



March 2018

Yesterday is history
tomorrow is a mystery
but today is a gift.
That is why it is called
PRESENT
- Master Oogway

Blaze brings.....

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BLAZE

Technical Magazine

Department of Electrical and Electronics Engineering

Message from the HOD

I am delighted to write a brief message for the technical magazine, Blaze. The technical magazine provides a suitable platform for students and faculty members of the EEE department to showcase their creative technical talent in print. This particular issue contains various write-ups such as technical and ethical articles. I congratulate and thank all the authors of this issue and in particular, the editorial board for the successful launch of this periodical. I hope this issue of Blaze will be an enlightening and intellectual treat to all the readers.

I convey my good wishes to all the readers.

- Dr. TA Raghavendiran, Professor and HOD

Message from the Faculty Advisor

It is indeed a great pleasure being the faculty advisor for the department. Garnering the memories and experience of the past, the students of EEE department have always been instrumental and innovative in every facet of their student life. They are always proactive to any constructional transformation—be it academics or extra-curricular. With no doubt I aspire that the EEE students to take this association and the magazine to an elevated horizon. Wishing you a very great and successful venture ahead.

- Gowtham Chendra, Assistant Professor

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Flexible Generators

Solid-state devices that directly convert heat to electricity without moving parts, TEGs are typically made from inorganic semiconductors. Yet polymers are attractive materials due to their flexibility and low thermal conductivity. These qualities enable clever designs for high-performance devices that can operate without active cooling, which would dramatically reduce production costs.

The researchers have developed P- and N-type semiconducting polymers with high performing ZT values (an efficiency metric for thermoelectric materials). “We’d (Yee Group, United Kingdom) like to get to ZT values of 0.5, and we’re currently around 0.1, so we’re not far off,” Yee said.

In one project funded by the Air Force Office of Scientific Research, the team has developed a radial TEG that can be wrapped around any hot water pipe to generate electricity from waste heat. Such generators could be used to power light sources or wireless sensor networks that monitor environmental or physical conditions, including temperature and air quality.

“Thermoelectrics are still limited to niche applications, but they could displace batteries in some situations,” Yee said. “And the great thing about polymers, we can literally paint or spray material that will generate electricity.”

This opens opportunities in wearable devices, including clothing or jewelry that could act as a personal thermostat and send a hot or cold pulse to your body. Granted, this can be done now with inorganic thermoelectrics, but this technology results in bulky ceramic shapes, Yee said. “Plastics and polymers would enable more comfortable, stylish options.”

Although not suitable for grid-scale application, such devices could provide significant savings, he added.

Article collected by

B Deepika Reddy, IV EEE

History of Electrical Engineering Education

The curriculum of education in electrical engineering dates back to the late nineteenth century where the first glimpse of this discipline of engineering was seen in the United States in 1880's and had its inception from the major branch of Physics. Before the World War 1, focus was largely concentrated to A.C. and D.C. equipments.

The initial stages of inception of electrical had only a handful or even lesser number of people undertaking this discipline and the presence of only a single individual with a doctorate degree in M.I.T. in the year 1925 justifies the same. The discipline exploded after the World War 2, as with war, there was formulation of new technologies like RADAR, microwaves and guided missiles. The first application of electricity was in telegraph and was developed by F.B.Morse and in 1876 Alexander Graham Bell patented the Telephone.

The first educational program in the arena of Electrical engineering was designed in 1882 in M.I.T. in United States. This field witnessed in the last quarter century an exponential bombardment of individuals and learners as electrical engineering in its own has multiple disciplines of subject based substance that relates to mainly all walks of life directly or indirectly.

