

# SCIENCE AND MATHEMATICS EDUCATION: A CATALYST FOR YOUTHS ENTREPRENEURSHIP, ECONOMIC GROWTH AND NATIONAL DEVELOPMENT

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## **Abstract**

Mathematics, always known as queen of science has the ability to function in almost all works of life as it found its applications in medicine, engineering, finance, science and technology and so on. There is a need for a nation that desire development and transformation to make mathematics a basic requirement for the study of science and technology because of it positive contributions to the development of mankind. This paper attempts to highlight the need of quality mathematics education as an essential instrument for youth entrepreneurship, economic growth and national development. Youth entrepreneurship gives young Nigerian opportunity to learn important skills such as teamwork, networking, problem-solving skills, critical thinking, innovations, and self-discipline. Financial risk and infrastructural development were highlighted to be vehicles' that speeds up economic growth of a nation. Also science, technology, business and industry were stated to be areas that can bring about national development and transformation through quality mathematics education. The paper, therefore, suggested that students should be encouraged on the applications of mathematics to real life in a manner that would develop their entrepreneurial skills.

**Keywords:** Quality Mathematics Education, Entrepreneurship, National Development, Transformation, Youth.

## **Introduction**

Mathematics, always known as queen of science has the ability to function in almost all works of life as it found its applications in medicine, engineering, finance, science and technology and so on. Because of its capacity in stimulating reasoning and creativity, it helps greatly in the area of decision making. According to Aminu and Bashirat (2023), every nation needs to prioritize mathematics for its influential usage to their everyday life as well as making it mandatory and prerequisite to gain admission into every high institution of learning. Therefore, for any nation to be developed, it requires extensive knowledge of mathematics as it yields professional in science and technology.

In the face of an unprecedented increase in youth unemployment in Nigeria, entrepreneurship development and job creation has become a major source of concern to the government of the day. Over the years, it has become very imperative for mathematics educators to train students on how to apply mathematical concepts and skills outside the classroom environment. According to Edeoga et al. (2018), if an individual has mathematics concepts and skills, he will be able to take decision on his own, be a consultant and will also be able to solve problems. Hence, he can stay on his own as an entrepreneur and can be an employer of mathematics educators. Udonsa (2015) emphasizes on a strong mathematics education to train the youth on various skills which include entrepreneurial skill, managerial, experience, record keeping, creativity and innovation.

Entrepreneurship education has the potential of developing youth with skills that can help them to be self-reliant and even creates and generate employment for others. It plays a significant role in the economic development of a nation and has a mandate to equip the youth with functional knowledge and skills to build up their character, attitude and vision. Entrepreneurship and innovation are increasingly recognized as important drivers of economic growth, productivity and development (John et al., 2022; Kavita, 2020; Ogburn & Omenka, 2019; United Nations, 2011).

Economic development is the process whereby simple low-income national economies are transformed into modern industrial economies involving quantitative as well as qualitative change. National Development is the improvement of a nation, economically, socially and politically to better the standard of living for a population (National Development Theory, n.d.)

Equipping learners with the 21<sup>st</sup> century skills is the current pursuit of nations of the world wishing to maintain global leadership and cutting-edge economic competitiveness, these nations now see science, technology, engineering and mathematics education as an option for equipping their up-coming generations with problem solving skills and potentials for becoming innovators and entrepreneurs of tomorrow (Akano, 2018).

## **Youth Entrepreneurship**

Entrepreneurship has been recognized as an antidote to unemployment and poverty among youth in both developed and developing countries. It is described as the willingness and ability of an individual to seek out investment opportunities and takes advantage of scarce resources to exploits the opportunities profitably (Sajuyigbe et al., 2016). Entrepreneurship is the act of creating a business or businesses while bearing all the risks with the hope of making a profit. According to Nicole (2023), entrepreneurship is about transforming the

world by solving big problems like bringing about social change or creating an innovative product that challenges the status quo of how we live our lives on a daily basis.

