

## **Transcript: Speech by Prof. Devendra Mishra on the RS Day of RMSoEE**

Good morning everyone, how do I follow these illustrious speakers like Dr. Partha Das, Dr Kalyan and our friend Paul sitting there in the audience. For me it is home coming as a special home coming, thank you, this is special home coming because it comes from scholars of my alma mater of my Indian institute of technology, when I look back at the 50 years I have spent navigating through a magical world of music ,film , video and technology in my professional career. It is this campus the Hijli campus of the Indian institute of technology that has shaped who I have been and who I am. Probably it has had the greatest impact only after my late beloved father Rajendra Mishra and my mother Sardha Mishra. I want you to look around the gurukul that you have , the gurukul that you part of , when I was in issues, I want get my degree and ran away as fast as I could , but when I look back what I am, is what this eminent professors mad me ,taught me , help me discover, as a matter of fact if the greatest company on the earth today is a knowledge company called Google, Larry Page and Sergey who were doing PhD at Stanford, decided to build a company that was going to organize all the information that was available in the word. Organize all the information and they had a great martyr, you will not doing any evil. So I was wandering how Larry Page and Sergey was any different from any one of you. The thirty scholars Partha talked about could be those Sergey and Larry of the world that we are all stepping into. We had a long flight from Los Angeles, the home of Hollywood , the home of the entertainment industry that I have been part of all my life, A really long flight for me it was mid night being with you right now, I saw three movies, and I want to recommend Dr. Ghosh and Parth here those three movies should be included in curriculum of the university the first movie was The Everest.1996 people was determent to be on the top of the world adventures physically, mentally fit to be there to touch the sky and then a avalanche at twentynine thousand feet whippet out a lot of them. To me it was learning in setting goals for yourself at whatever you risk. The second movie I saw that is Martian, movie that was just realised a few months ago, an astronaut was left behind and his name was Mark Whitben and he produced food and water and leaved for four years on the plant mars and when he came back successfully , thank god; he was addressing a gathering like this and he said "Space is the most danger seen there is but you must venture to go into space and the only way to come back from the danger is space solve a problem and another and problem and another problem". He had to solve the problem making of vegetable, problem of saving water he had a problem of flying back and catching the mother ship and he said I remember clearly" life is all about solving problems

and problems and problems and someday you will be totally victorious and you will be able to change the world". The third movie was about Bobby Fischer at the age of 12 he became the greatest chess champion of America had and few years later he beat Boris Pasky the great Russian chessman who I remember stood up and clap and couldn't stop clapping that Bobby Fischer had become the world's greatest chess master and the reason I share the story simply this, chess is all about strategy and no one is better knows than Kalyan does and he talked about how the strategy of his school has to bring entrepreneurship and innovation together. Which sort of comes to what I talk about today but when we landed in Kolkata yesterday the city was all celebrating Valentine's Day and I want to ask you if you did or not but I tell you from my personal experience the greatest love affair I have had with my alma mater IIT Kharagpur, a love affair that will never end, I know my wife is here and she knows how to shut up the lights. So the point I want to make is the director of the institute Dr P.P. Chakraborty the other day, the other day meaning November 2014 was addressing the teacher union or the teachers of our campus and he talks about 2020, vision 2020 in other words in the year 2020 we should achieve world class status to extent we can, and I want student should response to the challenge he gave us, I want us to response to the challenge he gave us a challenge that, How many in this room would want IIT Kharagpur to be the best in the world? I am so happy you raise your hand. How many think we are the best in the world? Divided, which basically says in the democratic world we have some ways to go. So I respect that a lot. So I want us to just think, in 1950 when I was walking the Nalini Ranjan Sarkar avenue A13 to the old building where the martyr's shed blood for freedom we are enjoying, I remember J.C. Ghosh, sorry Sir J.C. Ghosh excuse me the first director, I remember.....

In 1950 when I was walking Nalini Ranjan Sarkar avenue from 813 to the old building where martyrs have shed their blood for the freedom that you and I enjoy, I remember Sir (Dr.) J C Ghosh, the first Director, I remember working with Dr. Sengupta, the second director and now hopefully I have the privilege of meeting our current director, I have met them all over the years. When you are old you have that advantage, you get to meet everybody. So I look at the last 65 years of our Institute and I put it in three layers. Layer 1- from 1950 to 1980, because the Prime minister of India had told us that we were Institute of National Importance, National Learning, we had to build the infrastructure for independent India and I remember my seniors went and build bridges and stations, Bhakra Nangal, BHEL, atomic power station, Maruti and list goes on and on. What a great renaissance it was for India launched to a very