- **N Latha, IV EEE**

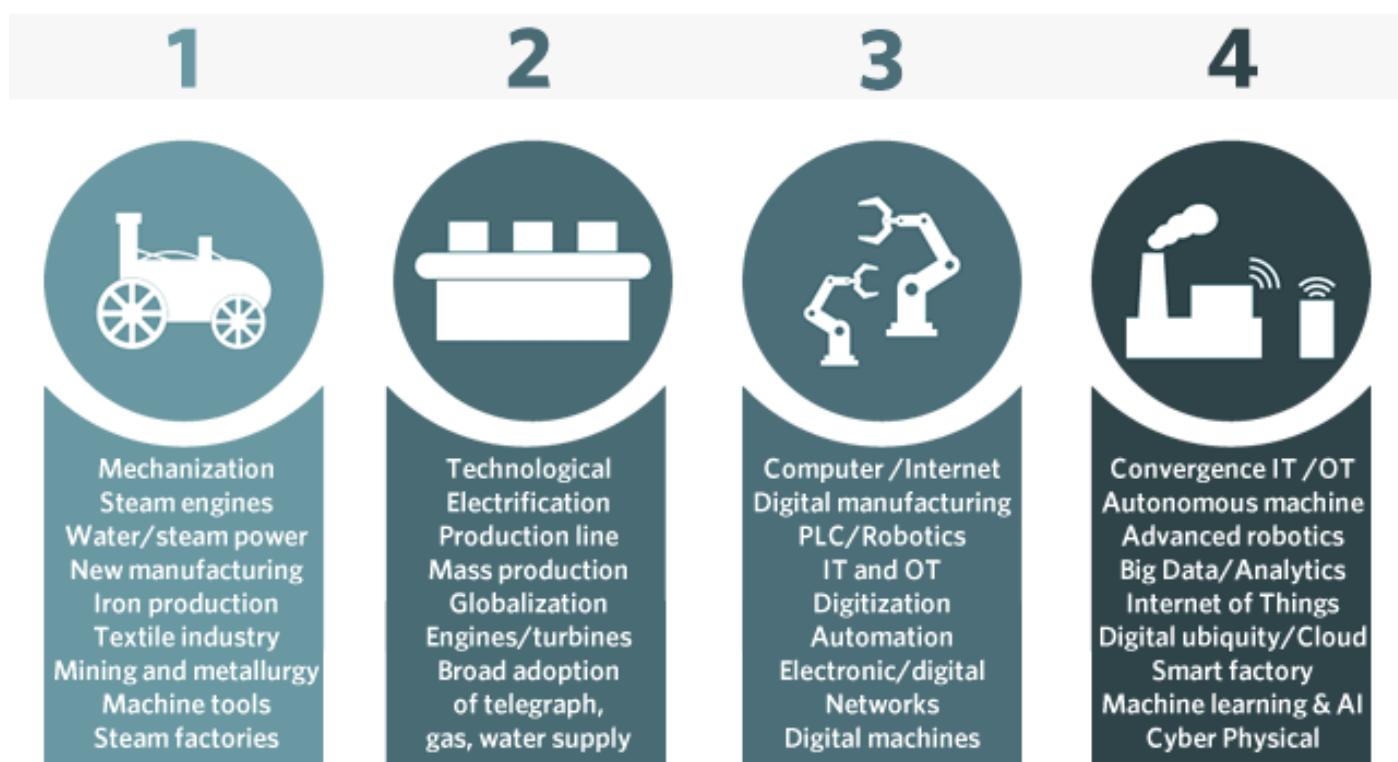
Industry 4.0 is the digital transformation of manufacturing/production and related value creation processes. Industrie 4.0 has been defined as the current trend of automation and data exchange in manufacturing technologies, including cyber-physical systems, IoT (*Internet of Things*), cloud computing and artificial intelligence in creating the smart factory. Industry 4.0 is often used interchangeably with the notion of the fourth industrial revolution.

It is characterized by, among others

- Even more automation than in the third industrial revolution
- The bridging of the physical and digital world through cyber-physical systems, enabled by the Internet of Things (*IoT*).
- A shift from a central industrial control system to one where smart products define the production steps
- Closed-loop data models and control systems and
- Personalization/customization of products.