### **Mathematics Education as a Catalyst for Youth Entrepreneurship**

Youth involvements in entrepreneurship programs build life skills and create job opportunities. Understanding mathematics concepts is essential when undertaking an entrepreneurial endeavour. Most youth entrepreneurship ventures include the development of a business plan. One major component of that plan is the financial strategy or budget. To develop a good business plan, young entrepreneurs need to know the mathematics behind their business in order to thrive (Dave, 2021).

One of the biggest advantages of getting started with entrepreneurship at a young age is the opportunity to learn important skills such as teamwork, networking, problem-solving, critical thinking, innovation, self-discipline, and so on. Youth entrepreneurship is a process whereby creative and innovative ideas are transformed into enterprises initiated and managed by young people with the primary purpose of addressing their socio-economic challenges such as poverty and unemployment (Ndwakhulu, 2019).

Mathematics is regarded as one of the major tools that bring about youth entrepreneurship. It helps in the area of decision making, keeping records and analytical thinking skills. Mathematics also helps a young entrepreneur in the following areas:

- i. Making business plan
- ii. Sales forecast
- iii. Analyse and optimise the return on investment
- iv. Estimate the gain from market activities
- v. Financial analysis, financial ratio and statements
- vi. Inventory management
- vii. Marketing and digital marketing
- viii. Analysis of data
- ix. Predicting future financial trends
- x. Risk management

### **Mathematics Education as a Catalyst for Economic Growth**

Mathematics is a subject that finds its applications not only in sciences but also in other fields of human endeavour such as economics, psychology, and political science and so on. This constitutes the nation's socio-political and economic conditions whose indices rely on mathematics for policy execution. Mathematics and economic development of a nation go hand in hand. Many people viewed mathematics as the foundation of scientific and technological knowledge which is considered vital in the socio-economic development of a nation (Tsafu, 2014).

Mathematics can help speed-up economic growth of a nation in the following ways:

1. **Financial Market:** Financial market includes many place or system that provides buyers and sellers the means to trade financial instruments, include bonds, equities, the various international currencies and derivatives. Financial market facilitates the interaction between those who need capital with those who have capital to invest (Financial Market, n.d.).

Financial mathematics primarily uses the modern mathematical methods and techniques of finance such as stocks, bonds, securities, potential investment, options and other financial instruments to include stochastic analysis, stochastic optimal control, portfolio analytical, non-linear analysis, multivariate statistical analysis, calculus, mathematical system, modern computational methods and so on (Yang, 2017). Financial analysts often use mathematics to analyze market data, find patterns in data and predict risks.

### ***Role of Mathematics in Handling Financial risk***

The following are the important role that mathematics plays in curbing financial risk:

- i. It helps companies analyze their target market and predict changes to reduce risk
- ii. It helps companies analyze their finances to prepare for and mitigate operational risk
- iii. It helps to make decisions on loans and contracts to reduce credit risk
- iv. It helps to reduce companies' liquidity risk by analyzing their budgets and predicting expenses.

2. **Infrastructural Development:** the development of modern infrastructure has become a key focus area for governments, policymakers and industry leaders across the globe. At the same time, mathematics has emerged as a fundamental tool for analyzing and modelling complex systems including infrastructural networks. The use of mathematical models and techniques has enabled engineers and planners to optimize infrastructural design and operations, improve performance and reduce cost. In particular, the study of mathematical concepts such as calculus, geometry and statistics has been instrumental in developing mathematical models that can capture the behaviour of infrastructure system and help make data-driven decisions (Ramraj, 2023).

Infrastructure spending occurs when government spends money to build or repair the physical structures and facilities needed for commerce and society as a whole to thrive. Infrastructure include roads, ports, bridges and sewer systems, these infrastructures help increases productivity by enabling businesses to operate as efficiently as possible.

### **Mathematics Education as a catalyst for National Development and Transformation**

Over the years, mathematics education has played a vital role in revealing underlying knowledge that helps explain the universe. Mathematics has become a pivotal subject that finds it applications in diverse field of science and humanity such as computing and information system, physical sciences, chemical sciences, artificial intelligence, space technology, medicine, engineering, communication, human behaviour, social system and so on. Yousef (2022) emphasizes that mathematics offers a commitment to technology and science development. Furthermore it has an important and diverse effect on human communities and strategic part in the growth of humanity as a whole.

