Social Innovation in Industry 4.0

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Lecture 29

Digital Innovation (Part 1 of 2)

Welcome to the next lecture on Digital Innovation. Digital innovation is one of the prime movers in social innovation. There are lot of start-up companies across the globe are working under Digital Innovation and their prime focus is towards society. Government of India has a special drive in promoting Digital Innovation for rural or societal problems. Students were asking about the four logos, why are they present in all the slides. IIT Kanpur has an ecosystem wherein which, we promote social innovators and innovation.

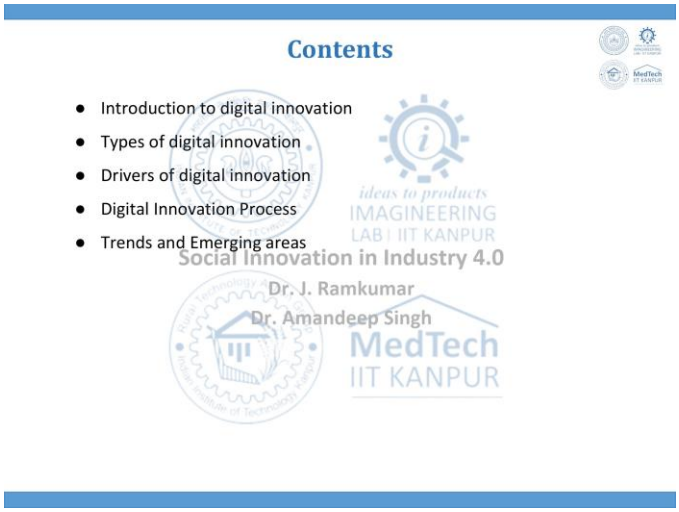
So, for promoting the social innovation, we have established a lab which is called as Imagineering lab. Imagineering lab name is coined from two words imagine plus engineering. We are trying to take the ideas, which are in the imaginary form, convert them into a workable form by using latest engineering technologies. For example, if there is a student, faculty member within our institute or across the country, are interested in developing a very feeble idea which they feel yes, it can be tried, I see a merit in it.

We call those ideas, help them in converting their loose ideas by drawing a virtual prototype or trying to do a wire frame model, convert their idea into a doable form, then start working on it such that, they can take it to the market. Under this lab, we have two other labs, which is RUTAG, IIT Kanpur and MEDTECH, IIT Kanpur. RUTAG stands for Rural Technology Action Group, which is an initiative taken by Prime Minister's Office Government of India. So. here we work especially with NGO's wherein which, these NGO's work with group of people like artisans, agriculturists and other people who are facing some technical problems or who are facing a problem in their livelihood.

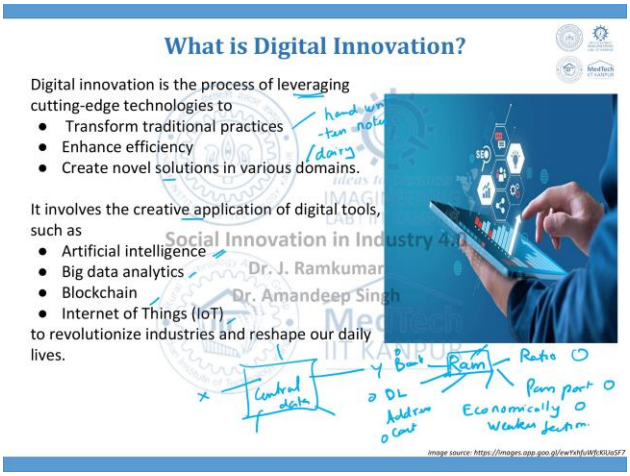
These NGO's identify the problems, come back to us and present these problem statements. We work with the young India people who are with ITI, people diploma, engineer, masters, MBA, we work with them in converting the idea into a solution and once we work in developing the solution, IIT Kanpur ecosystem has also a seed money giving policy. So, then we identify some of the best ideas, give them a seed money in converting their idea product into a market worthy product, here in which it is more focused towards rural technology only. We do an intervention such that, the rural community people can have a better livelihood. The next one is MEDTECH Innovation Centre.

