods used by AKU to get industry input were inadequate or could be strengthened.

Table 4.13   How Industry Opinion is Sought in Academic and Operational Processes

How Opinion is Sought	Selected		Not Selected		Total	
	Frequency	Percent	Frequency	Percent	Frequency	Percent
Market surveys	99	46.3	114	53.7	213	100.0
Advisory committees	109	51.2	104	48.8	213	100.0
Joint workshops	99	46.3	114	53.7	213	100.0
Focus group discussions	78	36.6	135	63.4	213	100.0
I don't know	31	14.6	182	85.4	213	100.0

The reseponses above were further supported by Table 4.14 below in which 51.2 percent of the respondents did not know whether industry proposed new degree programmes over the last five years. Only 46.3 percent were clear that industry proposed new programmes while 2.4 percent were sure that industry did not.

Table 4.14   Industry and Professional Bodies in New Degree Programmes

Proposed Over the Last Five Years	Frequency	Percent
No	5	2.4
I don't know	109	51.2
Yes	99	46.3
Total	213	100.0

Regarding how industry practitioners and experts are involved in curriculum development, Table 4.15 below indicate that 48.8 percent of respondents did not know the extent of the involvement of industry practitioners and experts are involved in curriculum development. About 7.3 percent thought they were slightly involved while 43.9 percent thought they were very involved. Thus, a majority thought did not know the involvement of industry or thought they were not very involved (56.1 percent).

Table 4.15   Industry Practitioners and Experts in Curriculum Development Process

Extent	Frequency	Percent
I don't know	104	48.8
Slightly involved	16	7.3
Very involved	94	43.9
Total	213	100.0

However, the respondents did express that they thought that industry had a significant role to play in development of curriculum as indicated in Table 4.16 below. About 95.1 percent of respondents felt that industry has a significant role in the development of curriculum in universities while 4.9 percent felt it did not. Thus, AKU should find a method to reconcile the views of the respondents and ensure that they involved industry in developing curriculum to match the view that industry's role was significant.

Table 4.16   Industry Role in the Development of Curriculum in Universities

Role	Frequency	Percent
No	10	4.9
Yes	203	95.1
Total	213	100.0

4.5.4   Teaching and Learning, and University Linkages

Teaching and learning, and university linkages covered the proportion of students sponsored by industry; if industry practitioners and experts taught classes or gave guest

lectures; if there was existence of exchange programmes between industry and faculty; if there was regular discussion of practical problems encountered at work; if there was regular practical teaching and discussion of emerging issues; and if it was required to report or carry out self-assessments on professional work.

Responses in Table 4.17 below indicte that 51.2 percent of the respondents did not know or thought none of the students were sponsored by industry. The remaining 48.8 percent of respondents thought students were sponsored at varying proportions with the highest being 22 percent who thought the proportion of industry sponsored students was over 20 percent.

Table 4.17   Proportion of Students Sponsored by Industry

Sponsorship	Frequency	Percent
None	10	4.9
I don't know	99	46.3
1-10 percent	36	17.1
11-20 percent	21	9.8
Over 20 percent	47	22.0
Total	213	100.0

In terms of delivering classroom content, a large majority of respondents, at 78 percent, agreed that industry practitioners taught classes or gave guest lectures as indicated by Table 4.18 below. The remaining 12 percent either did not know or said that industry practitioners did not teach.

Table 4.18   Industry Practitioners and Experts Teaching

Usage	Frequency	Percent
No	16	7.3
I don't know	31	14.6
Yes	166	78.0
Total	213	100.0

Table 4.19 below showed that the respondents were mostly unaware of any formal exchange programmes between industry and faculty with 43.9 percent stating they did not know of any such programmes and 17.1 percent stating no such programmes existed. Only 39 percent stated that such programmes existed. This could mean that the respondents viewed any teaching and guest lecturing as different from formal exchange programmes or as initiatives of the individual members of staff.

Table 4.19   Existence of Exchange Programmes Between Industry and Faculty

Existence	Frequency	Percent
No	36	17.1
I don't know	94	43.9
Yes	83	39.0
Total	213	100.0

On discussion of practical problems encountered in workplace or on duty by working students, 76.9 percent of the students and alumni said that they were often discussed all the time while 23.1 percent said they were never discussed or were discussed a few times as shown in Table 4.20 below.

Table 4.20   Discussion of Practical Problems Encountered at Work

Regularity	Frequency	Percent
Never	16	12.8
A few times	13	10.3
Often	81	64.1
All the time	16	12.8
Total	126	100.0

In contrast, Table 4.21 below indicated that 100 percent of the faculty respondents answered that emerging issues and practical examples were used often and all the time.

There is need to reconcile the views and expectations between the students and lecturers on the use of real-life practical examples.

Table 4.21   Practical Teaching and Discussion of Emerging Issues

Regularity	Frequency	Percent
Never	0	0.0
A few times	0	0.0
Often	6	42.9
All the time	8	57.1
Total	14	100.0

About 74.4 percent of students and alumni stated that they were required to report, self-assess, and evaluate their professional work and undertakings after taking classes/courses, whereas 25.6 percent stated they were not required to do so as implied by Table 4.22 below.

Table 4.22   Reports or Self-Assessments on Professional Work

Required	Frequency	Percent
No	32	25.6
Yes	94	74.4
Total	126	100.0

4.5.5   Continuous Assessments and Examinations, and University Linkages

Continuous assessments and examinations, and university linkages covered whether external examiners from other universities and industry were involved in assessment; the ease or difficulty of getting suitable and qualified external examiners from industry; and if it was required to do industrial and practical examinations and register with a professional body. Table 4.23 below indicated there was agreement by 65.9 percent of the respondents that external examiners from other universities were involved in assessment. The remaining 34.1 percent did not know or disagreed.

Table 4.23   External Examiners from Other Universities and Industry

Involvement	Frequency	Percent
Disagree	16	7.3
Neutral	57	26.8
Agree	140	65.9
Total	213	100.0

Table 4.24 below, however, implied that 78 percent of the respondents felt that there would be no difficulty in getting suitable and qualified external examiners from industry. The AKU should there for seek to include more external examiners in their operations management processes to match the views expressed in this research. There is a disparity between what the respondents view as being carried out by AKU against what they view as the potential possibilities.