The goal is to enable autonomous decision-making processes, monitor assets and processes in real-time, and enable equally real-time connected value creation networks through early involvement of stakeholders, and vertical and horizontal integration.

Evaluation of Industry 4.0



Industry 4.0 design principles

There are four design principles in Industry 4.0. These principles support companies in identifying and implementing Industry 4.0 scenarios.

- 1) **Interconnection:** The ability of machines, devices, sensors, and people to connect and communicate with each other via the Internet of Things (IoT) or the Internet of People (IoP).
- 2) **Information transparency:** The transparency afforded by Industry 4.0 technology provides operators with vast amounts of useful information needed to make appropriate decisions. Inter-connectivity allows operators to collect immense amounts of data and information from all points in the manufacturing process, thus aiding functionality and identifying key areas that can benefit from innovation and improvement.
- 3) **Technical assistance:** First, the ability of assistance systems to support humans by aggregating and visualizing information comprehensively for making informed decisions and solving urgent problems on short notice. Second, the ability of cyber physical systems to physically support humans by conducting a range of tasks that are unpleasant, too exhausting, or unsafe for their human co-workers.
- 4) **Decentralized decisions:** The ability of cyber physical systems to make decisions on their own and to perform their tasks as autonomously as possible. Only in the case of exceptions, interferences, or conflicting goals, are tasks delegated to a higher level.

Industry 4.0 envisions environmentally-sustainable manufacturing by having green manufacturing processes, green supply chain management, and green products.

The technologies can be summarized into four major components, defining the term “Industry 4.0” or “smart factory”: Cyber-physical systems, IoT, Cloud computing and Cognitive computing.



Internet of Things:

It is the combination of operation of various components such as actuators, physical devices with the help of network connectivity. It aims to integrate the devices under operation in various fields with the addition of embedded software or electronic sensors. This technology allows objects to be sensed remotely with the backbone of an existing network, thereby recording, analyzing, estimating and storing data efficiently and accurately without human intervention. Internet of Things is an emerging field of technology and has an open platform for Electrical engineering. In the discipline of electrical , several motors, generators, transformers can be networked together for absolute perfection in operation.

Next Generation Robotics:

A robot apart from its physical balancing, falls into mainly the discipline of Electrical engineering as on the whole it is a complete circuitry based system . Advancements in robotics tend towards making the collaboration of human-machine everyday working a reality. Using better sensors and accurate control mechanisms help in designing more flexible structures that can work under real time situations. The emerging technologies employ GPS based robots and intend to make them work in areas where human working is hazardous . Some examples include robots being used as pest controllers, furnace maintenance works and nursing.

Space Based Solar Power:

An emerging aspect of electrical discipline is renewable energy and its extraction by sufficient methods from the sources. The Space Based Solar Power technology differs from the conventional form of solar energy tapping in terms of the fact that this method of collecting energy from the sun is limited to the outer earth spaces only. It proposes to set up solar panels in the satellites revolving around the Earth. This form of energy tapping includes benefits of more power absorption and lesser losses. The tapped energy is then converted to microwaves and then focused towards the earth to be collected by means of a receiver, which in turn would convert it into electrical energy.

Smart Grids:

This type of technology is based on the intentions to completely automate the present power grids. Grids include, substations, transmission, generation and many more classes of complex systems that combined together result in power to be received and consumed by consumers. Automating the systems would mean tracking of information and data completely on a digital platform without the intervention of humans. This would lead to accuracy, efficiency and reduction in the frequency of hazardous exposure of employees working on high voltages and faults. Smart grids would enable a direct two way communication between the electrical department and the devices by using sensors such as fault sensors, distance locating sensors and parameter sensors.