So, here we try to work again with doctors, pharmacists, paramedics and patients in developing non-invasive and diagnostic devices, which can help in enhancing the livelihood of people. So, in this we have a well established platform wherein which, different stakeholders come to our campus and we also work with them in developing solutions.

The IPR policy is very well laid, the prototyping policies are very well laid. We also have an ISO facility such that, the product whatever is developed in the MEDTECH facility can be taken to the next level of animal trials or human trials with the approval of ITI committee clearance.



In this lecture, we will try to cover introduction to Digital Innovation, type of Digital Innovation, drivers of Digital Innovation, Digital Innovation processes and finally, trends and emerging area.



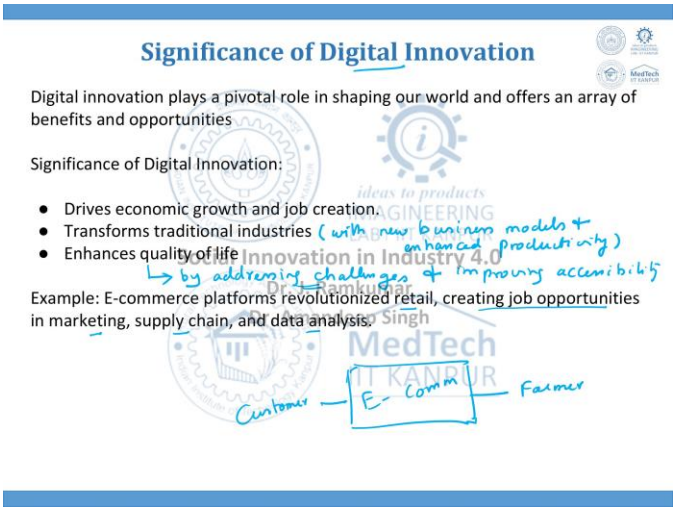
What is Digital Innovation? Digital innovation is the process of leveraging cutting edge technologies to transform traditional practice. Traditional practice may be hand written notes or diary. So, this is a traditional way of doing, it is you have a staring machine wherein which, the staring machine is manually done and you have to have a control over the time etcetera. So this is a Traditional Practice. So, now by the Digital Innovation, we can try to automate the process, we can try to convert all the hand written into digital written such that, it occupies minimum space, there is a consistency, reliability, repeatability of the data.

So, transform traditional practices, enhance efficiency. Suppose, you have a central data and this central data is been given access to so many people, now the data from X to Y need not go one to one, it can go through the central data. So, the efficiency of the process enhances. It also tries to create novel solutions in various domains. For example, there are archived audio cassettes or audio source wherein which, the good practices of traditional India are recorded.

Today, if you wanted to use them by a search engine, so then it is a challenge. So, today lot of digital technologies and start up companies come forward and try to put a keyword in the audio fashion and try to run it through several audio cassettes and then, try to pull out those things which are relevant. So, novel solutions in various domains can be easily made. The other thing is let us try to have for an individual say Ram, there is a ration card, there is a passport, there is a economically weaker section card, then I have an address proof card, I have a driving license, I have so many other bank, so I have so many details. All these details are never shrunk or never attached to a person Ram who has a unique ID.

Today, by using the digital technology, all these cards are rationalized and it is attached to a single ID which can be used by any of these departments and by the individual, which can be loaded in a smart phone. And, in a smart phone also, every time it tries to generate a dynamic QR code, which will be verified by this person as and when it is required. So, now the hard copy of the card is reduced to a digital copy. So, novel solutions in various domains can be created. It involves the creative applications of digital tools such as Artificial Intelligence.