Table 4.24   Suitable and Qualified External Examiners from Industry

Difficulty	Frequency	Percent
No	166	78.0
Yes	47	22.0
Total	213	100.0

In addition, Table 4.25 below indicated that 40 percent of the respondents affirmed that further industrial and practical examinations were required after graduation for them to be registered with a professional body or board. In addition, 17.5 percent did not know, and 42.5 percent responded by saying that this was not a requirement.

Table 4.25   Industrial and Practical Examinations

Registered with Professional Body or Board	Frequency	Valid Percent
No	91	42.5
I don't know	37	17.5
Yes	85	40.0
Total	213	100.0

4.5.6 Research and University Linkages

Research and university linkages covered the development of research proposals and receiving of grants from Kenyan organizations; confidence in the implementation and impact of research work by AKU; level of usage of research carried out by AKU to provide solutions to industry; and level of collaboration on research carried out by AKU to provide solutions to industry.

Table 4.26 below points out that only 31.7 percent were clearly aware that school/college had developed research proposals and received grants from Kenyan organizations to conduct research on local industry. The other 68.3 percent did not know or thought research had not been developed. This indicates that only a minority of the respondents were involved in the development of such research.

Table 4.26   Developed Research Proposals and Received Grants from Kenyan Organizations

Developed Research	Frequency	Percent
No	5	2.4
I don't know	140	65.9
Yes	68	31.7
Total	213	100.0

Conversely, Table 4.27 below indicated that 73.2 percent of the respondents were very confident of the implementation and impact of research work by AKU. Another 26.8 percent were somewhat confident. This shows that each of the respondents had some level of confidence in the implementation and impact of research work even though they may have not been involved in the development of the said research.

Table 4.27   Implementation and Impact of Research Work by Aga Khan University

Confidence	Frequency	Percent
Not confident	0	0.0
Somewhat confident	57	26.8
Very confident	156	73.2
Total	213	100.0

Regarding research carried out by AKU, Table 4.28 below showed that 58.6 percent of the respondents felt that research carried out by the university is often used and used all the time to provide solutions to industry and 41.4 percent did not know or felt it was hardly used. There is a disconnect between the usage of the research and the confidence the respondents feel on the quality and impact of the research. There exists a 100 percent confidence on the quality and impact of the research yet only 58.6 percent feel that it is used adequately.

Table 4.28   Research Carried Out by Aga Khan University and Solutions to Industry

Level of Usage	Frequency	Percent
Not used at all	0	0.0
Hardly used	16	7.3
I don't know	73	34.1
Often used	88	41.5
Used all the time	36	17.1
Total	213	100.0

Of the total respondents, 53.7 percent felt that there has a high level of collaboration between AKU and industry in research and development, 39 percent felt it was average while 7.3 percent felt it was low as highlighted by Table 4.29 below. This supports the previous perceptions that there is some form of collaboration, but it may not be adequate as only 53.7 percent rated it highly.

Table 4.29   Research Carried Out by Aga Khan University and Solutions to Industry

Level of Collaboration	Frequency	Percent
Low	16	7.3
Average	83	39.0
High	114	53.7
Total	213	100.0

4.6   Fit-For-Purpose Graduates

When asked to contrast the two frequently used terms, that is half-baked graduates, the interviewees described half-baked graduates as students who were not ready and not adequately equipped to perform tasks in the workplace. They described half-baked graduates as lacking capacity to do the job and unable to translate theory into practice hence not prepared for the field of work that they studied for. Moreover, half-baked graduates were said to lack essential soft skills which are increasingly becoming important in the 21st century workplace.

Conversely, fit-for-purpose graduates were described as suitable for the jobs they were recruited for since they had acquired the perfect cocktail of skills and competencies to allow them to practice. Additionally, they were seen to be well-rounded, versatile, and adaptable hence enabling them to work at various levels in the workplace. The ability to be professional, think critically, communicate effectively, have proper judgement, problem solve and innovate came out as key attributes to have for a graduate to be considered fit-for-purpose.

Table 4.30 below showed that more than 87 percent of the respondents agreed that all these skills (knowledge, technical skills, soft skills, leadership) were important to a graduate

exiting the university. With respect to importance of leadership skills, 87.8 percent of the respondents felt that they were important and very important while 92.7 percent felt that soft skills were important and very important. Approximately 92.6 percent felt that technical skills were important and very important while 92.7 percent felt that knowledge was important and very important. However, in order of priority, knowledge would be highest ranked as 80.5 percent ranked it as extremely important, followed by technical skills with 78 percent ranking it as extremely important and finally soft skills and leadership where 61 percent ranked it as extremely important. This indicates that hard skills (knowledge and technical skills) are perceived to be more important than soft skills (soft skills and leadership).

Table 4.30   Importance of Specific Skills Upon Completion

Importance	1		2		3	
	Frequency	Percent	Frequency	Percent	Frequency	Percent
Knowledge (information, facts)	16	7.3	26	12.2	171	80.5
Technical skills (ability, mastery)	16	7.3	31	14.6	166	78.0
Soft skills (communication, interpersonal)	16	7.3	68	31.7	130	61.0
Leadership skills	26	12.2	57	26.8	130	61.0

1= Not important, 2= Important, 3= Extremely important

About 85.5 percent of the respondents agreed that collaboration and partnership with industry has an impact on the quality of graduates with the remaining 14.6 percent being neutral as implied by Table 4.31 below. This indicates that the respondents understood the importance of collaboration between industry and the eventual production of quality.

Table 4.31   Collaboration and Partnership with Industry on Quality of Graduates

Impact	Frequency	Percent
Disagree	0	0.0
Neutral	31	14.6
Agree	182	85.4
Total	213	100.0

In terms of crucial processes, Table 4.32 below indicates that 85.4 percent rated governance at three and above while 92.7 percent rated curriculum development at three and above. About 95.1 percent rated teaching and learning at three and above while 90.2 percent rated assessment and examinations at three and above. 92.7 percent rated research at three and above. This indicates that a large majority of the respondents highly rate the importance of these processes when collaborating with industry to prepare the students to be fit for purpose.