Sense and Avoid Drones:

This form of technology is concerned with developing intelligent drones in ways that they can sense and detect any obstacle and avoid it . The drones are intended to be unmanned and capable of flying at different heights and levels. They can be used for surveillance and filming. The key feature of these types of drones is their complete autonomy and sensing power.

- Mrs. M Jyothsna Devi, Assistant Professor, Dept. of EEE

An unsung hero of India - Verghese Kurien

Post independence, India was suffering from a serious problem- shortage of milk and milk products. This may come as a shock to the citizens of one of the biggest agricultural-based countries in the world, but sadly it was true. Enter Verghese Kurien, the man who took India from a milk deficient nation to the largest milk producer in the world surpassing the United States in 1998. He is best known as the “Father of the White Revolution”.

Verghese Kurien was born on 26 November 1921 at Calicut (Kozhikode) into a Syrian Christian family. His father was a civil surgeon in Cochin. He graduated in Physics from Loyola College, Madras in 1940 and then obtained his Bachelors in Mechanical Engineering from College of Engineering, Guindy. Subsequently he joined the Tata Steel Technical Institute, Jamshedpur from where he graduated in 1946. He completed his formal education at Michigan State University- a masters in Mechanical Engineering on a Government of India scholarship in 1948.

After completion of his master's degree when he returned to India, he was deputed to Government of India's experimental creamery at Anand, Gujarat and half-heartedly worked there. While he was working there, all he was focused on was the quick completion of his bond period so that he could quit.

He had already made up his mind to quit midway but was persuaded to stay back by Tribhuva Patel. Now, this was the man behind the revolutionary and pioneering concept of bringing together Kheda's (the district in which Anand was located) farmers as a co-operative union for processing and selling their milk.

Inspired by Mr. Patel's efforts Kurien dedicated himself to the mammoth task (codenamed Operation Flood) before him. His hard work paid off when Prime Minister Lal Bahadur Shastri embraced him for his selfless work. Mr. H. M Dalaya was a friend of Mr. Kurien and he invented the process of making skim and condensed milk from buffalo milk, as cow milk was not abundant. This technology paved the way for Amul to successfully compete against Nestle. Upon its huge success Prime Minister Lal Bahadur Shastri created the National Dairy Development Board (NDDB) who wanted to replicate this model nationwide. Mr. Kurien was named Chairman of the Board for his dynamic leadership skills.



The ground ‘breaking billion liter idea’ (Operation Flood) was the world’s largest agricultural development programme. It was a project undertaken by NDDB which made India a self sufficient nation in milk production. It doubled the milk available for a person and India’s share accounted for 17% in the global milk production arena. It was a rural employment generator. This was simply achieved by “production by the masses and not by mass production”.

The Amul Dairy Experiment was followed in other districts of Gujarat as well, when Kurien set them all up under GCMMF in 1973 to sell the combined produce under a single brand name “AMUL”. Today Amul sells not only in India but also overseas. He was felicitated with 12 honorary degrees from universities across the world. He was also the recipient of several prestigious prizes including the Ramon Magsaysay award who he shared with Tribhuvas Patel, the Padma Bhushan, the Padma Shri, the World Food Prize and the Padma Vibhushan etc. to name few.

Now, this was a man who had dedicated himself to vastly improving the nation’s dairy production thereby providing employment to millions of people and making India self sufficient. India is now one of the major exporters of dairy products in the world. He will continue to remain immortal in our hearts for he was a person who believed in this nation’s capabilities when no one ever dared to do so.