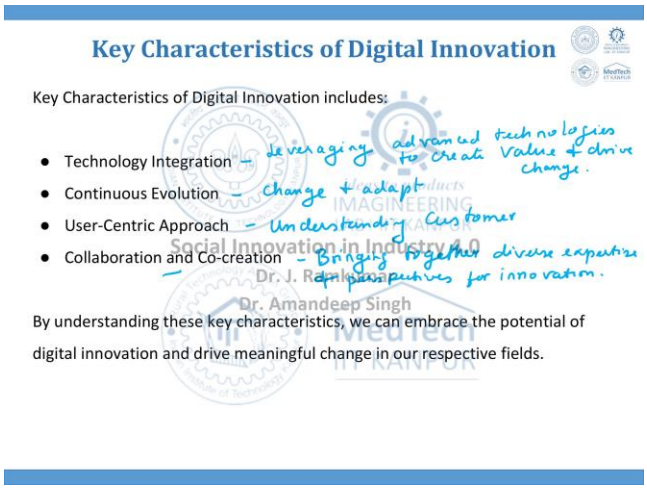
So, Artificial Intelligence only is used to check, scan, extract the data and bring it to the customers in a click of a button. So, Artificial Intelligence, Big Data Analytics, Blockchain and Internet of Things are some of the creative applications, which are used in the digital tool. This is used to revolutionize the industry and reshape our daily lives.



Digital innovation plays a pivotal role in shaping our world and offer an array of benefits and opportunities. The significance of Digital Innovation can be drives economic growth and job creation.

Next is transform traditional industry. So, here with new business model and enhanced productivity, then it is enhanced quality of life by addressing challenges and improving accessibility. Quality of life is addressing challenge. Say for example, you can try to write a social problem in a portal and then, that can be quickly taken to the next level of administrators to intervene and look for solutions. E-commerce platform revolutionized retail creating job opportunities in market, supply chain and data analytics.

This platform, which is e-commerce, connected various stakeholders that is a customer with a farmer. So this is a revolution which has been happened because of Digital Innovation.

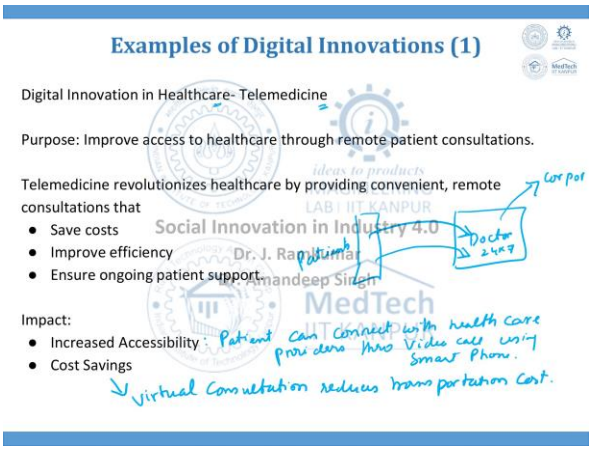


What are the key characteristics of Digital Innovation? They include technology integration, continuous evolution, user-centric approach and collaboration and co-creation. So, under technological intervention, it tries to leverage advanced technologies to create value and drive change, technological integration. Continuous evolution is change and adapt is a buzzword which is always used.

So, user-centric approaches understand the customers and try to customize the technology which can help the user. Today, there are several technologies, which has come, where the user has to only pronounce or through audio input try to retrieve and get more and more details. For example, if there is a illiterate, who wanted to understand what is available in the ration shop today or what are the government policies available today or what is the stock market or what is the price of onion which is sold in the market A, market B, market C and market D.

All he has to pronounce is, he has to say onion sale at market A today date. If he says then, immediately, it will try to pull out and say, what can be the pricing with which he can try to see or it can also help in identifying whether to go to market A or market B or market C.