Table 4.32   University Operational Processes in Collaboration with Industry is Crucial

Operational Processes	1		2		3		4		5	
	Frequency	Percent	Frequency	Percent	Frequency	Percent	Frequency	Percent	Frequency	Percent
Governance	0	0.0	31	14.6	42	19.5	52	24.4	88	41.5
Curriculum development	0	0.0	16	7.3	26	12.2	47	22.0	125	58.5
Teaching and learning	0	0.0	10	4.9	26	12.2	42	19.5	135	63.4
Assessments and examinations	0	0.0	21	9.8	36	17.1	68	31.7	88	41.5
Research	0	0.0	16	7.3	16	7.3	31	14.6	151	70.7

.

Concerning whether AKU graduates are fit-for-purpose and best suited to local and global needs, 95.2 percent of all respondents agreed and strongly agreed that AKU graduates are fit-for-purpose and are best suited to local and global needs and contexts as shown in Table 4.33 below.

Table 4.33   Graduates Fit-for-Purpose

Aga Khan University graduates are fit-for-purpose and best suited to local and global needs and contexts	Frequency	Percent
Completely disagree	0	0.0
Disagree	5	2.4
Neutral	5	2.4
Agree	21	9.8
Completely agree	182	85.4
Total	213	100.0

4.7   University-Industry Collaborations on A Fit-For-Purpose Graduate

To determine the relationship and impact between university-industry collaborations and fit-for-purpose graduate, linear regression analysis was used. Predictors were governance, curriculum development, teaching and learning, assessment, and research projects, while the dependent variable was fit for purpose graduate.

The regression model summary shown in Table 4.36 below indicates that 28.1 percent of the variation in the dependent variable (fit for purpose graduate) are explained by the independent variables, which is a low explanatory power. Other variables not considered in this study explained 71.9 percent of the variation in fit for purpose graduate. The overall model was, however, significant since p-value (0.00) was less that level of significance (0.05) meaning that governance; curriculum development; teaching and learning; assessment; and research projects had a significant influence on fit for purpose graduate.

Table 4.34   Regression Analysis

Model	R		R Square		Adjusted R Square	
1	.531		.281		.264	

Model		Sum of Squares	df	Mean Square	F-value	p-value
1	Regression	20.684	5	4.137	16.215	.000
	Residual	52.809	207	.255		
	Total	73.493	212			

	Unstandardized Coefficients	Standardized Coefficients		
	B	Beta	t-Value	p-value
(Constant)	4.966		27.984	.000
Governance	.362	.682	7.275	.000
Curriculum Development	.304	.305	1.069	.001
Teaching and Learning	.671	.379	3.106	.003
Assessment and Examinations	.127	.219	2.721	.007
Research Projects	.414	.683	5.097	.000

On individual significance, all the variables including the constant were significant since their p-values were less than 0.05. The estimated linear regression model was FFPG = 4.966 + 0.362GVN + 0.304CD + 0.671TAL + 0.127AAE + 0.414RP, where FFPG, GVN, CD, TAL, AAE, and RP, are fit for purpose graduate; governance; curriculum development; teaching and learning; assessment and examinations; and research and projects, respectively. The results also indicated that the level of fit for purpose graduate would be 4.966 if all other factors were to be held constant while governance; assessment and examinations; and research and projects would marginally increase, on the average, the fit for purpose graduate by 0.362, 0.304, 0.671, 0.127, and 0.414 in that order ceteris paribus. In addition, governance and research projects were the most important independent variables since their standardized coefficients were the highest, which were 0.682 and 0.683, respectively.

4.8   Discussion of Results

An organization's operations management practices include organizing, planning, and overseeing processes that turn inputs into outputs (Waters, 2002). This also includes implementing the needed modifications or improvements within these processes to guarantee efficiency and effectiveness, which will ultimately lead to output maximization and high-performance organizations. Operations management is multidisciplinary in nature and relies on a variety of inputs, including people, equipment, supplies, and technology. Practices in operations management include managing standards as well as designing, enhancing, and optimizing processes. The members of AKU well understood the nature of operations management and felt it had been well integrated into the structures and processes of the university. Operations management practices were highly rated in AKU giving an indication that they provided the necessary inputs to achieve the desired outputs. In general, there was the feeling that operations management was well used in AKU which led to the university becoming a high performing institution that produced graduates that met the needs of industry. Although there is a general notion that excellent operations management exists, there is a lack of consistency in terms of knowledge, awareness, engagement, and interaction with operations management. It depends on the specific AKU department or the person. The findings on the respondents' opinions of operations management are therefore varied within AKU.

Universities and colleges are recognized as essential for a nation's attempts to increase economic production, growth, and competitiveness (Bloom, Canning & Chan, 2014). Universities offer corporations access to information as well as a talent pool from which to

hire qualified people. The universities' educational programmes, their research, and the innovations that come from them must all be periodically assessed for relevance and effectiveness because these institutions have been instrumental in Kenya's social-economic development and continue to be so. Academia and industry have an interdependent relationship in that academia produces graduates who are absorbed by industry. University research is occasionally adopted by businesses and transformed into goods and services. Also, industry frequently looks to academia for answers to its problems. Industries rely on universities to provide programmes that consistently produce graduates with the skill sets they need. The majority of research topics also result from the interplay between the two, and the results ultimately benefit both parties. Higher education in Kenya must strike a balance between the demands of the economy and the graduates' academic qualifications. Tertiary education must establish a balance between national priorities and graduates' professional qualifications (Blom, Raza, Kiamba, Bayusuf, & Adil, 2016). Although there is cooperation between AKU and industry, it is not a robust partnership. If the university believes that industry input and relationships are crucial to helping it realize its vision, then it must find methods to make these alliances stronger. However, the research consistently concluded that AKU and industry do work closely together to conduct research and development.