great extent by my seniors. Then came 1980 to 2010: It was all about building the Industrial capacity of India. Vinod Gupta Management School taught us that management was a science, we have to learn the business of business, we have the infrastructure school that was built here by Chitra and her husband, we have the Gandhi school of law that was built here and the list goes on. To make matters even better Suhash Patil a year senior to me, I think RK hall, Electronics goes to the United States as a teacher and builds the first truly entrepreneurial company of an Indian in America called Syrus Logic. If not a billionaire certainly half a billionaire over the years and the guy living below me in A block RP hall Arjun Malhotra created HCL moved out to make headstrong as a great consulting company. Purnendu Chatterjee, I remember seven years younger to me became the right hand man for George Soros, one of the great capitalists in the world and Ajit Jain who was probably 3-4 years junior to me became the right hand man of Warren Buffet, one of the world's three top richest men. Ajit Jain is his brain when it comes to figuring out insurance, properties to take care of. Vinod Gupta creates the Vinod Gupta School of Management. Arun Sareen becomes the chairman of Vodafone and ladies and gentlemen, the list goes on and on, I could be here all afternoon talking about the greatness and there were equally great people on Indian side of the business, tycoons of business that you know much better than I do. What a great period that was.

Then came 2010 and I am going to say 2010 to 2013 is the promise of entrepreneurship and innovation coming together and the promise was created with the founding of the Rajendra Mishra School of Engineering Entrepreneurship and the Faruqie Innovation Centre. I look at some great Institutions of the world whether they might be Stanford or MIT. The students, the alumni of MIT have created 30000 companies over the last 150+ years probably created Two trillion dollars of revenue, 4.6 million jobs etc. Stanford came thirty years later has shown the world how education, entrepreneurship and capital funding can be brought together and to me that is legendary. When the Internet gets invented, when someone calls from UCLA to Stanford Research Institute or whether cyclotron get built at Stanford or in the garage of Bill Hewlett and David Packard becomes HP, when silicon valley is created because of the University and I still remember 1976, I was there when a Biochemist a scientist at the University of California, San Francisco created a whole new science the DNA science and his name was Dr. Herbert Boyer and there was a venture capitalist living in San Francisco, his name was Robert Suanson. Robert Suanson read about this professor coming up with the whole new science and he called up that biochemist and said would you spare me

ten minutes. They met and what ten minutes, it was four hours the discussion went on and finally they created a company called Genentech, they created industry called biotech, it all came because of the partnership of a professor, teacher, scientist with the venture capitalist, that's reality. So I take you to two aspects of this modern world we live in. I find it is the most exhilarating period of our time, of our lives of mankind and I don't want to say that to be cool or anything, I say that because I am very serious about it. When I look at the technology that has disrupted our life whether the Internet that was a university project, right, to keep the information in a university in a very confidential way and then later the US government got involved, where you can send bits and bytes all over the world at virtually no cost and instantaneously. Or it was digital technology where everything a piece of paper, a video, audio could all be digitized in zeroes and ones and therefore could be sent from Los Angeles to my village in Bihar, photos I could send, songs I could send. And then came Mobile, the smart phone that controls everything. I can do anything with it other than scratch my back. So the point I am making, when I look at the Internet, when I look at the digital, I look at mobile, I look at WiFi, the world has changed and for you and I to understand what the change is.

If I say, ask you, do you know what UBER is?

What is UBER? UBER is a company, two people developed, where in India we call it lift, what are those companies in India where you can book your taxis?

OLA...OLA

UBER was the 1st one, where all those cars that were sitting idle with you and me and others, for that the taxi drivers could be used. I could see him commit to me and I could track him, I didn't have to pay him, it's all electronically when done. Uber was created nothing but with minimal software.

It didn't require the Bhilai steel plant we built. It didn't require that you invest that millions of dollars to build infrastructure.

It is just putting your and mine share to work and create intellectual property like Uber.

Who has heard of Airbnb?

My house is in Los Angeles, I could rent it out, I don't have to stay in expensive Taj Hotels, I can stay in your house at 1/3 of the cost. Again it is a matter of building a company Airbnb, which is nothing but a software solution.

Or Netflix... How many of you have heard of Netflix. Probably many have, right?

Crowdsourcing.... how many of you have heard about Square...

The point I want to make is simply this, the new economy that you are going to build in and you are a part of, is so different from I can mean which I grew up, where infrastructure will be build hundreds of dollars had to be spend and now it's all about putting your grey matter to work.