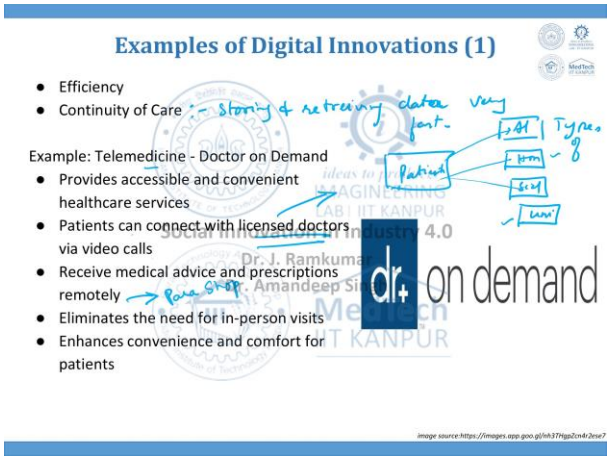
So, then the digital technology helps in doing so. So, understand the customers and try to change the technology to meet the requirements. Collaboration and the co-creation is bringing together diverse expertise and perspectives for innovation, that is collaboration and co-creation. By understanding all these key characteristics, we can embrace the potential of Digital Innovation and drive meaningful change in our respective fields.



Digital innovation in healthcare telemedicine, the purpose is to improve access to healthcare through remote patient consultation.

So, telemedicine revolutionized healthcare by providing convenient remote consultation that saves cost, improve efficiency and ensure ongoing patient support. The impact is, it

increased accessibility such that, the patient can connect with healthcare providers through video call using smart phones. Next is, cost saving it is virtual consultation reduces transportation cost. And, there are schemes wherein which, the doctors are 24 X 7 available and the patients can call the doctor anytime for a basic medicine they can contact. And, if there is emergency, immediately, these doctors will intervene and refer them to a corporate hospital.

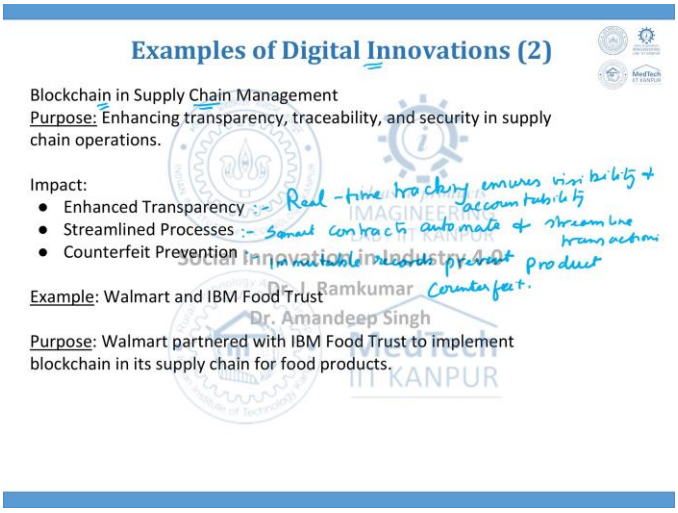


So, the Efficiency and Continuity of care also can be done. Social healthcare helps in storing and retrieving data very fast and it stores unique data continuity of care. For example, many a times, we take a medicine, we do not know the medicine name or we do not keep a track of the medicine name, which can later have a side effect in your career or your life. So, examples of telemedicine doctor on demand is a scheme which is used. So, it provides accessibility and convenient healthcare services.

Patients can connect with a licensed doctor via video call. This is very important. Today, there are lot of spurious doctors or quacks in the market. So, you do not know whether you are getting yourself treated by a licensed doctor. So, doctor on demand looks for a licensed doctor and it connects through a video call receive medical advice and prescription remotely.

This in turn will be connected to a pharma shop. They eliminate the need of in person visit and enhance convenience and comfort for patients. So, these are some of the examples of telemedicine, which is part of social innovation which is happening and there are lot of start ups which are coming up in this area. So, the other thing is, there are patients and there are different types of medication for example, allopathy, homeopathy, siddha, unani. So, now, all these different varieties or types of medicines are available today or the practices are available today.