- Mr. G Hanumantha Reddy, Assistant Professor, Dept. of EEE

Article-Student

India at a Glance

As a part of community program, I got to have a small discussion with my friends about “Contemporary India” and while discussing I noticed a strong sense of negativity and hatred prevails in the minds of Indian Youth. I remember Vivekananda’s words “If there is any land on this earth that can lay claim to be the Blessed Punya Bhoomi,... the land where humanity has attained its highest towards gentleness, towards generosity, towards purity, towards calmness, above all, the land of introspection and of spirituality – it is INDIA”. But what has happened now? I can blame the previous generations – the generations after the freedom and before us for not imparting how India was – its past glory with which if we were taught there would have been less choice for the hatred against the country. During freedom, possibly each and every family stood united to put an end to slavery. But years following freedom, we Indians started concentrating on our families more than on the country which has resulted in the carefree attitude on the society. Since ancient times when men started to settle on the banks of river, he had cultivated his own food – and so culture started to grow slowly. And today India stands at the top of the world in terms of culture and agriculture.

A foreigner once asked Patel, the Iron man of India, what is your culture and he proudly replied, “Agriculture is our culture”. India had approximately 36,000 (healthy) rice varieties alone. But today what happened to or what is happening to both culture and agriculture. Are they really developing? The answer is a harsh ‘No’ which may be bitter but it is a hard hitting reality. India once the topmost producer in the agriculture industry now imports the products. And the life of peasants has gone to the worst.

An alarming report says that total of 2000 farmers are leaving agriculture every day and if this alarm does not wake us up now, agriculture will go into indefinite slumber. Somebody can say “So what we can eat the imported burgers and sandwiches for food. Adopting western things has never been a difficult task for Indians, right.

What is a culture? Simply saying it is the compilation of life practices articulated by a group of people living at a particular place with the knowledge of their experiences. Every community has its own culture and practices and we cannot say one is above the other. Every culture has its own ups and downs. A culture should be flexible enough in such a way that it can give up a certain thing and follow that certain thing from other culture if and if it is logical. So what makes Indian culture reach greater heights among the other cultures? Of course its culture formed by the myriad of cultures. We have different culture, different language even different eating practices but we are united under one thing – that is India.

Then what comes as the threat to culture? We used to grow as a group, family were a joint family festivals (sorry if you read it as party) where meant to be a place for healthy social gatherings, food was healthy and medicinal, we learned the life values rather than to mug up science and technology. Today the concept of nuclear family has come into existence.

We are proud to say, “I don’t know who lives by my next door”, “I can rather spend my time social networking site than in a social gathering”. It’s the saving culture of India that helped her to manage the recent economic crisis with minimal loss where the so called developed nations were devastated. It is because of our mothers who have the habit of saving money. The plight of women security with number of rape cases increasing is still a major threat. Our culture is like ‘we give to the society and we take from the society but the trend now is changing as we will never give to the society but we will exploit it’. We already lost the value of our valuable regional identities and traditions to westernization.

I will never say that our culture is only the best but it has got some good element which makes it the one to be proud of. With the present day context I suggest another backbone of India – its Youth – who are the only pragmatic solution for the threats. Every third Indian is a youth in the age range of 15 – 34. By 2020, India is all set to become the youngest nation in the world with the average age of 29. A country develops when it has the energy and urge to develop which are the qualities of youth. If India has to prosper, its youth should be given a clear picture and awareness of what India is and what she wants right now. India is the largest democracy in the world and the recent elections showed the miserable voters turn out in the urban ‘well educated’ areas.

Democracy gets satisfied only when it includes the two way participation and that is what missing in India. The mentality is “I’ve voted and the elected person will keep things in order and I no need to have eye on the government. Let me concentrate only on my needs” and that’s where democracy starts to fail. The conclusion is India’s future rest with its dynamic youth and if they were guided in an unerring way, India will be the better place to live in.

Jai Hind!

- A Kavya, IV EEE

Maybe you have heard of the Smart Grid on the news or from your energy provider. But not everyone knows what the grid is, let alone the Smart Grid. "The grid," refers to the electric grid, a network of transmission lines, substations, transformers and more that deliver electricity from the power plant to your home or business. It's what you plug into when you flip on your light switch or power up your computer. Our current electric grid was built in the 1890s and improved upon as technology advanced through each decade. Today, it consists of more than 9,200 electric generating units with more than 1 million megawatts of generating capacity connected to more than 300,000 miles of transmission lines. Although the electric grid is considered an engineering marvel, we are stretching its patchwork nature to its capacity. To move forward, we need a new kind of electric grid, one that is built from the bottom up to handle the groundswell of digital and computerized equipment and technology dependent on it—and one that can automate and manage the increasing complexity and needs of electricity in the 21st Century.

