History of Economic Theory

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The Social construction of knowledge: Adaption and Revolution

Now, let us look at the scientific world image in some detail. The scientific world image as I said consists of concepts, number of which might not have a real life existence in contrast with the real world. Now, the best way to understand the scientific world image is by contrasting it, with the world of experience which the real, the scientific world image is trying to address all the time.

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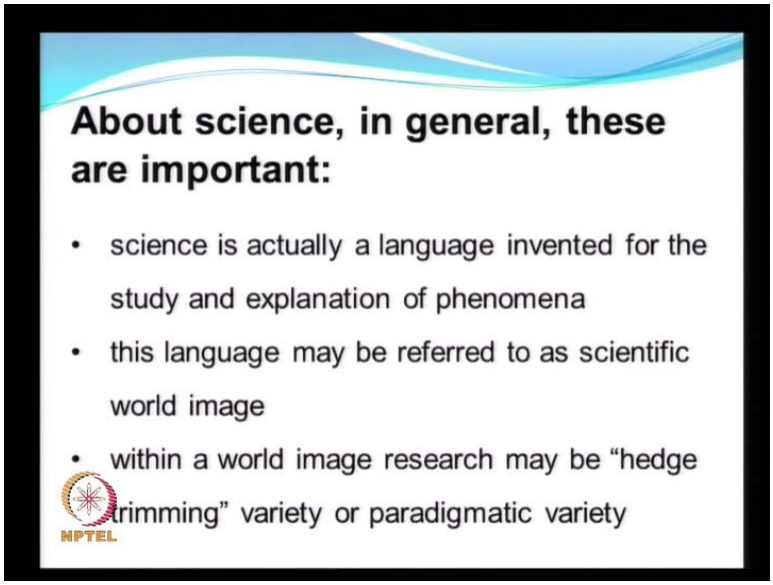

But the heart of the matter is that, the scientific world image does not exist by itself, it exists in order that it is able to explain the world of experience. In short the scientific world image is a functional world; it exists because of the functional necessity of human beings to construct a strict idea of causality, which world image alone can give, which means basically that the credibility of the world image depends upon, how it tallies with the world of experience, I repeat, a scientific idea exists so, that it can explain the world

of experience, but the scientific idea itself is credible only to the extent that it is explanation of the world of experience is credible.

If for example, there is a particular experience, which we are trying to describe say the experience of a monsoon, which we are trying to explain through some hydrological scientific language, if one simply says as an explanation in the world image of this experience. Suppose, we say it is 5 a plus 6 b equals 12 c, it might make sense within the world image, but it makes so no sense with the world of experience. But that 5 a plus 6 c equals of I am sorry 6 b equals 12 c itself, has meaning only as long at it translates itself into a meaning in the world of experience, which is meaningful. So, let us go one step further.

And look at a problem of credibility, which faced me most of the time when I was a learner of economics, in fact I should be honest I stopped being a learner in economics the moment I stopped feeling this question as a serious question. When my teachers used to say something like, the elasticity of demand is 0.75 I used to say all right, you measure something and you compare the rates of change and you get 0.75 as a result that is fine. But what is elasticity of demand, I do not have an elasticity of demand inside me, when I go to the shop in other words, the language did not make sense to me in terms of my experience, one step further.

This was the problem, when I have the this is the stage at which when I have started getting into pointless arguments, with my fellow students and sometimes with the teachers. This is the time when for instance suppose, I heard the law of demand said that, there is an inverse correlation between the quantity demanded and the price, which implement that you bought less, when the price rose and you bought more when the price fell. Then at invent situations, where people would buy more, when the price rose I had say look people buy it, because it is status people buy a costly thing, because it is status then immediately the economy is to come.

And say, but that is an exception then I say how do you know it is an exception, the whole society buys costly thing because it is status, everybody is buying costly things not because of any other reason except that, they can talk about it to others saying. I paid 1000 rupees to buy this, the only people who do not spend money on costly things, to demonstrate our people who cannot afford it. So, it say every person in the society, from

the small man to the big man loves to demonstrate, loves to show off. And one way is their like, they like to show off is the show off their relative appearance. So, if I am a small time peon I had that, probably take something to my office which is 5 6 hundred rupees worth saying I bought it. If I am a big man then probably say I will probably, buy a diamond brooch to my wife. And make her wear it to all the (()) and parties.

