

# THE ROLE OF ENGINEERS IN NATIONAL ECONOMY DEVELOPMENT.

LECTURE DELIVERED  
BY

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# Engineering in Perspective

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- The American Engineers' Council for Professional Development defines Engineering as: "The creative application of scientific principles to design or develop structures, machines, apparatus, or manufacturing processes, or works utilizing them singly or in combination; or to construct or operate the same with full cognizance of their design; or to forecast their behavior under specific operating conditions; all as respects an intended function, economics of operation and safety to life and property."
- One who practices engineering is called an engineer.
- Engineers borrow from physics and mathematics to find suitable solutions to the problem at hand.

# What do engineers do?

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**Engineers:**

**design**

**create.**

**explore.**

**innovate.**

**Engineers receive education and training in many different fields.**

**They work in many different environments.**

**Engineers do things that make the world worthy of living.**

# Major Roles of Engineers in the Society

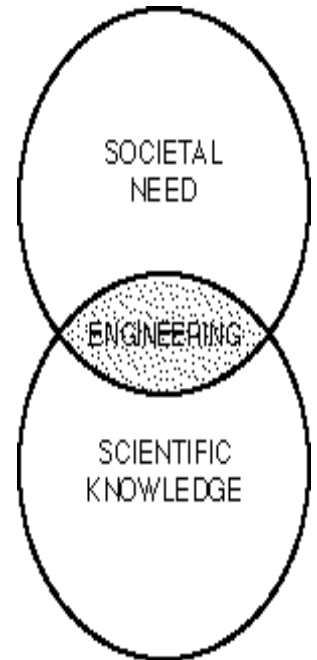
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- Technical
- Social
- Economic

# Engineering as a Bridge between Science and the Society

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Engineering bridges the gap between Society and Scientific Knowledge



# What is Economic Development?

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- Economics can be defined in many ways; following are some of the definitions.
- Economics is the human Science which studies the relationship between scarce resources and their various uses which compete for these resources.
- Economics is the study of how society decide what to produce, how to produce and whom to produce.

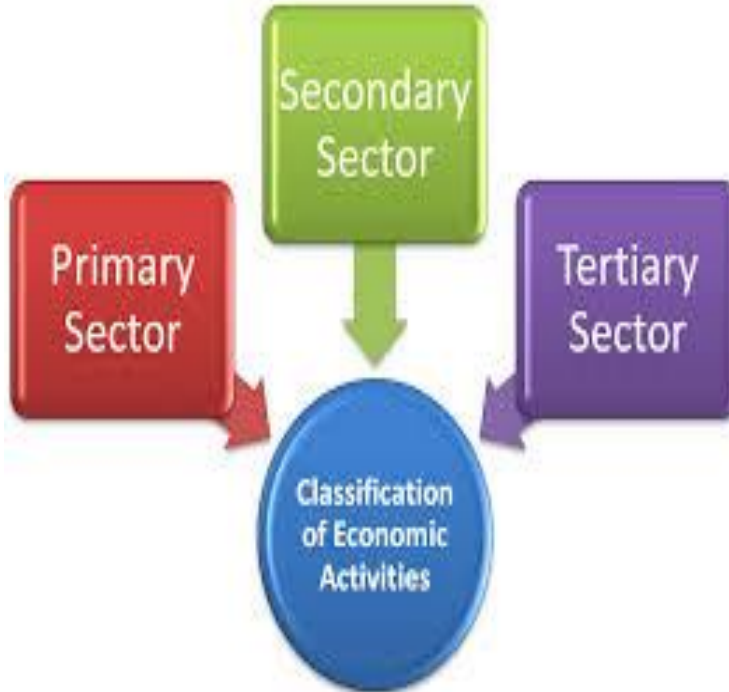
# Economic Development

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- The economic development process supposes that the legal and institutional adjustments are made to give incentives for innovation and for investments so as to develop an efficient production and distribution for goods and services.
- Economic development is a sustainable increase in living standards that implies increased per capita income, better education and health as well as environmental protection.