A system, policy, or programme that is created and operationalized according to local needs and circumstances is said to be fit-for-purpose (Taber, Akdemir & Gorman 2020). It is generally acknowledged that while technical abilities may be learned in the classroom or on the job, soft skills are tougher to master. Employers place a great value on soft qualities

like adaptability, collaboration, and resilience (Munene 2013). The World Bank observed that Kenya's higher education was failing to produce graduates with knowledge and skills fundamental for the attainment of Vision 2030, which aims at transforming the country into a manufacturing, industry-filled, middle-income country which is geared towards a clean and secure environment and an elevated quality of life for all its citizens (Vision 2030). Respondents rated the importance of certain skills deemed necessary for AKU graduates upon completion of their academic journey at the university. The highest rated was knowledge, followed by technical skills and finally soft skills and leadership. This indicates that hard skills (knowledge and technical skills) are perceived to be more important than soft skills (soft skills and leadership). Finally, an overwhelming majority of all respondents felt that AKU graduates are fit-for-purpose and best suited to local and global needs and contexts. The significant relationships of the independent variable and the dependent variables as illustrated in Table 4.40 depicted that an increase in university-industry collaborations may lead to improved fit-for-purpose graduate in AKU.

CHAPTER FIVE: SUMMARY, CONCLUSION AND RECOMMENDATIONS

5.1   Introduction

This chapter summarizes the findings of the study as per the objectives. The chapter also contains the conclusions made from the study and the recommendations that arise from the findings. It also provides areas for further research and the limitations of the study.

5.2   Summary

The study sought to assess, evaluate, and establish the impact between operations management and linkages between AKU and industries in Kenya. The study was guided by the operations management practices of process design, quality control, performance measurement, work scheduling, and resource and facilities allocation as well as the university-industry collaborations of governance, curriculum development, teaching and learning, assessment, and research projects.

The first objective of this study was to assess operations management practices at AKU. From the analysis, majority of the respondents at AKU were well aware and understood the nature of operations management. Quality control was strong point when it came to university operations management with a significantly high level of adoption at AKU. It was also perceived that performance management and work scheduling are well adopted at the university. In terms of the effectiveness of producing desired results or outputs in governance, teaching and learning, research and development, quality assurance, and industry collaboration and partnerships, majority of the respondents felt that AKU was

effective in achieving the university's desired results in those areas. However, AKU's effectiveness in community service was rated poorly when compared to the other areas.

Evaluation of university and industry collaborations at AKU was the second study objective. The results indicated that majority of the respondents agreed that AKU leadership seeks and incorporates the opinion of industry in the running of the university. However, only a minority responded that industry was represented in the boards and committees of academic programmes while a slim majority responded that industry was represented in the governing organs. These three parameters indicated that it really is a toss-up or lack of agreement on whether industry being represented in the university's governing organs amounts to the incorporation of industry views and opinions in the running of university affairs. While there was a general feeling that the opinion of industry was incorporated and represented in the governing organs, it was not very strong. Majority of the respondents did not know whether or not industry was represented on faculty boards and departmental committees of the university or at the level of design and implementation of academic programmes. The top three means by which the opinions of industry were sought and incorporated into AKU's operational processes were advisory committees, market surveys, and joint workshops. A slim majority of respondents agreed that industry experts and practitioners were involved in curriculum development which seems to contradict the prior views industry was not represented in boards and committees of the university. Further, an outright majority felt that industry has a significant role in the development of curriculum in universities. The analysis indicated that a large majority of the students and alumni responded that practical problems encountered in the workplace

while an outright majority of faculty responded that emerging issues and practical examples were used often and all of the time. Practical assessments and examinations were part of the learning experience to an to a high extent which points to the university's linkage with industry. There was a split between the need for further industrial or practical examinations after graduation if the graduates were to be registered with a professional body or board. A majority of the respondents felt that research carried out by AKU was often used or used all the time to provide solutions to industry.

The third objective was to establish the impact of university-industry collaborations on a fit-for-purpose graduate. From the analysis, majority of the respondents agreed that collaboration and partnership with industry will have an impact on the quality of graduates with none of the respondents disagreeing. A majority,therefore, see industry collaborations and partnerships as an important aspect of university education. Further, respondents were asked to rate university operations management processes. Teaching and learning were scored the highest rating, followed closely by curriculum development and research, then assessment and examinations and lastly governance. Respondents were also asked to rate the importance of certain skills as they are deemed necessary to have for AKU graduates upon completion of their academic journey at the university. The highest rated was knowledge, followed by technical skills and finally soft skills and leadership. This indicates that hard skills (knowledge and technical skills) are perceived to be more important than soft skills (soft skills and leadership). Finally, an overwhelming majority of all respondents agreed and strongly agreed that AKU graduates are fit-for-purpose and best suited to local and global needs and contexts.

5.3   Conclusion

The study concludes that the respondents at AKU were well aware and understood the nature of operations management. Process design, quality control, performance measurement, and resource and facilities are well adopted in AKU. However, there a large disparity in the adoption of the aforementioned three in comparison to the adoption of facilities allocation and process design. This significant disparity could indicate that not enough attention is given to the two areas at AKU. If the university considers allocation of facilities and design of processes as equally important in managing its operations, then due attention, time and resources should be spent in ensuring they are adopted to the same extent as controlling quality, managing performance and scheduling work. The AKU's effectiveness in community service was rated poorly when compared to governance, teaching and learning, research and development, quality assurance, and industry collaboration and partnerships. This disparity should be an area of note for AKU and if the university regards community service as an important part of its mandate, then it must strive towards improving its effectiveness to the level of governance, teaching and learning, research and development, quality assurance, and industry collaboration.

It can also be concluded that while there is collaboration between AKU and industry, it is not a strong collaboration. If the university feels that industry opinions and collaborations are important to enable it to achieve its vision, then it would need to find ways to strengthen these partnerships. If adequate policies on the same are already in place, then AKU should determine where the disconnect lies. Further, AKU has mostly included the needs of industry in their curriculum and industry recognizes this inclusion, thus does not require

further assessment prior to registration with professional bodies. However, there may still be areas where the inclusion of industry specifications is inadequate, hence the need for further assessment to ascertain competence before registration. However, there was consistent view from the study that there is a high level of collaboration between AKU and industry in research and development.

The study further concluded that order of priority for collaboration with industry was in the following order - teaching and learning; curriculum development; research; assessment and examinations; and governance. The study also indicated that AKU graduates have been equipped with the necessary knowledge, technical skills, soft skills and leadership skills that are required in and by industry.