So, here when the patient tries to contact, we always try get connected with an allopathy guy. So, now, what will happen is, if there are certain diseases and in these diseases, there can be a best care by unani and homeopathy, then the patient will try to report whatever is the symptoms he has, then an AI will try to figure out what can be the root cause and then, it will try to forward to the best practice where in which, he or she can get a quicker cure. Otherwise, it was patient always trying to connect with an allopathy doctor and then, they try to have medicines only in that domain. So, here AI is used in telemedicine in a big way.

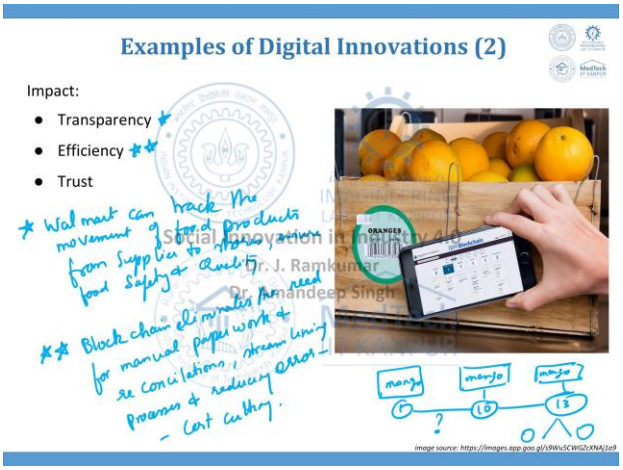


Next one is Blockchain in Supply Chain Management. It enhances transparency, traceability, security in supply chain operation. At any given point of time, if you are able to locate and see where exactly what is.

So, then accordingly, you will try to plan your resources and you will also try to plan your storage. So, Supply Chain Management is very important today. Blockchain in Supply Chain Management is the other big digital innovation which happens today.

The impacts it enhance is transparency. So, you will try to have real time tracking which ensures visibility and accountability. Next is Streamlined Processes. Streamlined processes are smart, contracts, automate and streamline transactions can happen when the process are streamlined this is smart.

Next is Counterfeit Prevention. So, it immutable records prevent product counterfeit. So, this is the other thing which is coming up. So, the impact is Enhanced transparency, Streamlined Process and Counterfeits Prevention. See, Walmart and IBM food trust, they are examples of using Blockchain in Supply Chain Management. The purpose is Walmart partners with IBM food trust to implement blockchain in its supply chain for food products.



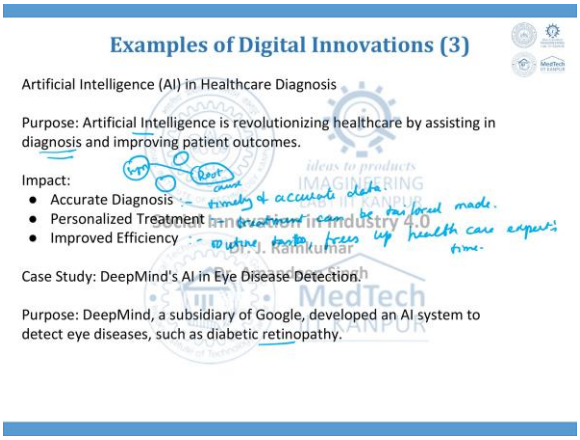
So, if you look at it, this is the example for two. So, IBM blockchain is there. So, you try to look at a mango. So, this mango, one moment you see at the mango, you can try to looking at the mango color, you can try to say, whether it is ripened, not ripened and looking from the smell whatever it comes, you can try to say, how sweet it can be and all those data's are digitally stored and you can see, this entire crate is given with a QR code. Moment, you scan the QR code, you try to get the history where did this mango come from? When was it packed? And where is it moving? All those details you will try to get.