So, that she can demonstrate my appearance to the world. In short I would argue, everybody seems to be interested in buying costly things precisely, because they are costly. And people would say, but that is an exception to the law of demand. So, I would not ever understand, why this was an exception, when such large number of people did it right. Much later when I started looking at institutional economics, a lot of it made sense to me. But not in the early days, when I had my worse with the law of demand, I am just giving you an illustration to show, how the credibility of scientific world image rested heavily on how they explain, the world of experience. I showed you some illustrations of how I had problems, but more generally. If there is law in economics which tells you something, which is completely ruled out in the world of experience, either statistically or otherwise then, that law would not exist as simple as that for instance.

There was this whole business in the time was Stanley Jevons, I think when people were trying to talk of correlation between sunspots and the harvest of corn. When there are x number of sunspots and that this is what happens, to the harvest of corn and so forth. Well you know it is to say the least farfetched. So, how farfetched such a notion less is a way of saying the science is no good. So, one of the crucial aspects of science is it is continuous, informal verification against the world of experience. Now, this is where the whole dynamics of science begins, as I said the world of experience is generated and presented in a scientific, form to the scientists through statistics. And through other quantitative techniques, which might describe behaviour of not just human beings, but behaviour of phenomenon in general.

So, statistical verification of hypothesis in science, becomes a crucial part of research. All scientific research then is nothing but verification, either of the logical coherence of scientific propositions or of the statistical; credibility of this propositions, there is no research outside of these two. A lot of piece a lot research try to do both, they examine a proposition logically and say through this proposition, there are these questions emerge logically and therefore, a third proposition emerges logically. Let us verify that

statistically. So, that is a statistical cum coherence verification kind of measure, so lot of researches of this type, continuously verifying the credibility in a statistical sense. Outside of economics for instance, in social sciences in subjects like, ethnography social sociologies, social anthropology.

Statistical credibility of a hypothesis not a very important thing, if you can produce evidence from field, If you can produce evidence from field about the behaviour of somebody in the field doing something something, which questions the validity of a sociological hypothesis that is good enough. To give you an example, I hope you remember the argument of Max Weber about religion and the spirit of capitalism protestant ethics. And the spirit of capitalism very argued that, there was a strong correlation between places where protestant ethics spread and the places, where capitalist enterprise was growing. In other words, he was drawing a correlation between religion and capitalism. And then, we were went on to say that oriental religions like, Hinduism did not have that positive correlation and therefore, they were not in favour of industrialization and capitalism.

Now, how do you verify this, a great verification was done in the 1960s by an American sociologist called Milton Singer, he came down and settled down in madras for 2 years or god knows, how many years and started studying Tamil entrepreneurs. How they behaved, what was the entrepreneurial activity, they were involved in and how. He was checking whether, they were Hindus had anything to do with what; they did in their business enterprise. Whatever, it is he had his own conclusions and he said that well, what is happening here is something is which Weber, which proves that, the Weber is not correct you can have an oriental religion. And still have a efficient business, successful business etcetera, that is a different issue. But what is of importance to us here is to show that in sociology, statistical credibility of this verification is not so important, an empirical case study is good enough.

So, it depends upon the subject, it depends upon the science concerned, in biomedical statistics for instance. The size of the sample would be so, small that an ordinary statistician would be obstruct, for instance to study whether, a particular drug has a particular effect. You would probably, have about 20 samples and 20 controls that is 20 cases outside of that sample. To see whether, this was working now, but total sample size of say 40. Now, at the end of the study a paper might be produced, which might get

published in very high level medical journal, based on this kind of statistics, but an ordinary statistician might say. Now, what is credible about 20 should you not have 200, there are so many patients with this disease what about 20, but then people will say there are lot of problems in hospitals. And where this people came and where this data are available etcetera etcetera.

Whatever, it is the long and short of it all is the world statistical credibility is a varied world and it has a different meanings. But what is important is to note that whatever, science it is the world image constantly rests on it is credits, only by continuous verification empirically, by which is mostly meant statistically it is. Now, so what does a research mean in science, in science research usually means anticipating something, most of scientific propositions or hypothesis are based on certain parametric understanding, for example, in economics, you say when price rises demand falls ceteris paribu other things remaining the same.

You can change the other things about and verify, what happens to demand as price falls no fashions change, travelling distance increases, a number of you can, you can bring in a lot of external changes. And then see what happens, to this law of demand is not it, this is research. In other words, there are initial conditions under which a particular phenomenon is supposed to happen, in the scientific world image. Most of the times you change the initial conditions, assumptions about initial conditions and see what happen, to the hypothesis about the phenomenon. Most of research is like this, then what happens is you keep adding to the corpus, vast corpus of knowledge of the subject by basically, adding punctuations to existing concepts, existing scientific world image for instance, if we have discovered that a certain kind of inferior good.