# Economic Activities

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# Economic Activities

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## **PRIMARY SECTOR**

- Simply speaking primary sector refers to that sector of the economy which uses natural resource to produce goods.
- Natural factors play crucial role in the production process. Agriculture and allied activities like mining, fishery, forestry, diary and poultry are included in this sector.

## **SECONDARY SECTOR**

- Secondary sector is also called as manufacturing sector or industrial sector.
- The sector which transforms one physical good into another is called secondary sector. The manufacturing, electricity, gas, water supply etc. are included in this sector.

## **TERTIARY SECTOR:**

The service sector of the economy is called tertiary sector. Services of various kinds like education, health, banking, insurance, trade and transport are included in this sector. In advanced countries, the contribution of tertiary sector to national income is the highest.

# ECONOMY DEVELOPMENT

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- Quality Education
- Clean and efficient energy
- Sophisticated infrastructure
- Improved social Amenities
- Increasing phase in GDP per capita
- Ability of self-production
- Good economic stability

# How can we get there?

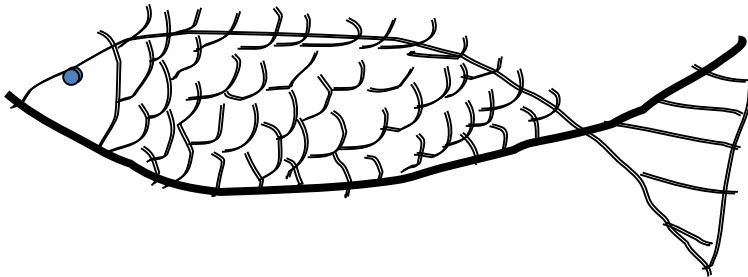
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*Previous efforts have tried to use foreign aid, investment in machines, fostering education at the primary and secondary levels, controlling population growth, and giving loans and debt relief conditional on reforms to stimulate the economic growth that would allow these countries to move toward self sufficiency*

*All of these efforts over the past few decades have failed to lead to the desired economic growth*

# How can we get there?

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Give a person a fish: you have fed him for today. Teach a person to fish: you have fed him for a lifetime.”

And: teach him how to process and package fish for export, and you have stimulated economic development.

This is the work of Engineers!!!!

## Quote

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- "Most of the major issues that face the country and the world, such as climate change, water availability and energy security, need engineers to fix them," says Philip Greenish, chief executive officer of the Royal Academy of Engineering (RAEng),

# Roles of Engineer in National Economy

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- The engineering profession makes important contributions to the economy, both from the direct addition to economic output from the work they do, and the contribution of the sectors in which they work.
- One can also consider the long run return to the economy of improvements in physical infrastructure, in which engineers have played a vital role, and the contributions engineers make to the knowledge economy and to sustainability.

# THE ROLE OF ENGINEERS IN NATIONAL ECONOMIC DEVELOPMENT

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## TECHNOLOGY AND INNOVATION

**This has played a vital role in:**

**Education**

**Production**

**Construction**

**Information and Telecommunication**

**Foreign Exchange**

**Infrastructure**

**Clean, Sustainable Energy**

# TECHNOLOGY AND INNOVATION

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## **Quality Education with modern days technology:**

**Many developed countries balance and sustain their economy with returns from their institutions and colleges**

## **Efficient Production :**

**Production of goods have been multiplied with less human effort, low cost, and improved qualities.**



# TECHNOLOGY AND INNOVATION

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## **Information Communication and Technology:**

**The rapid growth in ICT and Telecommunication has open doors of opportunities, and in turn boost the economy.**

## **Infrastructure:**

**The huge investment in Engineering in Dubai makes it a must go area for luxurious lovers.**

# TECHNOLOGY AND INNOVATION

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## Development/ Construction:

The Engineers deal with the creation, improvement, and protection of the environment, providing facilities for living, industry and transportation, including large buildings, roads, bridges, canals, railroad lines, airports, water-supply systems, dams, irrigation, harbours, docks, aqueducts, tunnels, and other engineered constructions within a given region which produces high economic values

# TECHNOLOGY AND INNOVATION

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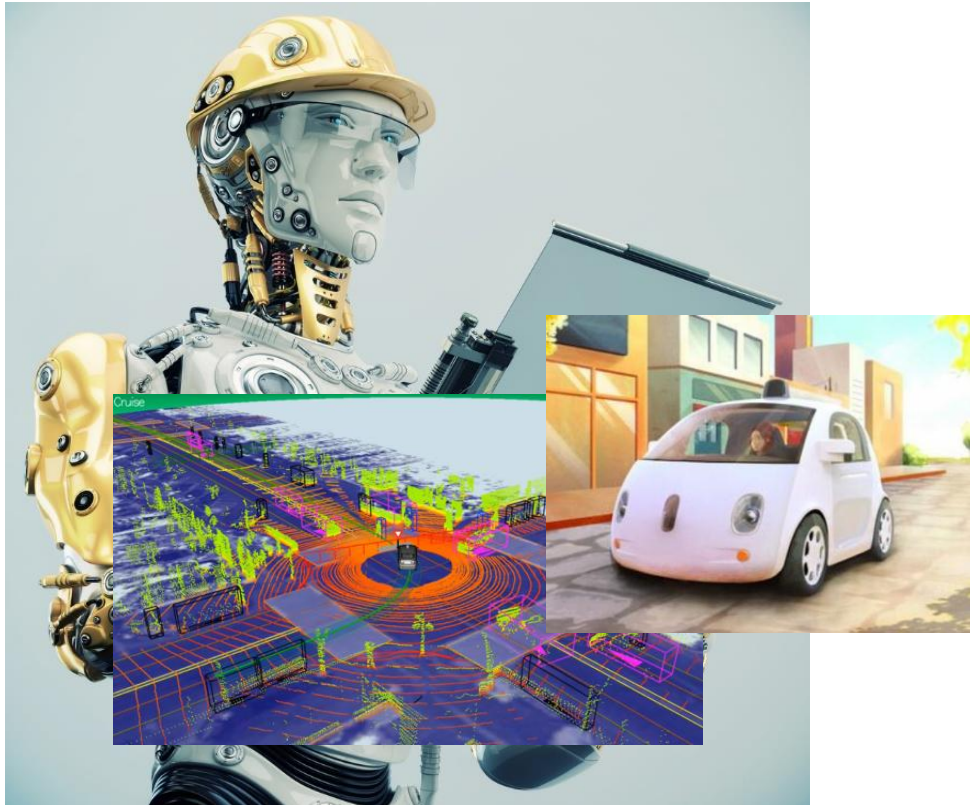
## Clean, Sustainable Energy:

**Power plays a huge role in any other developments that happen to a country.**

**Stable and sustainable power; stable and sustainable economy.**

# Robotics

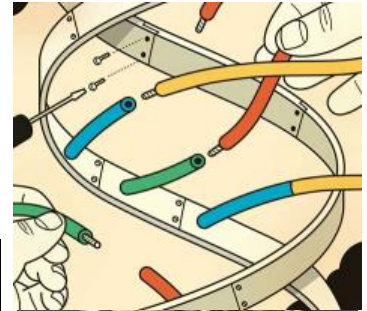
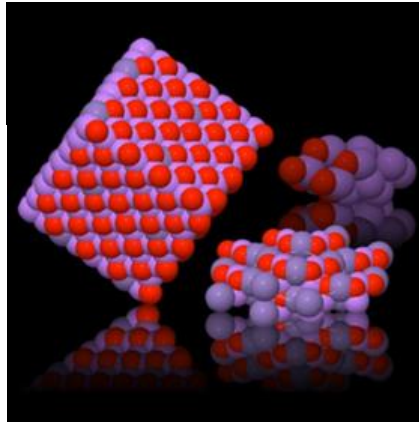
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# A lot more now and to come

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- 3D printing
- Synthetic biology
- Brain enhancements
- Nanomaterial
- Etc.