5.4   Recommendations

The first recommendation is to create awareness on the value of operations management practices and the value of university-industry linkages to the members of AKU. While there is a semblance of understanding that there is need for good operations management and collaboration with industry, this understanding, level of awareness, level of engagement and level of involvement with operations management and industry linkages is haphazard. It is dependent on the specific department in AKU or the individual. Thus, the results on how the respondents view operations management and industry collaborations and linkages is inconsistent across AKU. Thus, AKU should have a deliberate drive and awareness campaign to streamline the views of its members on the value of operations management and industry-university collaboration and linkages. The campaign should seek to ensure

that all members at the same level of awareness and engagement in these two areas. This will in turn improve the fit for purpose graduate and their experience at AKU.

Secondly, AKU should review and amend its policy on university-industry linkages. It can be concluded that while there is collaboration between AKU and industry, it not a strong collaboration. If the university feels that industry opinions and collaborations are important to enable it to achieve its vision, then it would need to find ways to strengthen these partnerships. If adequate policies on the same are already in place, then AKU should determine where the disconnect lies. The AKU should determine if any shortcoming lies on the university's part or if it is determined by forces beyond its control such as accreditation and regulation. This could be done through analysis of pass/fail rates of AKU graduates in the industrial and practical examinations offered by various professional bodies in medicine, nursing and media. The shortcomings identified would then form the priority areas for AKU to address such as facilities allocation, process design, community service, representation of industry on boards, schools and in governance, curriculum development, teaching and learning, assessment, and research projects. For instance, there is a large disparity in the adoption of quality control, performance management and work scheduling, in comparison to the adoption of facilities allocation and process design. This significant disparity could indicate that not enough attention is given to the two areas at AKU. If the university considers allocation of facilities and design of processes as equally important in managing its operations, then due attention, time and resources should be spent in ensuring they are adopted to the same extent as controlling quality, managing performance and scheduling work.

Finally, AKU should set up a directorate of university-industry linkages or empower any existing structure to such a level. The mandate of such a directorate would be to investigate the needs of industry and integrate this into the fabric of AKU through operations management practices and university-industry collaborations of governance, curriculum development, teaching and learning, assessment, and research projects. This directorate would ensure that industry is involved at every level of AKU and their input is integrated in the departments, schools, boards and management. This directorate will also work hand in hand with regulators and professional bodies to ensure that students meet the requirements of these, as well as market and sell the graduates of AKU as fit for purpose. The AKU should also understand that it can contribute to industry by engaging industry stakeholders especially in the areas of research projects that seek to find solutions to problems.

5.5   Areas of Further Study

It would be important to further investigate the value of having of university-industry linkages at the level of boards and committees or whether there is a disconnect between the reality and the perceptions of the respondents. Equally important would be to establish whether such representation would result in additional robustness of the programmes. The impact of collaboration between universities and industry may be based on the perception of the respondents and not the actual reality. It may also be affected by the nature of AKU being a private university, the nature of programmes being offered, the type of students/alumni who are attracted to the university, and the nature of the members of staff and faculty. More comprehensive research should be carried out which includes more

universities. There should be a comparative study done between private and public universities to determine the role of operations management practices and university-industry linkages on fit-for-purpose graduates. A qualitative study encompassing more universities would yield richer data that can be used to reach better conclusions on operations management practices and university-industry linkages.

5.6   Limitations of the Study

The research was carried out in Nairobi, Kenya and in a single university - AKU. The AKU is a registered private university recognized by the Kenya Commission for University Education. This context should be taken into account when attempting to generalize these findings across universities in other countries. Caution should be exercised when generalizing the findings. The data collection was also conducted during the COVID-19 pandemic of 2020-2021 thus the questionnaire had to be circulated online and most interviews conducted over zoom. This presented a limitation on response rate and physical accessibility to the respondents. The nature of the tools used limited the kind of responses that could be given since the primary data gathering tool was a questionnaire. While there was qualitative data gathered in the form of interviews, the primary tool used limited the kind of responses that could be given by the respondents. A large majority of the respondents were female and this could bias the nature of the responses toward their perspectives or outlook based on their experiences in higher education.

REFERENCES

Allen, D., & Fifield, N. (1999). Re-engineering change in higher education. Information Research, 4(3) 251-289. Retrieved from http://informationr.net/ir/4-3/paper56.html

Awiti, O. A., Orwa, C., Mbuvi, L., & Karumba, M. (2019). A study on job entry-level skills: Seizing the moment, securing the future. Retrieved from https://ecommons.aku.edu/eastafrica_eai/28/

Baruch, Y., & Holton, B. (2008). Survey response rate levels and trends in organizational research. Human Relations, 61 (8), pp 1139-1160

Blom, A., Raza, R., Kiamba, C., Bayusuf, H., & Adil, M. (2016). Expanding Tertiary Education for Well-Paid Jobs: Competiveness and Shared Prosperity in Kenya. Washington DC: The World Bank.

Bloom, D. E., Canning, D., Chan, K. J., & Luca, D. L. (2014). Higher education and economic growth in Africa. International Journal of African Higher Education, 1(1), 22-57. Retrieved from https://doi.org/10.6017/ijahe.v1i1.5643

Clark, K. B. (1996). Competing through manufacturing and the new manufacturing paradigm: Is manufacturing strategy passé? Production and Operations Management, 5(1): 42-58. https://doi.org/10.1111/j.1937-5956.1996.tb00384.x.

Cronbach, L. J. (1951). Coefficient alpha and the internal structure of tests. Psychometrika, 16, 297-334. DOI: https://doi.org/10.1007/BF02310555.

Cronbach, L. J., & Meehl, P. E. (1955). Construct validity in psychological tests. Psychological Bulletin, 52(4), 281–302. DOI: https://doi.org/10.1037/h0040957.

Crosling, G., Heagney, M., & Thomas, L. (2009). Improving student retention in higher education: Improving teaching and learning. Australian Universities' Review, The, 51(2), 9-18.

Davenport, T. H., & Short, J. E. (1990). The new industrial engineering: Information technology and business process redesign. Sloan Management Review, 31, 11-27.