Behaves on a particular way in a model, then you say the law of demand, subject to the condition of inferiority of good, in the following way etcetera etcetera, that becomes a paper or a Ph D thesis or a whatever and that is your research. And that gets added to the corpus of knowledge in the subject, by subject so and so, and so. And all these people have said this about the law of demand, but this piece of research says comma also this. So, most of scientific research is adding to the corpus of scientific knowledge. By basically, assuming changes in initial conditions, what this does is that this essentially confirms existing scientific knowledge by saying that, in these exceptions this is what happens therefore, this is true in a more general sense right.

So, here is what, we come to learn about paradigms, all hypotheses have bound out of a certain basic theoretical ideas, on which most of the scientists are formulating their work. These basic scientific ideas, themselves are a product of a great path breaking, work in the past. And this path breaking work has created a basics, a new scientific tradition, which is being followed today right. And this scientific tradition has what is called it is paradigm, that is a dominant analytical model. So, a writer like Thomas Kuhn, history of scientific revolution tries to tell you that, most sciences rest on paradigms. And paradigms are continuously threatened and questioned by verifications right. So, most as, I have just now told you.

Most sciences have a built in defence mechanism, constantly scientists are encouraged to do research on changing initial conditions and studying, what happens to the scientific phenomena under consideration. Now, this kind of research is what I call head streaming research; it is head streaming, because the head is already there. You keep trimming it to different shapes right, the theory the paradigm is already there, you keep trimming it in different shapes basically doing two things, one improving the flexibility of the hedge, it can get into different shapes. And more importantly in confirming the hedge itself, that you do not need any other plant other than this by, if you keep on trimming and you can get any shape. So, this kind of research, which I call head stream, head streaming research is a research, which confirms and affirms a paradigm.

Nine out of ten activities or research are of this type occasionally, a particular scientists starts into the an area of research, either wittingly or unwittingly which starts questioning the very basis of a hypothesis. Which starts questioning on the very foundations of a paradigm and then their statistical verification, everything go on. And the questioning becomes, deeper and more profound till sustain us the whole scientific world image, surrounding a particular paradigm is shaken very badly. Now, the scientific world does two things when this happens, one they look the other way, they look the other ways saying well look he is done this work, but you know all that exists is so important, so valid. So, much research has been done.

And what is going on he has involved so many laboratories, so much of funding, so many scholars so many this, we cannot shake all that in other words, this is an establishment view. What I am trying to argue is any earth shaking work in science, which ends up consciously or unconsciously, wittingly or unwittingly questioning a

paradigm is fundamentally seditious is fundamentally seditious, because it shakes up an establishment. It has a political role unwittingly or wittingly and triggers a political response one, second more importantly, there is an attempt in the large body of science, to incorporate this x has said that this does not work. So, let us see under what conditions, that this will work.

So, incorporate the critical, work which shake up shakes up the paradigm in such a manner, that it is absorbed into the paradigm as a very special case, or as exception and so forth right. In that case you have converted the seditious work into a work, which confirms the establishment. So, this means an adaptation of the scientific concepts so, you create a whole lot of head streaming activities in this direction right. So, when there is a fundamentally, radical work a revolutionary work, which threatens a paradigm the first response of the paradigm is to adapt, is to adapt to this threat. And either the paradigm adapts itself in such a manner that substantively, it remains the same, but formally.

It accommodates the fundamental questioning of the work then what happens is paradigm goes, richer and stronger and more extensive in it is capabilities. And in consuming this seditious work, the paradigm is ground stronger. So, what is happening here is a selective selection process as in the case of species in nature, there are scientific ideas and ideas, and ideas, and ideas which constitute an existing set of selection. A particular set of area, of particular area of research, a particular set of hypothesis get confirmed by the establishment. And this view goes on till some fundamental work, which occurs questioning these. And when the questioning happens, the response of the establishment is to adapt.

Adapt and adapt in such a manner as this questioning is assimilated, if it is not assimilated, then a suitable rejoinder must be produced, which rejects this seditious activity. In other words this is the argument of Kuhn, when a paradigm is fundamentally questioned; it results in the credibility of the paradigm in the sense in which, we have talked about it earlier. What happens then is that, a new work sets of a process of change which results, in a very change of paradigm itself then, a new scientific orthodoxy is born. A new paradigm is created and Kuhn says this is, how scientific revolutions happen I am saying it is slightly differently.

