

Lecture Series

Challenges before Indian Society

5

Technological Disruption Are we Ready?

Shakti Sinha



Govind Ballabh Pant Social Science Institute

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Jhansi, Prayagraj-211019

Welcome note

by Prof. Badri Narayan,

Director, G.B. Pant Social Science Institute

We have to look for the new challenges and expand the horizon of the society from conventional to non-conventional. And in this programme we invite historians, political scientists, social scientists, social and political activists, who are involved in making a better society. All are welcome to come together and think about these issues. We are very inspired with Milan Kundera as a novelist, those who are knowledgeable they don't have experience and those who have experience do not have knowledge. So here we are trying to create a link between knowledge and experience. That is why we have an amalgam of different sets of people who are practicing social science in their everyday lives and making social science they can come together and think about these social issues. I shall take two minutes to introduce our speaker and also our chairperson. Shri. Shakti Sinha is the Director, Nehru Memorial Museum and Library of New Delhi. He is also a distinguished fellow at the Institute of National Securities Sri Lanka, Colombo. He was an AGMUT Cadre IAS officer of 1979 batch. After 34 years, he took voluntary retirement when he was with the Government of National Capital Territory of Delhi as Principal Secretary (Finance & Planning); was also concurrently Principal Secretary (Power) and CMD Delhi Transco. He took charge at various distinguished positions at University and local level as well at the Centre. He also served as the Joint Secretary in the Prime Minister office during Atal Bihari Vajpayee's regime. Various cadres of positions he has held in his life as an IAS. Shakti Sinha has been the Chairman of South Asian Institute for Strategic Affairs, an upcoming think tank in Delhi. He writes and speaks on governance, political economy, strategic affairs and on Afghanistan.

He worked with the UN Mission in Afghanistan for three years coordinating international support to the Government on National Development - Strategy and governance issues. He has to his credit three books and chapters in edited volumes. He has also contributed several working papers, policy brief, columns etc. on political economy, India's Foreign Policy, governance, Chinese Economy politics and Indo-Afghanistan relations in global and Indian publications. Our Chair Honourable Hangloo ji is the Vice Chancellor of the University of Allahabad, he is an specialist on Kashmir Indian and Central Asian History religion, politics and culture. As a celebrated historian he was the former Vice Chancellor of Kalyani University, West Bengal, he was also a member of the academic council of United Nations System for two years for Asia and Africa. He has headed the Indian studies at Trinidad and Tobago, and served as visiting professor at various national and International universities. He has to credit publication of more than 100 papers in national and international journals. He has also written more than half a dozen of books. He recently authored a book History of Science and Technology in India exploring new avenues and issues published by Rawat publications, New Delhi. He has been honoured with various prestigious scholarships and awards for his academic excellence. We are lucky to have amongst us two types of innate scholars, first is to speak on issue and the other for chairing the session for series on socio-cultural and economic challenges. Thanks all of you.

Shakti Sinha is the Director of the Nehru Memorial Museum & Library, New Delhi. He is also a Distinguished Fellow at the Institute of National Security Studies Sri Lanka (INSSSL), Colombo. He has a master's in public policy from George Mason University, and a master in Indian and Chinese history from Delhi University. He was a member of the Indian Administrative Service from 1979 to 2013, when he took VRS. He has held positions at different levels at the union, provincial and local levels, including as private secretary/joint secretary to prime minister (Vajpayee), head of Delhi's power utility, finance secretary in Delhi provincial government, chief secretary of the Andaman government and others. Internationally, he headed the United Nation's governance & development team in Afghanistan (2006-09) coordinating donor support to the Afghan government, and was earlier Senior Advisor to India's Executive Director on the World Bank board (2000-2004).

Mr Sinha has worked at think tanks in India (Director, India Foundation; Visiting Senior Fellow, Observer Research Foundation) and Singapore (Research Fellow, Institute of South Asian Studies) and edited three books, written many book chapters, working papers, policy briefs, columns etc. on political economy of India, Indian foreign policy & strategic affairs, governance, Chinese economy and politics, and on Afghanistan, for global and Indian publications.

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Auditorium

Thank you Badri Narayanji, Honourable Vice Chancellor Ratan Lal Hanglooji. Friends! My association with the city of Allahabad is very old. Now I have got an opportunity to come to Allahabad after a period of 20 years. I am very grateful to you all to have invited me to this beautiful city. I am also happy and humbled that our vice chancellor, an eminent historian, is presiding over the session.