David, M. (2011). Overview of researching global higher education: Challenge, change or crisis? Contemporary Social Science. 6(2), 147-163. DOI: https://doi.org/10.1080/21582041.2011.580610

Fuller, E. J. (1994, April 19). Trust as the basis for urban school reform and as an explanation of the variability in involuntary minority academic achievement. (Conference presentation). The annual meeting of the American Educational Research Association, Detroit, New Orleans. Retrieved from https://files.eric.ed.gov/fulltext/ED376245.pdf

Gichaga, F. J., Kaane, H., & Wainaina, G. (2005). University-industry collaboration in Kenya. (Conference presentation). University-Industry Collaboration in Kenya, Institution of Engineers of Kenya Conference. Retrieved from http://erepository.uonbi.ac.ke/handle/11295/26657

Kande, A. W., Kirira, D. P. G., & Michuki, D. G. N. (2017). University – industry collaboration and innovativeness of firms: evidence from Kenya innovation survey.

International Journal for Innovation Education and Research, 5(3), 1-10. DOI: https://doi.org/10.31686/ijier.vol5.iss3.76

Kenya National Bureau of Statistics. (2019). Economic Survey 2019. Nairobi: Kenya National Bureau of Statistics.

Krejcie, R. V., & Morgan, D. W. (1970). Determining sample size for research activities. Educational and Psychological Measurement. 30(3), 607–610. DOI: https://doi.org/10.1177/001316447003000308.

Lemoine, P. A., Jenkins, W. M., & Richardson, M. D. (2017). Global higher education: Development and implications. Journal of Education and Development, 1(1), 58-71. DOI: https://doi.org/10.20849/jed.v1i1.253

Maobe, A., & Peng, L. (2020). Higher education reforms in Kenya: Options and development. SSRN: 3524744. Retrieved from https://ssrn.com/abstract=3524744 or http://dx.doi.org/10.2139/ssrn.3524744

McClay, R. (2019). Operations management theory. In Investopedia. https://www.investopedia.com/ask/answers/050715/what-operations-management-theory-and-how-can-it-help-business.asp

Mehrabi, J. (2012). Application of six-sigma in educational quality management. Procedia-Social and Behavioral Sciences, 47, 1358-1362. DOI: https://doi.org/10.1016/j.sbspro.2012.06.826

Mense, E. G., Lemoine, P. A., Garretson, C. J., & Richardson, M. D. (2018). The development of global higher education in a world of transformation. Journal of Education and Development, 2(3), 47-60. DOI: https://doi.org/10.20849/jed.v2i3.529.

George, M. L. (2002). Lean six sigma: Combining six sigma quality with lean speed. McGraw-Hill Trade: New York.

Muema, E. (2020). Leadership and policy for reforms and change in higher education: A review of the juakalization phenomenon of public universities in Kenya. (Electronic Thesis, Bowling Green State University). Retrieved from https://etd.ohiolink.edu/apexprod/rws_etd/send_file/send?accession=bgsu1598346230750732&disposition=inline.

Mugenda, O., & Mugenda, A. (2003). Research methods: Quantitative and qualitative approaches. Nairobi: Acts Press.

Munene, I. (2013). New higher education reforms in Kenya. International Higher Education, 73, 14-16. Retrieved from https://www.researchgate.net/publication/283521298_New_Higher_Education_Reforms_in_Kenya.

Munyoki, J. M., Kibera, F., N., & Ogutu, M. (2011). The influence of technology transfer on organizational performance: A study of medium and large manufacturing firms in selected industries in Kenya. Journal of Faculty of Education, 1 http://erepository.uonbi.ac.ke:8080/xmlui/handle/123456789/14631

Njogah, M., Mang'eni G., & Gatumu N. (2017). University-industry-government linkages for a 21st century global, knowledge-driven economy: A Kenyan perspective. Academia. Retrieved from https://www.academia.edu/3662412/University_Industry_Government_Linkages_for_a_21st_Century_Global_Knowledge_Driven_Economy_A_Kenyan_Perspective

Oanda, I. O., Chege, F., & Wesonga, D. (2008). Privatization and private higher education in Kenya: Implications for access, equity and knowledge production. Dakar: African Books Collective.

Oketch, M. O. (2009) The growth of private university education in Kenya: The promise and challenge. Peabody Journal of Education, 78(2), 18-40. DOI: 10.1207/S15327930PJE7802_02

Ilieva, J., & Peak, M. (2016). The shape of global higher education: National policies framework for international engagement. London: British Council.

Porter, M. E. (1990). The competitive advantage of nations. Competitive Intelligence Review, 1(1), 14-14.

Sibhato, H., & Singh, A. P. (2012). Evaluation on BPR implementation in Ethiopian higher education institutions. Global Journal of Management and Business Research, 12(11), 1-29. Retrieved from https://journalofbusiness.org/index.php/GJMBR/article/view/736

Slack, N., Chambers, S., & Johnston, R. (2010). Operations management, 6th Edition. New York: Pearson Education.

Taber, S., Akdemir, N., Gorman, L. (2020) A "fit for purpose" framework for medical education accreditation system design. BMC Med Educ 20, 306 https://doi.org/10.1186/s12909-020-02122-4

Vygotsky, L. S. (1962). Thought and language. Cambridge, MA: MIT Press.

Waters, D. (2002). Operations management: Producing goods and services. 2nd edition. New York: Pearson Education Limited

World Bank. (2019). Improving higher education performance in Kenya: A policy report. World Bank, Washington, DC. Retrieved from https://openknowledge.worldbank.org/handle/10986/32361 License: CC BY 3.0 IGO.

APPENDICES

Appendix I   Introductory Letter

Joyce Wangu,

P.O. Box 30270 – 00100,

Nairobi, Kenya

Email: wangujoyce@gmail.com

Dear Sir/Madam,

Ref: Introductory Letter – Research Project

I am a graduate student in the Department of Management Science and Project Planning under the Faculty of Business and Management Sciences at the University of Nairobi. In partial fulfilment of the requirements for the award of a degree of Master of Business Administration, I am conducting a research on "Operations Management Practices and Fit-For-Purpose Graduates: A Case of Aga Khan University".

Please take some time to read through and fill in the Google Forms questionnaire that has been sent to you. Your responses will be confidential, and your need for privacy and anonymity will be respected. While your participation in this research is voluntary, I highly appreciate your willingness to contribute to this study. Your responses shall be used purely for academic purposes.

Thank you for your feedback and support.