I am saying it may or may not happen what happens, here is that a seditious activity in science sets up an adaptive response in the routines of research, in the routines of teaching right. Which the scientists are absorbed in please note that, I am using evolutionary language, here by talking of routines. Because all teaching is nothing but routines, of creating thought patterns in students. And these thought patterns are things, which are part of the establishment of science. And these are based on routines of research, which have created bodies of knowledge in science, which are meant to be taught. So, the whole of the science rests on particular routines of research particular routines of teaching, all of which contribute to the establishment in science, to a particular paradigm.

So, when a particular paradigm is under question, when a particular scientific orthodoxy comes under fire with new research, as I said the protest does not take the form of an attempt to repress the questioning. The response is actually much more survival oriented, it is to assimilate accommodate and adapt. So, that the new questioning is also taken in without the establishment, being fundamentally shaken. In other words I am saying that, there is an evolutionary process involved here, in slight variation with Kuhn and others. I am saying that it is only, when a particular body of knowledge cannot adapt itself to change anymore, that it results in something new. That results in something fundamentally different a new paradigm.

So, by that time a new paradigm comes long attempt, long series of attempts or adaptation and modification have been tried to assimilate and accommodate, when this is not possible, the revolution does happen. To me this selection process is like, selection of populations in a very Darwinian system, there is an external challenge here in the. And the world image of science, the external challenges statistical credibility, see what is happening is the world image, is very static in the sense. That it is a given set of propositions, which are designed only for logical coherence, is it not. Now, for instance when you postulate elasticity of demand, in a particular way and state it in terms of first order differential conditions.

You are doing it, because it is the most coherent way of doing it right. To state that d by d p where d is demand and p is price, as a particular inverse correlation. You are stating the relationship in demand and price in a very right rigid, statement of coherence. So, the rigidness of the statement of coherence is a heart of the scientific world image. And

because it is so, rigid as a text it is very inflexible whereas, human experience is continuously dynamic, human experience is nothing but dynamic. So, there is a fundamental structural this is my argument, there is a fundamental structural contradiction in the very structure of the building knowledge between the world of experience and the world of, I mean world of world images. World images are fundamentally texts, whose validity is in the tight net, argument of the text. The world of experience is one; where there is no text which can bound them, which can limit them it is continuously dynamic and full of uncertainties, full of new things novelties.

So, there is a fundamental contradiction between in human condition between the world of experience. And scientific world image not just scientific world, world image in a very loose sense, talking of even the way we speak. So, the world images is compel to adapt continuously, constantly, continuously adapt to the continuous dynamism of change with a world of experience is pushing on it. So, as I say knowledge is an evolutionary process, knowledge is a process where there is a continuous adaptation to change to external pressure. And when adaptation fails a particular body of knowledge falls, apart and a new body of knowledge comes into existence. And when this happens yes, that is when Kuhn's paradigmatic revolution takes place.

But my argument is there is a long long, way to go before such paradigmatic revolutions do happen. Because establishment tries adaptation, adaptation, adaptaion, adaptation till you cannot survive anymore, till only the rival survives. So, there is an evolutionary bases to this as I argue.

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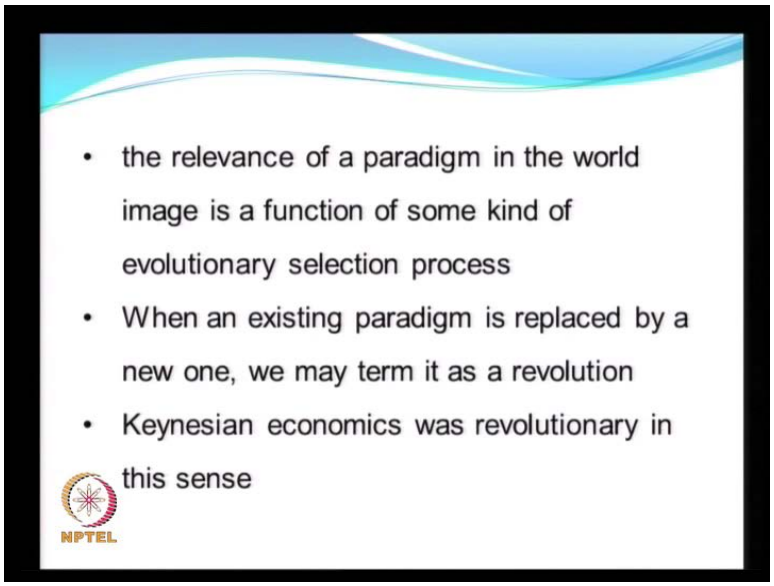

Now, when this happens, when adaptation is no longer possible, then an existing paradigm is replaced by a new paradigm. What does this mean a new establishment is born, the new paradigm becomes the bases of new orthodoxy. And this new orthodoxy becomes the bases of a new establishment. And another set of head streaming activity start around a new paradigm for generations, till something else happens somebody questions it somewhere. Some fundamental work comes up from somewhere, which questions the very bases of the paradigm, again attempts at adaptation assimilation, if they succeed then, the fundament question is assimilated. If they do not succeed then there is yet another paradigmatic revolution.