You all are social scientists in G. B Pant; social science is mainly about the problems of the society; about understanding of society and based on that understanding, how do we go about solving problems. Today, I would like to present before you certain emerging issues that are potentially going to affect social problems and see if in our discussions we have an adequate and proper lens to understand it. Our life styles have undergone a sea change. If you see this cell phone you may recall that 20 years back, we used to use a camera for taking photographs, we had put reels in the camera etc. We would take only 12 photos at a time and it was very costly. It is not like that at all now and you can take 50 pictures in a burst. Secondly we can listen to music in our phones. If we want to watch movies we can do it in our mobiles. We used to hang calendar on our walls, now we check the date on our mobiles, we used to keep diaries, addresses book etc. even now I have an address book in which friends of my 1973-74 time are listed on it.

All these old devices and support systems have gone. Even desktop and laptops are becoming obsolete. I have just returned from China, and as I had a lot of matter to be typed, I preferred to carry my laptop. When laptop was invented it seemed as though it is such a convenient discovery, so light and mobile. But now even carrying a laptop in the shoulders is very painful. In most offices, the post of personal secretary is gone, with automatic exchanges that divert calls. Earlier, we used to go post office, now do we write letters and post them? Thanks to emails, whatsapp and courier services, the postman does not come to our homes. Our mobile phones even let us know the local temperature of Allahabad so that we don't have to consult wall-mounted thermometers. And yes, given the opportunity we even use our phones to call and talk to people. I had gone to buy a phone and the shopkeeper went on highlighting about the mega pixels and capacity of the different features of the phone. I said I need a phone! It was then I realized the call feature of phone has now become a secondary feature. You are all quite young. Our Badri Narayanji is also quite young. In yesteryears if we required a phone in our homes, we had to book it years in advance. We used to depend on neighbours, to keep in touch with our own people requesting them to allow contact our people by using their phones. Things like scooters were a rarity. In the 1960s and up to the 1980s when a boy was born, mostly the father used to first book a Vespa scooter. A scooter was a lifeline (Unfortunately, we did not think about how scooters would revolutionise the life of our girls). Therefore, by the time the son reached college, he would get the scooter that his father booked when the former was born; a wait period of 15-17 years!

Over the years I have seen these drastic changes in the Indian society. Looking beyond, in 1970, 47 years ago, futurists American social scientists, Alvin and Heidi Toffler, wrote a book called 'Future Shock'. There is a saying that one should never make any predictions about the future. In fact, it is not wise to predict at all as most of the times it is wrong. Toffler also went a long way making future predictions, many of which went wildly wrong. But there are five things he predicted which I think that even now are worth appreciating. First he said that in future- "Knowledge would be the key". That is, if a society has to progress it has to be a knowledge society. How much labour you have, what is the amount of agriculture land you have etc. would not carry as much importance as knowledge. This was revolutionary.

Second in those days there were not many computers, only NASA and other specialised agencies had a few. The capacity of those computers was even far less compared to the present day computer systems. Most people had never seen a computer or knew what it did, except as super calculating machines. In those times, Toffler talked of information overload which would be caused because information would be transmitted and shared through personal computers, something that would not be invented/ created for decades. Envisaging personal computers whose usage would be universal, Toffler predicted that this information overload would create chaos and would be difficult to handle.

He talked of another thing which is relevant even today. In fact, he was the first to talk about 'sharing economy'- meaning that you do not have to own a particular item to use it. Earlier the kings aspired to create palatial buildings

and monuments so they did. Suppose the only way to enjoy holidays in Kolkata or in Mussoorie, you had to build or own a house there? That phase of our history is over, and we rely on hotels. Even that is under threat with OYO, when you don't need a hotel, just some rooms. But Toffler went further and was of the idea that you use the thing required and return it when need is over, just like borrowing books from a library. Fourthly, he even talked of 'telecommuting'. He said every house would have a personal computer so going to office could become redundant. We can work from home. The physical location and presence would no more remain important. And he said this in 1970.