Yours Sincerely,

Joyce Wangu

Appendix II   Questionnaire

Dear Respondent,

My name is Joyce Wangu, a graduate student in the Department of Management Science and Project Planning under the Faculty of Business and Management Sciences at the University of Nairobi. I am conducting a research on "Operations Management Practices and Fit-For-Purpose Graduates: A Case of Aga Khan University".

Section One: General Information

a) Please indicate your gender.
- o Female
- o Male

b) Please indicate your age range.
- o 20 – 30 years
- o 31 – 40 years
- o 41 – 50 years
- o 51 years and above

c) What is your highest level of education?
- o High School/Secondary School
- o College Diploma
- o Bachelor's Degree
- o Master's Degree
- o Doctorate Degree

d) Which college/school/institute/department do you represent at AKU?
- o School of Nursing and Midwifery (SONAM)
- o Medical College (MC)
- o Graduate School of Media and Communications (GSMC)
- o Institute for Human Development
- o Administrative Support Unit/Department

e) Please indicate category.
- o Student
- o Faculty
- o Staff
- o Graduate/Alumna

Section Two: Operations Management Practices

a) In your understanding, which of the following definitions best describes operations management? (select all that apply)
- o The process of engaging in commercial, industrial or professional activities.

- o The area of management concerned with designing and controlling the production process and redesigning of business operations in the production of goods and services.
- o The conversion of materials and labour into goods and services.
- o The administration of business practices to create the highest level of efficiency possible within an organization.

b) In your experience, has AKU adopted the following operations management practices? (select all that apply)

	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
Process Design					
Quality Control					
Performance Measurement					
Work Scheduling					
Facilities Allocation					

c) Effectiveness is the capability of producing a desired result or output. On a scale of 1 (lowest) to 5 (highest), rate the effectiveness of AKU in the following areas.

	5	4	3	2	1
Governance					
Teaching and Learning					
Research and Development					
Quality Assurance					
Industry collaboration and partnerships					
Community Service					

Section Three: Governance

a) Is industry represented in the governing organs of AKU e.g. University Council, Board of Trustees, Senate/Academic Council etc.?
- o Yes
- o No
- o I don't know

b) Industry is represented in the various boards/committees which are responsible for academic programmes and activities in AKU e.g. faculty boards, university-wide and departmental committees.
- o Agree
- o Neutral

o Disagree

c) Does AKU leadership seek the opinion of industry and incorporate these views in the running of university affairs?
- o Yes
- o No
- o I don't know

d) How is the opinion of industry sought and incorporated in AKU's academic and operational processes? (select all that apply)
- o Market Surveys
- o Advisory Committees
- o Joint Workshops
- o Focus Group Discussions

Section Four: Curriculum Development

a) Does AKU have a curriculum development policy and process?
- o Yes
- o No
- o I don't know

b) Have you been involved in the curriculum development process at AKU?
- o Yes
- o No

c) Interviews, market surveys or focus group discussions are organized and conducted for every proposed academic programme of AKU.
- o Agree
- o Neutral
- o Disagree

d) What university academic programmes does AKU offer at present? (select all that apply)
- o Traditional degree programmes
- o Degree programmes based on market research
- o Credit granting short courses based on market research

e) Who of the following approves new degree programmes before they are launched/offered? (select all that apply)
- o Faculty/Departmental Boards
- o Deans Committee
- o Senate/Academic Council
- o Commission for University Education

    o   Professional Regulatory Bodies

f) In the last five years, have there been cases where industry or professional bodies have proposed new degree programmes or short courses at AKU?
- Yes
- No
- I don't know

g) To what extent are industry practitioners/experts involved in the curriculum development process at AKU?
- Very involved
- Slightly involved
- Not involved
- I don't know

h) Do you think that industry has a significant role to play in the development of curriculum in universities?
- Yes
- No

Section Five: Teaching and Learning

a) To the best of your knowledge, what proportion of AKU students are sponsored by industry i.e. have their tuition fees paid by industry donors?
- None
- 1 – 10%
- 11 – 20%
- Over 20%
- I don't know

b) To the best of your knowledge, what proportion of AKU academic staff is part time?
- All
- Over 30%
- Below 30%
- None
- I don't know

c) Do industry practitioners/experts teach classes or give guest lectures in your school/college or in AKU in general?
- Yes
- No
- I don't know

d) Is there an exchange programme between industry and faculty in your school/college or in AKU in general?
- o Yes
- o No
- o I don't know

e) **Students and Alumni only:** How often do/did you discuss practical problems that you encounter(ed) in the course of your professional work or line of duty with your lecturers i.e. faculty?
- o All the time
- o Often
- o A few times
- o Never

f) **Students and Alumni only:** Are/Were you required to write reports or self-assessments outlining the professional work that you engage(d) in and to evaluate how your professional undertakings have/had improved after certain classes/lessons?
- o Yes
- o No

g) **Faculty only:** How often do you teach and discuss emerging issues using real and practical examples (including your own experiences) during your classes/lessons?
- o All the time
- o Often
- o A few times
- o Never

Section Six: Continuous Assessments and Examinations

a) To what extent are practical assessments and examinations part of the learning experience in your school/college or in AKU in general?
- o High extent
- o Average extent
- o Low extent
- o I don't know

b) AKU involves external examiners from other universities and industry to participate in the setting, marking and moderation of continuous assessments and final examinations.
- o Agree
- o Neutral
- o Disagree

c) In your opinion, would there be difficulties in getting suitable and qualified external examiners from industry?

- o Yes
- o No

d) In your school/college, are further industrial/practical examinations required upon or after graduation for graduates to be registered with a professional body/board?
  - o Yes
  - o No
  - o I don't know

Section Seven: Research

a) How many active research institutes and centres are there in AKU?
  - o 1 – 5
  - o 5 – 10
  - o More than 10
  - o I don't know

b) Has AKU or your school/college developed research proposals and received grant funding from a Kenyan organization to conduct research on issues related to local industry?
  - o Yes
  - o No
  - o I don't know

c) How confident are you in the implementation and impact of the research work carried out by AKU?
  - o Very confident
  - o Somewhat confident
  - o Not confident

d) To what extent is the research carried out by your school/college used in providing solutions to industry?
  - o Used all the time
  - o Often used
  - o Hardly used
  - o Not used at all
  - o I don't know

e) In your opinion, what is the level of collaboration between AKU and industry in the area of research and development?
  - o High
  - o Average
  - o Low

Section Eight: Fit-For-Purpose Graduates

a) Rate the importance of the following in an AKU graduate upon completion of their academic journey at the university.