# How can we get there?

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Involvement of engineers in decision making

# Recommendations

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- Engineers need to develop broad fundamental understanding of their professional responsibilities in the society.
- Students in tertiary Institutions need to begin to see themselves more as potential engineering ambassadors and prepare for the challenges of participating in the Socioeconomic activities in the country
- Their activities on campus shouldn't be inclined on activism but on development and innovation. The era of activism to gain power is fading. We are no longer in military era
- The era of engineers being limited to the workshops and on the field is becoming outdated.
- The students have an opportunity to integrate their "professional code" into their daily work as engineering students.
- Programmes that bring professionals into the academic folds are to be more encouraged.

# Recommendations

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- Since it is difficult for every practicing engineer to participate in the development of national economy, it may be better to localize this experience for professional engineers. Every position you find yourself in the community should be used to showcase the dynamism of engineering leadership in problem solving.



# Recommendations

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- The most effective mechanism is the personal involvement of each engineer in integrating the topics of safety and the welfare of the public, professional ethics, legal considerations, environmental responsibilities, quality, and communications into the methodologies which all engineers use to approach and solve problems in the ordinary course of practice.
- This could be considered a natural extension of "Concurrent Engineering" in which the elements of design, manufacturing, and other issues are considered concurrently in engineering methodology.

# Engineering Economics

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- Engineering economics, previously known as engineering economy, is a subset of economics concerned with the use and "...application of economic principles" in the analysis of engineering decisions
- Get familiar with project management Costing, Accounting and Learn all the rudiment of economic development.
- You will need these knowledge as you advance in leadership during your career.

# Engineering Economics Contd.

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- Engineers personal Development must include leadership and preparation for participation in National politics. This is where decision makers and policy that affects National economy are made.
- The Era of Engineers sitting back as advisers and consultants is fading Prepare for the Leadership of your country

# THE ROLE OF ENGINEERS IN NATIONAL DEVELOPMENT

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## Engineers and Politics:

Involvement of Engineers in politics afford them the opportunity to be at these policy/decision making bodies. Engineers at these levels, use their professional knowledge to attract and defend important engineering infrastructural development projects. Similarly, Engineers in politics contribute to the enhancement of the welfare of other Engineers thereby motivating them to higher productivity for national economy development.

Engineering is the bedrock for development of any serious Nation. China has 15 high policy makers, 9 are Engineers. You and I know the level where China is today in terms of world power and National Economy Development.

# Presidential order 5- Engineers sneaked into the Nigerian Economy

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- The recent signing of presidential order 5 is a marked departure from old order and it is not the destination we wish but a signpost to the beginning. The roles played by the engineers in the enactment of the Presidential order 5 is so big that it will take a separate programme to track from the beginning. This is typical of how engineers' works are often not noticed but for the results.

# Presidential order 5- Engineers sneaked into the Nigerian Economy Contd.

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- Engineers must lead this new industrial economic revolution. There is some excellent leadership by professional organizations such as the institute of electrical and electronic engineers(IEEE), world engineering partnership for sustainable development (WEPED), world federation of engineering organization (WFED), Nigeria society of engineers (NSE), American society of civil engineers (ASCE), and world business council for sustainable development (WBCSD), among others to make sustainable economic development high priority in engineering and business both in practice and in the education of future engineers.

## Presidential order 5- Engineers sneaked into the Nigerian Economy Contd.

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- The engineers of the future must be much more interdisciplinary – the lines between the traditional engineering disciplines must be much more fluid. Engineers will have to join forces with biologist, chemist, meteorologist, economics, planners, political scientists, ethicists, religionists and community leaders in unprecedented ways to lead the society on a sustainable economic path.