Another thing he dealt with was the changing business scenario. For businesses, the basic concept is the firm which implied a formal or vertical hierarchical structure with a horizontal spread of self-contained specialised departments functioning independently and not always in tandem with each other. Like the example of different departments like physics, chemistry, math in a college. The wall between the Chemistry and Mathematics is such that the process of osmosis even does not work. He predicted that the firm of the future would be based on the principle of adhocracy, in other words, a specialised group of persons brought together to handle a specific task and once the task was accomplished, the group would be dissolved with new groups being formed to cater to new issues. Nowadays, corporate giants and new companies like Google, Microsoft etc. they have shifted from very formal structures to informal flat structures.

Change is an issue which is easy to talk about but is very difficult to identify precisely. In economics there is term

known as point of inflection. This is when the trajectory changes e.g., an economy picks up, but the most interesting characteristic of this change is that it is very difficult to state when did the process begin. It is identifiable only in retrospect. When the actual change of direction occurs, we fail to observe it. With the advent of industrial revolution there was revolution in production processes and England became one of the most powerful nations of the world. The rest of the countries either caught up with it much later or tried to catch up with it. In this period there was massive adoption of new technological processes. The steam engines, shuttles etc. were invented and commercialized for use in this period. English society then became a predominantly industrial society, moving from a rural village-based economy to an urban industrial society. The feudal landed class had ruled the economy and society till then but this power shifted to urban industrial tycoons.

What were the changes in the society when this happened? With this technological change the illiterate agricultural workforce got transformed into semi-literate urban workforce. Secondly, the new owners of capital dominated the economy. New professions like banking, law and teaching became important. This had an impact on the government and political system as well. First only the landed propertied class had the vote, then the industrial owners class obtained this right to vote and then the professional class also acquired this right too. It was only after this process that right to vote got extended to the working class. In England from the first move to change the voting rights to universal suffrage took well over a span of hundred years. If we study the history of human evolution over the one lakh years or two lakh

years, these changes over two centuries appears very rapid since on this scale two hundred years is a mere blip. Changes have happened at a very fast pace in recent times, for example as compared to the period from 500 CE to 1750 CE, massive disruptions have occurred in the period 1750 CE to 1950 CE. If we study these changes on annual basis, we see that this change was happening at maybe 1.5 to 2 percent change every year. Incidentally, if at present the Indian GDP does not grow more than 7 per cent per annum, everybody starts worrying. During that time, in England GDP was changing at a rate of 2.5 to 3 percent which was understood to be very high. Therefore if we take a long term view, the change is massive and huge but if we see this change from an individual's or from a family point of view, the process was very slow. Is it still happening now? Let us divert ourselves to the field of economics slightly just to link the two together. During the World War II, international economy underwent a boom, 1970s there was stagnation which was recovered in 1980s and then there were cycles of movement and lag till the year 2008. Therefore, if we ignore these minor up and downs we can observe that the world economy grew very fast in the period between 1945-2008. The 2008 economy collapse was so massive that even today some countries of Europe have not been able to reach the per capita income of 2008. Some have recovered but countries like Greece, Spain and Italy are still lagging behind. In USA the performance has been much better. But even here, the unemployment rates are lower due to the reason that many persons have dropped out from the labour force. Women, middle aged or older people have dropped out. So since the denominator of total workforce has declined, the rate of unemployment has reduced.

There is a book by Piketty on the global economy which says that income inequality is rising. The top 8 percent that owned the resources and money or skills earlier are improving their standards of living and the rest are lagging behind. If we see the countries like Japan, South Korea, China or the Asian Tigers we see that their economy grew by more than 10 per cent growth over a period of two to three decades. These were the countries like Japan and China that became the factories of the world. I have just returned from China three days back and what I observed is that, what was China 15 years back, is what we are now! In these 15 years the country of China has gone 50 years ahead. Otherwise the condition of the global economy is stagnating. In words of Larry Summers, an eminent economist, there is 'secular stagnation' in the world economy and he predicts that this would continue for 10-15 years more. If we see our export figures we see that there has been a fall in our export earnings but not the fall in export volumes. For example suppose we were selling 10,000 tonnes of petrol last year, we are still selling the same volume even today but the prices are reduced. So the volume has stayed up but the income has come down. In this condition India cannot become a superpower equivalent to China very easily or automatically. We have hopes that more jobs would be created in the near future in factories and other growing sectors and then we would have larger employment leading to improvement in our standards of living and hence development of our country would take place. The government has various attractive slogans like the Jan Dhan Abhiyan, Mudra, Start Up India, Stand Up India, Skill India etc. But we have to carefully assess the challenges that are coming up. Let us leave out politics in terms of selection of policies. One thing is clear that the path of development process that was

successfully used by others is not available for us with the new challenges coming up.