Amazon.com is nothing but an IT company. Wouldn't you agree? It is an IT company and you ask yourself, we in India as a result are in the unique position to take advantage of this because we are analytical more than any other race in the world. I don't know what it is. I cannot explain...we are analytical

We have a strong Family system, we understand life and therefore it's all natural for us that we should seize this opportunity to create the intellectual property which anyone of us can do.

I had some very interesting discussion this morning, and you were talking about healthcare, you were talking about energy, talking about reusing materials for housing. That is the opportunity for Entrepreneurship... that's the opportunity for innovation.

There is no end to it. We don't have to compete for it with America, Russia or England. We can do it because GOD has given us those capabilities. So, I want us to address Prof. Chakarabarti's challenge to us for greatness in the world.

Greatness in the world will happen to us, it will be grand that will be established, if we integrate all the intellectual capital we have.

And what do I mean by that.

If Ranjendra Mishra School has Ecell, and the people at STEP, people in incubation lab, people at the law school at the intellectual property, people at the Vinod Gupta School of Management all collaborate. If IIT Kharagpur tells the world that's we are all about. We are about innovation. We are about entrepreneurship and by the way we have these different schools, that can come together not physically together but integrated in a very very virtual manner. That is when the world will recognize, we are in a different kind of university. Just being the best Civil Engineering, the best Mechanical Engineering, the best computer science Engineering, is good ..... THANK GOD. We have that foundation. But as job for Dr. Das, Dr. Chakraborty, Prof. Kalyan, Prof. Ram Babu and others....is how you leverage all these, and market ourselves, create the reality and perception. That we are the class when it comes to innovation, when it comes to entrepreneurship.

Now I realize, We don't live in Chennai, we don't live in Gurgaon, we don't live in Mumbai, we live in West Bengal. It is very hard to find great companies and VCs and capitalists and bankers here. So should we give up as its now?

It gives us a whole different opportunity, and how many of you have heard about C. K. Prahlad....

Many of you....

Coimbatore Krishnarao Prahalad, a good friend who died too early. He told us. Go and find the fortune at the bottom of the pyramid.

Bottom of the pyramid to C.K was 4 billion people out of the 6/7 billion in the world who are unserved, or under privileged etc. etc.. etc..

So when you were telling me educating the women, giving knowledge about the system, so that they can deal with the pregnancy. Young Lady that's what C.K.Prahlad wants you to do.

When our boys and girls get National and International Award with the solar powered cold storage to preserve agricultural product.

Ladies and Gentlemen! that is what entrepreneurship is all about.

The world is such a place where the rich and poor are there and the gap is getting wider and wider..

The world is such a place where the climate change threatens us all.

The world is such a precarious place where its environment is threatened. Our social culture gives us the answer, it's called social entrepreneurship.

Let's go and copy Gramin Bank. Let's go and copy Nirma. Let's go and copy Amul Butter, the whole story of empowering the milkman and milk producers. Let's go and empower the women and that is the opportunity we have.

It's our destiny that we do it and we have to do it.

IIT system was established to do it. We were first not just we were had to be first but because we had to be the best.

And my father will always tell me when you hold my hand and walk down to the street; you got to be better than the best.

All I want to see.... and the example I think of. All these departments are like diamond that have been cut and polished, and it probably came from Surat, Gujrat. But when you put it together for Innovation, Entrepreneurship you create a necklace whose value is 1000 fold greater, that is what we got to do. We got to reach out, we got to get idea, go to management schools.

Say, how do I structure my organisation, how do I hire my people. Believe me somebody told me this morning the risk involved with small company are huge, but we have the faculty, we have the capability, we have the resources, we have the facilities here in our Gurukul that will help us to deal with them.

You know when I see it from outside, I see it all, when you are on inside, you don't see it all. Getting a great idea you have to make it sure it is intellectually protected, go to Gandhi School of Law. We fail because management is not good, experts are there. We fail because Civil Engineering construction has not been done, well there are the mechanical Engineering construction.

Only thing I would like to add is we need to attract Venture Capitalist, we need to attract Banks and I think Vinod Gupta School of Management can help us. Do that.

Vinod Gupta hangs out with Warren Buffet, for simple reason he knows what Warren Buffet can do with all a million of dollars. I think we should have our own Warren Buffet, and we have many of these in India whether it's Premji, Narayana Murthy or others or some of our Alumni, so I want to live with that thought. I want to really get little excited may be little angry, I will reach out. I want to go and learn. I want to be better what I am doing.