# Conclusion

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- Every Section of Economic activity has the roles of engineering and technology. Whether it is Raw material, manufacturing or distribution.
- The Challenges facing country in Energy, Infrastructures and environment are engineering challenges.
- Engineers must play a much stronger role in the public policy process to provide the right incentives for industry and others to move on sustainable path so that engineers can be encouraged and supported to design sustainable technology for the purpose of economic development that benefits society in a holistic way now and in future
- Therefore the engineers of 21<sup>st</sup> century cannot afford to sit back.

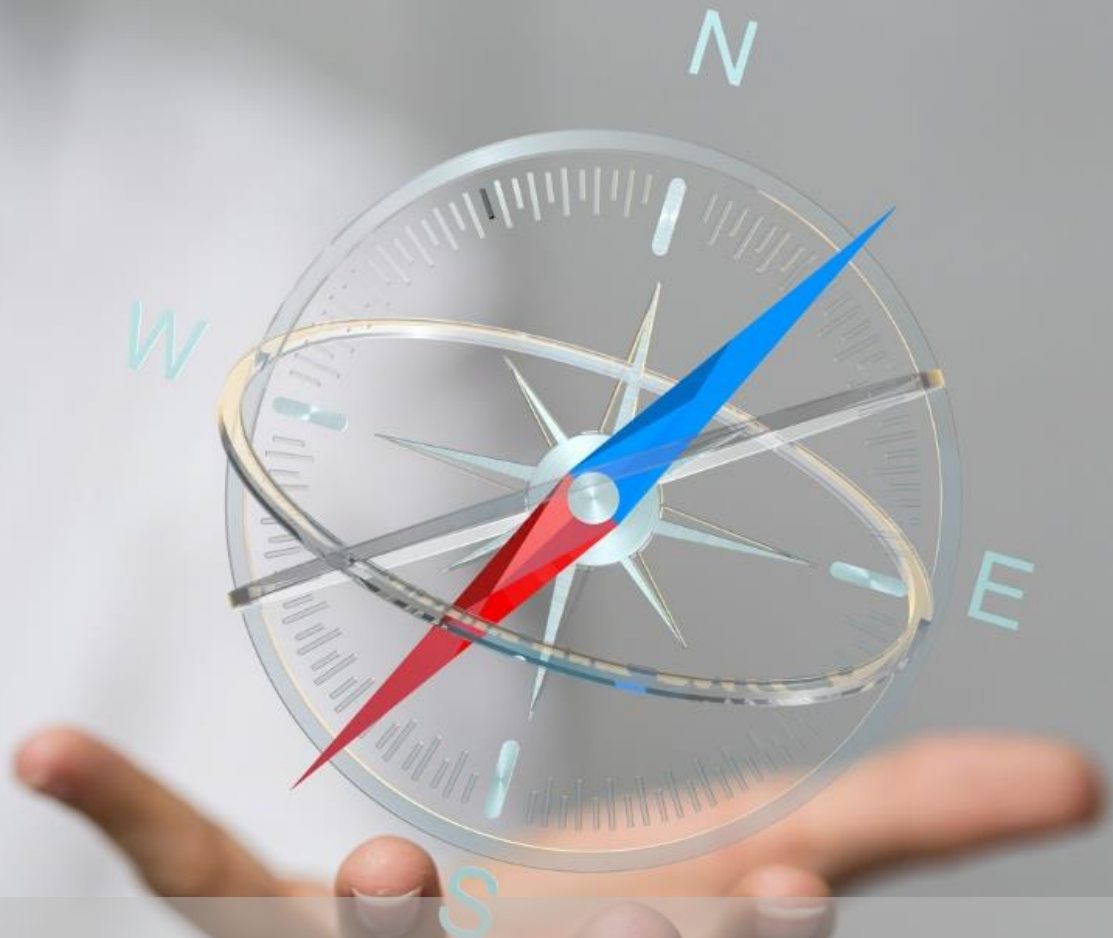


One final thought

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**No Engineers No Development**

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THANK YOU



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