Our future is very uncertain. It is particularly uncertain as technological change may be happening in ways we do not fully comprehend even as we have a feeling that technology will change everything. Let us see specific examples from history. Printing press reached Europe in 1500s from China, and mass literacy occurred in Europe in about 300-350 years. Therefore the benefits of printing press could reach the masses over this relatively long time period. Mass consumption of electricity took 100 years to happen. In the early stages electricity for industrial use was available but not for domestic consumption given the lucrative returns from consumption of electricity in manufacturing. Computers took 30-35 years to become the norm and commonly available. The rockets that America and Russia sent to moon had lower computing power as compared to our phones. It is stated that there are 100 million smart phones in India while its population is 1.2. billion. Therefore we can safely conclude that there has been mass diffusion of smart phones in the country. Now the speed with which artificial intelligence, robotics, internet of things (IOT) is impacting manufacturing industries is tremendous. Today, scientists and manufacturers are coming up with customised biological and pharmaceutical products i.e. the medicines consumed by patients would be specific to that person, taking into account her needs, genetic make-up etc. That day is not far. Driverless cars are already being experimented in USA. There are mixed emotions with such experiments as on one hand there would be cars without drivers so increased safety while on the other lakhs of people employed as drivers would become

redundant. With the potential success of power banks, our entire energy system based on hydrocarbons would collapse. This would be good from the environmental point of view but what about the lakhs of people employed in this industry? Therefore in every field successes will also be accompanied by considerable challenges.

Even today what we call the West or the developed world, be it America, Europe, Japan, South Korea or Australia, traditional jobs in manufacturing have been lost in large numbers. India is trying to catch up with China which is still far ahead in manufacturing, but even in China, there have been major job losses. The standard blame politician in the West employ for such job losses is the effect of globalisation. Is it true that jobs were lost due to globalisation? The reality is that most jobs were lost due to the advent of technology, which has caused massive disruption. There are so many types of work which have become redundant now. In the private sector, there used to be secretaries which has now vanished. The world's largest supplier of hotel rooms is Airbnb which itself does not own a single hotel room. Now take example of hiring taxis, wherever I wish to go I order a car by Uber and payment is done by Paytm or some other electronic platform. Uber does not have even a single taxi of its own. Toffler's prediction that hierarchical pyramidal system would collapse and become flat is now coming true. Taking example of USA, as a share of GDP the manufacturing sector has not changed in the past 25 years but the number of workers employed has become half. That is to produce the same quantity, half the labour force is required. In India, Maruti has made a new factory of cars where the number of employees is negligible

compared to its earlier factories. Though most people are not aware, America is the number one manufacturing giant of the world because it does not need employees, everything is mechanised from 3 D printing to artificial intelligence to robotics. The basic difference between a machine and artificial intelligence is that while a machine needs to be manually operated using specific computer programmes, an AI instrument is capable of learning by doing by itself and can subsequently alter its processes without human input or command. Though we have not outsourced thinking as such to machines, the reality is that a part of the thinking process has been outsourced already.

Our country is very young as 45 per cent Indians are less than 24 years old. We are the youngest large country in the world. The country has also a very high working population and the dependency ratio is 27 percent, which is also relatively low. Our population growth rate has stabilized at 1.19, though some states like UP and Bihar are lagging behind. There are 720 universities, 38400 colleges and about 12000 stand own institutions like GBPSSI in India. Now if we see these numbers and also pay cognisance to the fact that in the last three years or so hundreds of engineering and management colleges have been shut down, we can understand the growing challenges. There is need for greater investment in education, both private and public. To set up one IIT, the government spends about 311 crores while to set up a state university, it requires 12 crores. We are putting out these figures just to show that only numbers of institutions are not only important but it is equally important to pay attention to the quality of education. It is also a question of relevance, and of affordability.

How do we face these challenges? How can we overcome or bridge the loopholes in our formulation of rules and regulations? For example when I was staying in USA, during my college vacations, I thought of utilising this time in doing an Advanced Economics course on International Trade. Because it was a summer course, it was time limited capsule course of 16 classes and each class was for 2.5 hours. Our teacher was a well-known economist Wendy Tackas. She informed the class when the session started that there has some fault in the schedule and instead of 16 classes there would only be 15 classes. As an Indian, I was very happy that I got rid of one class. But other than me the entire class stood up in protest asking how it was possible? If the schedule mentions a course for 16 classes it was binding on the teacher to take 16 classes. The attendance requirement was 100 percent. The students created massive objection and compelled the teacher to take 16 classes as scheduled in the course structure and for which, the students had paid fees accordingly.