Just submitting research paper is not good enough, creating that business may be a better idea and you can do it. If Airbnb can be created, if Uber could be created, if Google could be created, none of them was any different from you. So I wish and I know I will have opportunity to talk to Deputy Director. I would love to see at that level, they getting this idea. We have to leverage all the discipline we have.

We want to brand ourselves at IIT Kharagpur, as the place for Entrepreneurship and Innovation and we have all that it takes the Management or the Engineering or be Humanities. We have it. And now we got to serve, not only India that's gonna be the 3<sup>rd</sup> largest economy of the world in a matter of 15 years. We will be by probably 2030, the 3<sup>rd</sup> largest economy in the world, but probably impact the world as well.

So what I would like to do now is Shut Up, not because I am out of breath. I want to take question that you may have. I just hope that you do have a lot of questions. Someone was telling me what Data Analytics is, Could you raise your hand. So Data Analytics in my mind and I am so proud, Partha that you have created a collaboration with IIM Calcutta and ISI Kolkata. I cannot tell you how proud I am of that. You don't realise what value you have brought. Okay, that can be and should be World Class because this Data Analytics that transforms Business like you would not believe. It's not just about doing little bit better which is what typical technology is about, work faster, better, smarter, that's okay. But when you have Data Analytics when you have disruptive technologies, now you changing the way we do business, the way we think. These businesses didn't exist before, that you have created.

Any Question, this is not a class, this is not a classroom, please just ask.

I could spend a matter of fact, I am going to commit Partha to come back and spend weeks if anyone is willing to take my time, to take this idea forward, where think of a Matrix, where you have Entrepreneurship and Innovation, okay and other part of the matrix are the different discipline we have, Law School, Management School, Civil Engineering.

And in this process of Innovation to Entrepreneurship you require different skill at different stages. We can map this out, and we can help the department figure out, how to collaborate. It's easy to say go and collaborate, how when and where. Does it make sense?

We can map this out, so back to the question about the trends we see, there are lot of trends, and in technology, whether we like it or not, America is light years ahead than the rest of the world; light years ahead of China, light years ahead of Russia, light years ahead of Germany, France and England. For the simple fact, the entrepreneurial spread of America is second to none; no one has ever come close to it. I think if anyone can, it is us. And I don't say that because I am an Indian, I don't say that because I am from IIT Kharagpur, I only say this because it is in our DNA, it is in our genes to be analytical. It is in our genes to think of the eco system where there are animals, plants; human beings are amending the balance. So, back to your question, I will give you some things that makes sense to us, rather be very broad, I want to be very specific. There is a whole approach that is being mastered at my university at Pepperdine where there is a whole methodology that can take any intellectual property and say what can we do with this intellectual property, what can we do with this idea? And they come up with ten, twenty, thirty, forty different business ideas going through a methodology-

number one. Number two: Design Thinking. I urge all of you to learn about design thinking. Ken Brown at a company called IDEO, created design thinking. And design thinking basically says - start with a user interface; what is it that the user wants? And then work backwards towards what the product, what the service should be. We always do it from here; oh you take it. If anyone changes that pattern then they receive jobs, and you and I both know what he did. So to me that is a major trend. The two trends that we all have to be aware of. When I was growing up, when you were growing up, Newton's law, Galileo's law and principles, Kepler's principles were very important, they still are. But the two laws that are important to us in today's world, one is the Metcalfe's law and one is Moore's law. Moore's law basically says "Every eighteen months, we are going to double the capacity of the semiconductor chip at probably the same cost". And this was said forty-five years ago and people felt all the juice is going to be extracted out of the lemon. But guess what, we have not. This Moore's law is going to keep applying I think for the rest of my life, if not all yours. So the fact that technology has become cheaper and cheaper, storage has become cheaper, the cost of doing an experiment has become very low, the cost of information is extremely low, the cost of getting connected is extremely low which enables you and I to invent, be entrepreneurial more than we think we are capable of. Number two, is Metcalf's law. Metcalf's law says "The power of a network is equal to factorial n ( n!)" if there are three people, the power is three times two which is six. If there are four people then, four times three times two is twenty four. So when Mike Zuckerberg created Facebook and he has got maybe two billion people if not four connected through Facebook, imagine the un-tapped power of that whether it be advertising, knowledge sharing, and whatever it is. The personalization that the world wants. You and I want personalization. That Metcalfe's law with Facebook enables you to do that. I am not going to go talk about space, I am not going to go talk about water, I am not going to talk about diseases, Genome projects- I think they are big areas in terms of trends. I know a company called Illumina; what they do is they take information from Genome and if anyone of you is interested in a particular area of genome, they will fund you until you will become commercially successful. So Genome, as you all remember, that was a project supported by the US government, has all that information. And putting that to use in healthcare, I think that will be an incredible future for all of us. So, hopefully I have answered, but please talk to me later and I can be more specific to your area of question.