The impact is transparency. So, transparency is Walmart can track the movement of food products from supplier to source and ensure food safety and quality. For example, I pluck a mango today and then, I transport the mango after 10 days. Now, then let the mango go to Walmart on the 13th day. Now, the question comes is, why did it take 10 days for the mangoes to be shipped? So, that means, to say in between here, they would have done something or they also know that the fruit which is plucked on the first day and the 13th date is going to come. So, here, Walmart has to sort out two things saying that, fresh and quickly going to the perishable separately.

So, all these details can be taken using digital innovation. So, where in which, you have developed a digital platform plus a hardware to assess everything. So, the next one is Efficiency. Efficiency is blockchain eliminates eliminates the need for manual paperwork and reconciliations streamlining process and reducing error, which leads to cost cutting. So, this is the blockchain, eliminates all these things.

The trust factor is, the customer gains confident about the product whatever is sold in Walmart. So, these are the advantages which happens because of digital innovation under social innovation segment. So, Walmart partnered with IBM food trust to develop all these things as that the farmer gets the best gain in the deal and the customer also tries

to know, from which farmer he has got these fruits and how has this pricing, whatever he has given has influenced his family livelihood.



The third example is using Artificial Intelligence in healthcare diagnosis. Artificial Intelligence is revolutionizing healthcare by assisting in diagnosing and improving patient outcome diagnosis.

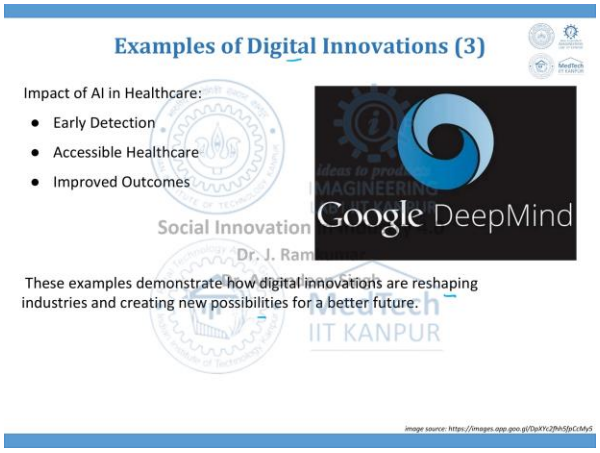
Diagnosis is very important by looking at the symptoms. Identifying the root cause is not so easy. The symptoms can be plenty many. So, from these symptoms, using your wisdom in identifying what is missing and connecting it with the root cause is done today by AI. By taking a snapshot of your eye, we can try to talk about the blood sugar level.

Trying to take your tear from the eye and talking about the blood sugar level. Trying to clean your ear with a small device, which again tries to look at the dirt inside the ear and then, AI tries to change the pressure of sucking so that, you clean your ears through a vacuum sucker. So, all these places, they start using AI as their advantage. AI gives an accurate diagnosis.

So, it provides timely and accurate data. It tries to do treatment personalized. So, the treatment can be tailor made. So, tailor made using this AI and then efficiency is, it tries to routine tasks, frees up healthcare expert experts time. So, these are the impact, which is gained out of digital intelligence, getting integrated in the field of healthcare for diagnosis.

Let us take a case study. The case study is Deep Minds AI in Eye Disease Deduction. The purpose is Deep Mind a subsidiary of Google developed an AI system to detect eye diseases such as diabetic retinopathy. So, this is done by a digital technology using AI. So, just by taking a photograph of your eye with a particular camera and then, we try to

take the data, apply filters and then, extract the diabetic retinopathy information for giving medication.



So, the impact of AI in healthcare early deduction can be done, accessible healthcare can be done and improved outputs can be done.

This is Google Deep Mind. So, it is the third example in under the topic of digital innovation. These examples demonstrate, how digital innovation are reshaping the industry and creating new possibilities for a better future. Thank you very much for your patience here.