This kind of responsibility and accountability has still not developed in our system. And in looking at the future makes one feel scared, since societies elsewhere are moving ahead at fast pace and we seem to be lagging behind. For the first time in human history, we have conditions emerging where changes are visible and felt; we would not have to wait for history to identify the inflection points. In Assam a bridge of 15 kilometres in length was built and the Prime Minister inaugurated it. This bridge is a very important link and would give a fillip to regional economic development. However, due to this bridge the boatmen who used to ferry people and goods up and down the river from one shore to the other lost

their employment. There is hue and cry to re-train people or to re-skill people who lose jobs due to technological change or other such disruption like this bridge. But my counter argument is, suppose I am 45 years old and my entire life I worked as a shop assistant now at this age what will I learn? Computer coding? Suppose I do learn computer coding but my next question is how many can do so successfully?

I reiterate that I am not here to frighten you but just to place the challenges and issues realistically before you. The type or standard of thinking that we are used to of incremental change may have become insufficient. Fortunately the Indian economy is very large and the per capita income of the people is also very low. This means that our learning time is bit more and we have more space available in which to fashion our responses. Because we still need a lot of effort to be put it together to facilitate the conversion of our informal sector into becoming more formal, which would facilitate the absorption of technology, access to capital etc. This upgradation would allow many employees to keep on getting absorbed into proper jobs with security; we have some breathing space which is absent in many societies that are aging even before becoming developed. Now do we utilise this breathing space to get ourselves ready for the second half of this century should be the focus of our discussion. So when Prof. Badri Narayan asked to come and talk here, I knew what I should speak to budding social scientists.

Several short cuts are emerging. Actually, we may not even term them as short cuts rather they may be called lateral thinking, like mass online open courses. We have to bring in many such methods that can use the new

technologies to convert our potential into kinetic energy. When there are challenges ahead of us, the opportunities are also ours because we are benefitting from the learning experiences of others and do not have to repeat the same and we can jump. Like, I jumped to this age without entering the levels in between. When I go to five-star Hotel I get scared of the Television screens because at home we have usually two separate panels, one for set top box and the other for TV screen. Till today I fail to distinguish them and even I do not want to know. I can jump to the next level and this learning is redundant. The whole ambience for the social scientist of tomorrow is that this is the big challenge before us - how do we take the Indian society ahead, how will we make it a developed society, what will be the different sets of challenges and hurdles, and what are the opportunities? We have to find the path ahead. I thank you for giving me this opportunity to speak, I feel deeply honoured and grateful.

Question answer session:

Prof. Badri Narayan opened up the session for discussion and discourse to the students and listeners citing verses of Tulsi Das, "Vinay Patrika deen ki bapu aaphi baanch". Prof. S.K Pant raised a very serious issue questioning the quality of education ongoing in the Universities, colleges and mushrooming institutes. He said, what would be the quality of the output of these educational institutions when students as products get ready to be absorbed in the market. The concern that by time the students get ready for absorption, the technologies are so fast changing that they may become obsolete.

I cannot comment on the government policies but for the technologies the key lies is how we learn and relearn. The issue is how to keep constantly upgrading myself.

Prof. Pant intervenes and questions if the provision of jumping as cited in the lecture is valid for such courses.

If the provision of jumping is there or not, I cannot comment. Evaluation is done by you and not me. The thing is not to give people knowledge as such but to equip them to keep upgrading their knowledge and skills. For example how do we internalise the new operating system of Windows? Skill programme has its limitations as you have pointed out but as I said the Indian economy is so underdeveloped and lagging behind comparatively, to be frank we are far behind many of our contemporaries, so we have time to skip some steps and move ahead much faster. We cannot leap frog everything but there are chances and opportunities available.