What Makes a Grid “Smart?”

In short, the digital technology that allows for two-way communication between the utility and its customers, and the sensing along the transmission lines is what makes the grid smart. Like the Internet, the Smart Grid will consist of controls, computers, automation, and new technologies and equipment working together, but in this case, these technologies will work with the electrical grid to respond digitally to our quickly changing electric demand.

What does a Smart Grid do?

The Smart Grid represents an unprecedented opportunity to move the energy industry into a new era of reliability, availability, and efficiency that will contribute to our economic and environmental health. During the transition period, it will be critical to carry out testing, technology improvements, consumer education, development of standards and regulations, and information sharing between projects to ensure that the benefits we envision from the Smart Grid become a reality. The benefits associated with the Smart Grid include:

- More efficient transmission of electricity
- Quicker restoration of electricity after power disturbances
- Reduced operations and management costs for utilities, and ultimately lower power costs for consumers
- Reduced peak demand, which will also help lower electricity rates
- Increased integration of large-scale renewable energy systems
- Better integration of customer-owner power generation systems, including renewable energy systems
- Improved security

Today, an electricity disruption such as a blackout can have a domino effect—a series of failures that can affect banking, communications, traffic, and security. This is a particular threat in the winter, when homeowners can be left without heat. A smarter grid will add resiliency to our electric power System and make it better prepared to address emergencies such as severe storms, earthquakes, large solar flares, and terrorist attacks. Because of its two-way interactive capacity, the Smart Grid will allow for automatic rerouting when equipment fails or outages occur.

This will minimize outages and minimize the effects when they do happen. When a power outage occurs, Smart Grid technologies will detect and isolate the outages, containing them before they become large-scale blackouts. The new technologies will also help ensure that electricity recovery resumes quickly and strategically after an emergency—routing electricity to emergency services first, for example.

In addition, the Smart Grid will take greater advantage of customer-owned power generators to produce power when it is not available from utilities. By combining these "distributed generation" resources, a community could keep its health center, police department, traffic lights, phone System, and grocery store operating during emergencies. In addition, the Smart Grid is a way to address an aging energy infrastructure that needs to be upgraded or replaced. It's a way to address energy efficiency, to bring increased awareness to consumers about the connection between electricity use and the environment. And it's a way to bring increased national security to our energy System—drawing on greater amounts of home-grown electricity that is more resistant to natural disasters and attack.

Giving Consumers Control

The Smart Grid is not just about utilities and technologies; it is about giving you the information and tools you need to make choices about your energy use. If you already manage activities such as personal banking from your home computer, imagine managing your electricity in a similar way. A smarter grid will enable an unprecedented level of consumer participation. For example, you will no longer have to wait for your monthly statement to know how much electricity you use. With a smarter grid, you can have a clear and timely picture of it. "Smart meters," and other mechanisms, will allow you to see how much electricity you use, when you use it, and its cost. Combined with real-time pricing, this will allow you to save money by using less power when electricity is most expensive. While the potential benefits of the Smart Grid are usually discussed in terms of economics, national security, and renewable energy goals, the Smart Grid has the potential to help you save money by helping you to manage your electricity use and choose the best times to purchase electricity. And you can save even more by generating your own power.

Building and Testing the Smart Grid

The Smart Grid will consist of millions of pieces and parts—controls, computers, power lines, and new technologies and equipment. It will take some time for all the technologies to be perfected, equipment installed, and systems tested before it comes fully on line. And it won't happen all at once—the Smart Grid is evolving, piece by piece, over the next decade or so. Once mature, the Smart Grid will likely bring the same kind of transformation that the Internet has already brought to the way we live, work, play, and learn.