Last question before I shut up. Yes, there is a question: what is the basic thinking you need to have to start a company, to be an entrepreneur for a research scholar who is coming from a

technical background and wants to join either an educational institution or to join as an analyst for a company.

I am glad that you asked that question because to me, that is at the centre of this discussion on entrepreneurship. Thank God for this new generation. For this new generation, there is nothing impossible; and I mean this. I am not being smart or satirical and I see it in America a lot. They believe that they can do anything. Particularly the Millennials: people who were born in 1990 and later. They feel they can do anything. They don't need to work for anyone. If they work for you; you should be grateful that I work for you. They don't believe in schedules, they want flexibility. My generation and I speak for myself; everything was impossible. Passing the exam was difficult; getting a job was difficult, finding a career- no clue! Everything was difficult; somewhat impossible. So this mental shift. And when you go through a programme like the engineering entrepreneurship programme, it is hard work. Your parents may not even approve of it and you learn things from the management school. Once you have a good idea, there is a methodology to implement that idea, to commercialize that idea; am I not right? We know how to take the steps, once we give them those steps, once we assist them and make sure capital is available because capital is the key. Right?...

Capital is the key right! I mean I have the greatest idea but no one is funding me. I really think you do a great job. You may in IIT Kgp attracting capital from the govt. The STEP program is a good example of that. I hate to admit to you in US all the fundamental research that's done is sponsored by US dept. of Defense. Whether there was a space program, the biotech programme or the genome programme or now the brain research program of Obama is all funded by the govt. under the dept. of Defense. The reason I have mentioned that we should make an effort particularly in the area of Social entrepreneurship particularly in state of Bengal to attract that clan of stuff from Pranab Mukherjee or other leaders, Mamata Banerjee. We should really tell them look this is what we doing for the women in Midnapore, this is what we doing for housing, this is how we gonna get clean water, this how we gonna get energy at a lower cost, etc. So I really think Bhaskar, there is a. I know you are teaching them and I am preaching to the quire, you doing it every day, I don't. Just doing research should not be our objective and I see too many in this room and even outside are just happy, I did great research thank God, but research prodded to use whether you're socially entrepreneurial or technological entrepreneurial or either way or there may be a third way that I don't know of. Make it happen.

*Question was asked by someone which was not audible*

1. The analytical skills you taught us here and the balance between engineering and humanities that you taught us here and the environment you created of depending on each other. Going up with no water for a bath or no food that was ever delicious or no girls to hang out with, whatever those reasons were. We grew up in that environment. When I'm going to put you which was best engineering school in America, it is a walk in the park. They said I had to get my master's in three semesters, because my father Prof. Rajendra Mishra has said two semesters is all you should take. I signed up for two, I finished in two and I got out after two. So it is really easy getting my master's. I became an expert in operational research because data analytics was my interest. I ended up being in the music business, I started working for Elvis Priestley and Kenny Rogers and Diana Ross. I was making product for them, many products, making many records, making CDs, cassettes. I applied my engineering and analytical skills and in a matter of few years, I was the Vice President running the worldwide operations of our CA in 12 different countries of the world. I was strategic because you had taught me to be strategic, to take a long term view of the things. The video industry was coming along and I said well, time to move, I moved to the video industry and ended up with a company and we made Terminator, we made Basic Instinct, we made Total Recall, we made Rambo. These were the movies we made. And if you look at Rambo or you look at Terminator, there was more technology in that movie Terminator than that we teach you at IIT Kgp, the technology of morphing, you call it morphing now, but I spent \$73 million getting that technology developed so that you could morph. Year was 1986-87, that someone had written the story where a piece of mercury become a tiger, a lion, a human being, a sword could be something else. Someone wrote that story. We paid \$2 million for the story whereas in Hollywood, no one has ever been paid more than \$200,000 for a story. We paid \$2 million. And then this technology could not be delivered. So George Lucas came along, the man who made Star Wars and he said "I can do it" and he did it and we made Terminator. So here we are applying engineering and science to movie making, now you get the idea. Who would have? Would you tell your students, you gonna be in the movie business, you gonna be in the music business? Was I actually being Amitabh Bachchan, No. Was I the guy behind the scene putting the architecture and infrastructure, the distribution? Yes. So, there's a role for us. So, I hope I have answered your question. I know we have other things for the programme. So, thank you very much. Thank You.