Sir, I have a dissent. It is not the technology but it is the capitalism that has taken away employment. There was a time when Biology

was the destiny of a woman but technology has brought changes. With use of contraceptives, family planning women now seem to have leisure time to sit and discuss.. their numbers in social science field is also increasing. So biology does not now remain the destiny due to advancement in technology. Similarly, if it is the globalization or capitalism that is grabbing away jobs? Technology could have had increased our leisure time not take away jobs! We could have sat near the Sangam side idle for long or listened to music and spent time for own self. With advent of technology we have to remain available 24X7. If we imagine our 21st century that we work for four hours a day and live life for our self satisfaction, peace and happiness with minimum basic needs. I think capitalism is the main problem. I believe if you had focused on politics also ... you mentioned leaping process and in your lecture you also leaped and left the discussion on politics of this issue. If we do not jump this political discussion and think of a socialist society model of the 21st century, the 20th Century model is a failure. If this proposed model worked we would be able to create jobs along with leisure time as well. In such case technology would not be replacing but could be useful.

You cannot blame capitalism. Entrepreneurs bring in new jobs. I was lately in China in Shanghai Academy of Social Sciences. They have a component division of Marxist Studies. When did China start growing? It was when with socialism and Marxism was discarded. As an economic system they did not have the ability to allocate resources efficiently. Adam Smith had forecast that there would be need for regulations to make sure here are no entry barriers in a capitalist system and to ensure that monopolies do not jeopardise larger interest of society. Blaming capitalism is not right nor appropriate. If investments do not take place there would not be capitalism. What was the condition of society in terms of living standards before? What was our life style at the time of independence? It is not the capitalism to be blamed alone but yes we need to control excesses of capitalism and not allow crony capitalism. It is the politics which determines the efficiency of the economic system.

We do have a choice and we have to be ready. Second thing which I wanted to discuss is that which way are we going to choose? Is it the machines displacing labour or the labour displacing machine system? So what do we highlight machine or technology? Parallely if you say technology is replacing manpower; I would say it is creating new jobs also. Somewhere there are replacements which are positive so we have to look the other side also.

As you said when changes take place in a short duration we tend to overlook it. What are ways that could be taken to see through these changes and be prepared? Another question that I wish to state is hidden in my first question itself that if we get an understanding of these causes we can solve many questions of social sciences. For example a small district of Gaziabad of western Uttar Pradesh region. From here students migrate to Delhi and Noida for higher education. They become cultured and adopt urban ways while their remaining families still remain uncultured. These conflicts are giving rise to social evils. My fourth question is that you mentioned that in the 21st century we became more developing. It took us ages to graduate from raw eating to cooked food consumption from the Stone Age period to the period when fire was discovered. These minor changes took 1000s of years to occur. How is this happening in the last 200-300 years we have changed massively?

Prof. K.N. Bhatt: Technological disruptions are occurring. My fear is what about the environmental disruptions? With advent of computerization nature of jobs and the ways of performing the jobs changed radically. But my worry about the environmental disruptions! How do you collate the two things?

I have a very simple question. Should we focus on the problems or on the possibilities?

Do we see a diminishing or fading social hierarchical system with spread of technology?

What is adaptive to change only can survive. Suppose with the use of technology spare time for leisure is generated. Now the question is how we use this leisure time and get adapted. It is not about unemployment.

With the advent of Uber the black and yellow taxis objected. But it is wrong assumption for it not the black and yellow taxis but the car manufacturing giants like Maruti, Hyundai that should object. In my house because we are four members, we sat together and calculated that one car is sufficient and there was no need of a second car since using Uber was cheaper than buying a new car! Therefore Uber replaced the purchase of new car. Who would bear this impact? It would be the car manufacturers who would suffer. Uber was a data aggregating firm, it is earning money not from taxis but after collecting the information data on taxi users which it sells. From use of taxis it incurs loses. Last year it had a loss of one billion dollar alone in India. But they make up the loss from selling information about your usage of cars. Yes, technology is really empowering and there is no doubt to it. The vegetable vendor knows where his vegetables would be available and where his customers are! The self-employed at the low end are the biggest beneficiaries of mobile technology. But as I discussed disruption occurs with technology. For example with Uber the Indian car maturing industry suffers and with 3 D manufacturing and AI technology where 100 workers were required to manufacture cars now only 20 are required. So where technology is liberating and empowering and it is also creating employment for those super skilled engineers who can handle 3 D machines and AI. It is creating job but it is shedding jobs at the mid and low levels. My focus was only on the point that we may like or dislike technology but it is coming and we should be prepared for it. What if we are not prepared for it? Challenges are at our horizon but fortunately we have some time left. We can get ourselves prepared. That is the point. I do not understand the difference between technology and machinery. The divisions and walls of demarcation between the two have broken down now. Osmosis is in the entire system. What is the final product and what is the intermediate product? Those days have gone. All these distinctions have now disappeared. Whether this technology in use is obtained from outside or created in-house is not relevant. Empowerment can also be a disruption. For