- Manonmani S, III EEE

Article-Student

The personality: Malala Yousafzai

Malala Yousafzai received the 2014 World's Children's Prize for her courageous and dangerous fight for girls' right to education.

Later in 2014, Malala was also awarded the Nobel Peace Prize. She won the Nobel Prize together with another WCP Laureate, Kailash Satyarthi, who was honored by the WCP in 2015.



The Challenge

In many parts of the world, girls are subjected to brutal violence and cannot live freely. Over 130 million girls are not allowed the education they have a right to today; 5 million of them live in Pakistan. Their rights have been taken away from them due to poverty, war and discrimination.

The Work

Malala began speaking openly about girls' rights at the age of 11 when the Taliban prohibited girls from attending school in the Swat Valley in Pakistan. As a 15-year-old, she was shot in the head on her way home from school. The Taliban thought they could silence Malala by killing her. Instead, her voice became even stronger. She and her organization Malala Fund now support local activists in Syria, Nigeria, Pakistan and other parts of the world where girls are severely affected by injustice and violence. Malala demands that the world's leaders keep their promises to vulnerable girls, and also makes sure they get to tell their stories and demand their rights themselves.

Results & Vision

Malala has created a global movement for girls' right to education and a good life. Together with them, she continues to fight to ensure that every girl receives 12 years of free education in a safe environment, and where girls lead others in their efforts for a better world.

Malala Contributes Towards Fulfilling the Global Goals, Including

Goal 4 : Quality education, in particular, girls' right to go to school.

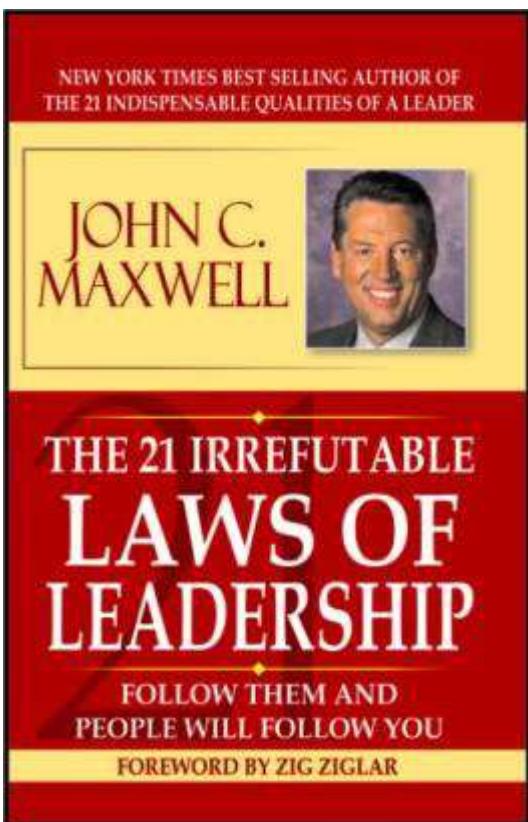
Goal 5 : Gender equality.

Goal 10: Reduced inequalities.

Goal 11: Sustainable communities.

- Reddicherla Aswini, IV EEE

Book Intro: The 21 Irrefutable Laws of Leadership



The 21 Irrefutable Laws of Leadership

Author: John C. Maxwell

What would happen if a top expert with more than 40 years of leadership experience were willing to distill everything he had learned about leadership into a handful of life-changing principles just for you? It would change your life.

John C. Maxwell has done exactly that in *The 21 Irrefutable Laws of Leadership*. He has combined insights learned from his thirty-plus years of leadership successes and mistakes with observations from the worlds of business, politics, sports, religion, and military conflict. The result is a revealing study of leadership delivered as only a communicator like Maxwell can.