	Extremely Important	Important	Less Important
Knowledge (information, facts)			
Technical Skills (ability, mastery)			
Soft Skills e.g. communication, interpersonal			
Leadership Skills			

b) Collaboration and partnerships with industry by universities have an impact on the quality of graduates.
   o Agree
   o Neutral
   o Disagree

c) On a scale of 1(lowest) to 5(highest), in which of the following university operational processes is collaboration with industry crucial?

	5	4	3	2	1
Governance					
Curriculum Development					
Teaching and Learning					
Assessments and Examinations					
Research					

d) AKU graduates are fit for purpose in that they are equipped with knowledge, technical skills and competencies as well as soft and leadership skills which make them best suited to local and global needs and contexts.
   o Completely agree
   o Agree
   o Neutral
   o Disagree
   o Completely disagree

Do you have any additional information or views you would like to share on operations management practices in universities and fit-for-purpose graduates?

THANK YOU FOR TAKING TIME TO COMPLETE THIS QUESTIONNAIRE

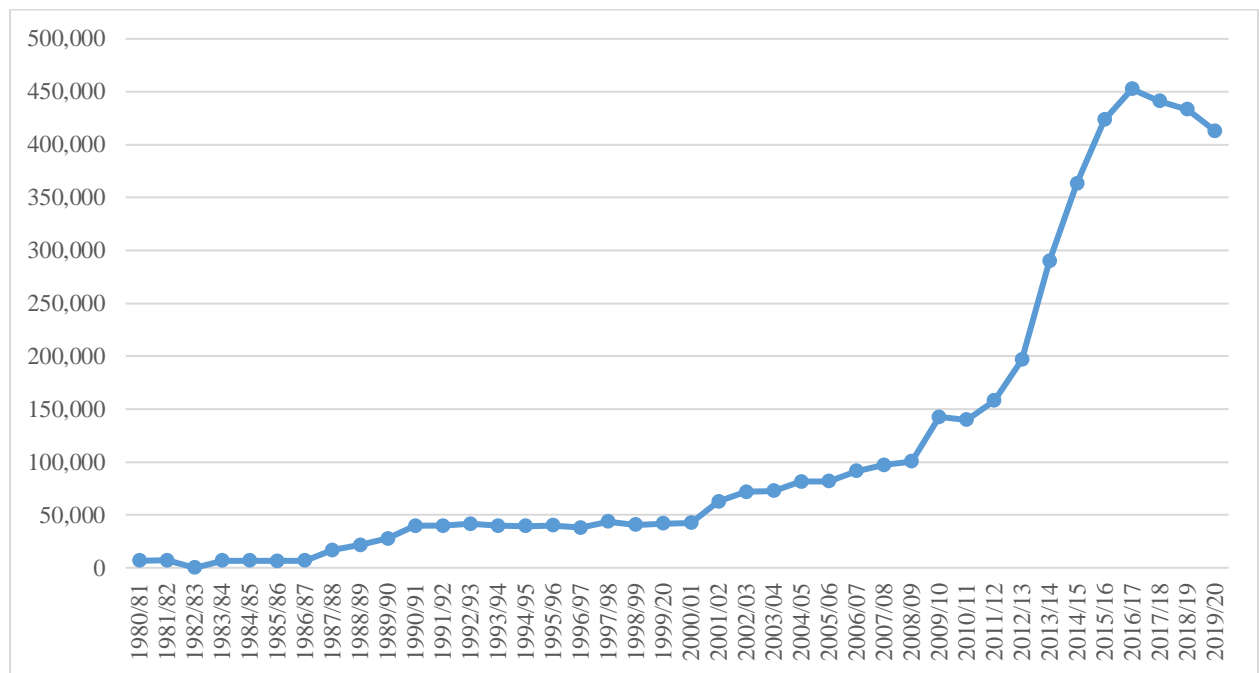**Appendix III Summary of Student Enrollment in Public Universities**

The table below and figure derived from it summarize student enrollment data in public universities in Kenya from academic years 1980/1981 to 2019/2020 showing the increase over the years.

Year	Students	Year	Students	Year	Students	Year	Students
1980/81	6,627	1990/91	39,723	2000/01	42,346	2010/11	139,770
1981/82	6,924	1991/92	39,687	2001/02	62,677	2011/12	157,916
1982/83	**	1992/93	41,492	2002/03	71,832	2012/13	196,737
1983/84	6,875	1993/94	39,571	2003/04	72,551	2013/14	289,733
1984/85	6,682	1994/95	39,340	2004/05	81,491	2014/15	363,334
1985/86	6,410	1995/96	40,065	2005/06	81,677	2015/16	423,584
1986/87	6,760	1996/97	37,973	2006/07	91,337	2016/17	452,494
1987/88	16,565	1997/98	43,591	2007/08	97,107	2017/18	441,131
1988/89	21,635	1998/99	40,570	2008/09	100,649	2018/19	433,245
1989/90	27,572	1999/20	41,766	2009/10	142,556	2019/20	412,845*

** Data not available
* Provisional data
Source: KNBS – various Economic Surveys

Appendix IV Summary of Student Enrollment in Private Universities

The table below and figure derived from it summarize student enrollment data in private universities in Kenya from academic years 1994/1995 to 2019/2020 showing the increase over the years.

Year	Students	Year	Students	Year	Students
1994/95	3,545	2004/05	10,050	2015/16	77,929
1995/96	4,845	2005/06	10,639	2016/17	85,195
1996/97	3,379	2006/07	20,892	2017/18	80,928
1997/98	3,646	2007/08	21,132	2018/19	86,217
1998/99	3,888	2008/09	22,198	2019/20	96,628
1999/20	6,920	2009/10	35,179		
2000/01	6,999	2011/12	37,848		
2001/02	8,671	2012/13	60,712		
2002/03	9,129	2013/14	54,459		
2003/04	9,541	2014/15	71,646		