example, if a teacher is used to teaching one way where pupils silently listen in the classroom and do not pose questions and then all of a sudden, the students become empowered to ask question next day, then it interrupts the teaching method of the teacher. I am not passing a value judgment whether disruption is good or bad. I was very clear that I will not pass a value judgment. I have come here only to tell you what is happening. In my understanding this is what is happening and we need to be ready. The HR systems have to cope up and it is absolutely true that HR systems are far behind. Ideally we should all have leisure time. But if my leisure time comes at the cost of 10 people losing their jobs, then what kind of society do we have? Can a human society afford an underclass of 80 percent? This is the fear. But there are advantages, and we must reap benefits from it. Let us try to understand how to make the best use of it. Empirically the rate of change is definitely speeding up. Tremendously! Acceleration at every 32 seconds is an example to explain how the rate of change is gearing up each moment.

Thank you

Prof. Badri Narayan thanked Prof. Sinha for patiently responding to intriguing questions and requested Honourable chair Prof. Hangloo to share a few words.

Honourable Chair

Prof. Rattan Lal Hangloo

Vice-chancellor, University of Allahabad

Prof. Sinha is not only a wonderful academician but also a wonderful scholar. Prof. Badri Narayan, my friend and Director of the institute, my colleagues and other colleagues from the pant Institute and their students. I think Prof. Sinha has created a food for thought. Prof. Sinha has raised some of the fundamental issues and relevant questions. Let me recollect. He talked about the disruptions that take place and we are not aware of them. Technological disruption is I should say is historically inevitable in society. Anytime if you look at human society, but how we use this technology which is disruptive and intruding into a particular society.. it is inevitable whether we are prepared or not. We have to make a choice whether this disruption can be tolerated, diverted or restricted. For example when we had initial technology in the 1st century AD, we call it second vedic age because we began to use till more of iron on the tip of the plough. Even in the 7th Century AD we were still using plough. But when we see the rest were using a heavy plough with eight blades and coated with iron. There were huge gaps in the movement of the west and east. What are the reasons for that, in fact also needs to be debated. When we look at Indian society we found that the major proportion was going into use of luxury culture in the upper class of the society. In the western societies we see that the same amount of money earned is going into further development of the society. I feel like laughing when people ask whether it has to be adopted or not? Even the illiterate people who could not identify numbers are using cell phones so fast without any training. Our society has to make choice. Is there a technology to restrict migration from villages to smaller towns, from smaller towns to bid towns, from big towns to larger cities? There is no technology because somewhere we are lacking this. Providing

mechanization to horticulture, to agriculture etc. we find that it is not universally touch the human society in the Indian context atleast. We have to make choices what technology we want! After looking at the social landscape of India which kind of technology do you want would be a question posed to me if I were at a decision making authority level of the government. Out peasants toil hard in agriculture we have to make a choice whether we want leisure time for them also or not. We should have the knowledge of escaping the wrath of nature. If you go the Gharo hills, if there are floods in Assam agriculture would be totally spoiled. Therefore, technologies have always disrupted human societies and human beings have to make choice at each point of time as to which technologies are necessary. For example, I would suggest that Nokia company cell phones were not that much necessary in India as it was necessary for the Nokia Company to make up the money. I do not disagree that it was important but there was something which was relatively more important. A larger component of Indian population are the peasants. So in Kashmir, Ladhak, Uttarakhand who are not in a position to make use of land during the short period of summer season to sow crops. There is the need for technological intervention. Here, cell phone and laptops are relatively less important. For them the technology that helps them to feed their families is more important. The technology of accessibility is important, mobility of human society is important. So therefore, we need to understand that the speed of technology is the whore, secondly it is growing leas and bounds in every part of the world and thereby we cannot escape it. Rather we need to make judicious choices of technological use and be prepared. For adoption of technology we need to be very cautious and secure. The lecture was very though provoking. It really sort of invokes questions in human mind. Such lectures are important otherwise we may go on and does not merit students. I thank Prof. Badri Narayan and Prof. Sinha for being here.

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