Mathematics also has a crucial role to play in the economy and technological development of a nation, as it is the key to the solution of most human problems. Mathematics is the language of technology, as it is used to formulate, interpret and solve problems in diverse field of economics, seismology and ecology. Mathematics provides us with powerful theoretical and computational techniques to advance our understanding of the modern world and societal problems, and to develop and manage the technological industries that are the bedrock of our nation's economy. It also helps in combating against poverty, crime and security problems (Amao&Bakare, 2021).

Mathematics has always been a peculiar subject both in the role it has played in its practical application in many aspects of human activities and in the development of other areas of learning or academic subjects. The role of quality Mathematics education to the development and transformation of a nation could be seen under the following areas:

**1. Science and Technology**

Mathematics has been the back bone of several human endeavours notably science and technology, and this is the life wire of national development. It has advanced so much that what is left for man to attain is the creation of man itself. There is no doubt that technology has brought higher standard of living to people both in advanced countries and developing nations. It is the rising living standard that makes the acquisition of technical competence so attractive to those countries (New Encyclopaedia Britannica, 1981).

Today, the products of science and technology are glaring and enjoyable. The invention of satellite, the mobile phones, the high security gadgets etc are the products of science and technology. In Nigeria, science and technology have been applied in many spheres especially in the oil industry. Mathematics is an instrument for fostering scientific and technological advancement. The usefulness of mathematics to the ordinary man is its ability to develop his reasoning faculty to the extent of modifying man's pattern of reasoning. Hence, the knowledge of geometry and trigonometry are most rapid in architecture, surveying, building, modelling, sculpturing and medicine, which include major parts of national development. Internationally, the computer usage worldwide was made possible because of the knowledge of mathematics. Computer is a facilitative technology and merely allows those who are already doing something to do more of it faster and more accurately.

**2. Business and Industry**

Quantitative techniques are statistical and operations research or programming techniques, which help in the decision-making process especially concerning business and industry. They involve the use of numbers, symbols and other mathematical expressions; According to Eunice (n.d.) some of the important operations research techniques often used these days in business and industry are as follows:

- i. Linear programme
- ii. Game theory
- iii. Decision theory
- iv. Network analysis
- v. Simulation

All these techniques are not simple but involve higher mathematics. The tendency today is to combine several of these techniques and form into more sophisticated and advance programming models. All these are aspects of national development. A lot of mathematical knowledge is used in modern industries in determining which models of machine would produce greater materials at a maximum profit within minimum time.

**Conclusion**

This paper emphasized on the role of quality mathematics education in the development and transformation of a nation. Quality mathematics knowledge is essential in establishing and sustaining businesses which in turns will bring about economic growth of a nation. There is a need for a nation that desire development and transformation to make mathematics a basic requirement for the study of science and technology because of it

positive contributions to the development of mankind. Quality mathematics education is seen to inculcate faith in man's ability to make rational decision for its intrinsic value and its ability to make man reason logically and think critically. Mathematics has proven to be the basic ingredient needed to start up a successful business and to make up a robust business plan. Most youth entrepreneurship ventures include the development of business plan. Youth entrepreneurship or entrepreneurship at a young age gives opportunity to learn important skills such as teamwork, networking, problem-solving skills, critical thinking, innovations, and self-discipline. Therefore quality mathematics education in Nigeria is one of the major tools that bring about youth entrepreneurship and youth entrepreneurship brings about economic growth which brings about national development and transformation. Hence, for any nation to attain to its desired height, it needs to employ the knowledge of mathematics as it is a foundational knowledge to both science and technology which is the basic ingredient for national development.

### Recommendations

1. There should be adequate plans to ensure quality training and retaining of mathematics teachers.
2. Teachers should let students conceive and perceive the mathematical concepts, which they want to teach.
3. Students should be encouraged to focus on the applications of mathematics to real life in a manner that would develop their entrepreneurship skills.

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