So, my submission in the social construction of knowledge, in general and science and particular is that Kuhn's revolutions do not happen that easily. There is a considerable evolutionary process involved and Kuhn's revolution is only, one stage in the evolutionary process, when a particular species is knocked out, as unfit for survival and something is selected in it is place. So, if you look at in an evolutionary fashion, what is important to it is to see, how adaptation is happening all the time. Now, in what remains of the time I shall illustrate all, this with economics.

I shall first, use the case of Marxism then I shall bring in Keynes as two different examples, what Marx was doing was, he was questioning the idea of perpetuity of a capitalist economy as a bliss of efficiency. In other words Marx was saying that the

capitalist economy is a historical entity, unlike all historical entities it comes and it must go. And in that again he was merely stating the case of Ricardo very beautifully, a lot of Marx's economics is record in economics in the sense it is Ricardo, who actually was the early predictor of the crisis of capitalism. The falling rate of profits, which is so crucial to the crisis of capitalism, is first in Ricardo. And so the Ricardian economics stated very beautifully by Marx in his writings, but eventually Marxian economics, acquires credibility as a rival paradigm of not the validity of capitalism, but of the very nature of capitalism.

So, Marxism comes under questions a whole paradigmatic structure of classic and neoclassical economics, which the Marx's call economics. And the politics of it is so clearly illustrated that, where Marx's come to power Marxian economics comes to power paradigmatically, where Marx's do not come to power, Marxian economics does not come to power paradigmatically. In short there is a innate pragmatism in Marx's when they say that they must capture power, in order that the transformation is effective. Capturing power is not only a precondition, but is the very process of transformation according to Marx's.

So, the political nature of the scientific revolution is inherent, in the very way Marx's look at change. So, when Marx's came to power in Soviet Union by 1920-21, there he defined a whole lot of disciplines, including psychology for instance. The idea which was most popular with Marx's was behaviorilism of Pavlov, have you studied Pavlov, about Pavlov's dog behavioural psychology says all learning is condition reflex. So, the best example of that as Pavlov showed was a dog, which was put in a cage or wherever and it was fed at a particular time every day. And the dog salivates when it see the food, then for a few days, each time the food is presented to the dog a bell is rung and then the dog salivates. And after while there is no food only. The bell is rung and the dog salivates and by this they proved that salivation is a condition reflex, they say then all learning is condition reflex.

Now, Pavlovian psychology, became immensely popular under the soviets in the first two decades of their rule, for the simple reason that, it was believed that the whole population at to be conditioned, in an educated in socialist thinking. And socialist behaviour, socialist psychology should not be Boojwah psychology, it should not be like fried, which talks of you know sexuality and so forth which is all Boojwah, degeneracy

according to Marx's. So, Pavlovian psychology became immensely important likewise legal system has to be adapted. It was considered that, marriage at least in the first few years of the third decade of the century, that is from 1920 onwards in number of soviet cities, it was thought that marriage is a boojwah institution, whereby one becomes a property of the other.

So, you cannot have that boojwah institution, people should just live together without such boojwah trapping so, people just live together. And a vast number of children were produced by this living together, who had serious identity problems say twenty years down the line when, they had to look back and say who were their parents nobody knew. They were born and they were brought up by some home or something, because their parents produce the children and left them somewhere, it was not part of marriage part of family, this family was a boojwah institution.

So, what I am trying to say is that, whole paradigm of existence come into existence with the coming, into power of the soviet with union right. Now, unfortunately or fortunately the raise of the soviet power, itself was a very suvtle question of the writings of Marx. Now, Isaiah Berlin, whose probably the greatest biographer of Marx, ever says this about Lenin's revolution in Russia. He says, where did Lenin learn his lessons from about making revolution in Russia, certainly he did not learn from Marx, because in Marx's writing capitalism, is hardly exist in Russia. This hardly any major industrialization and capital, Russian capitalism whereas, in Germany and Brittan capitalism substantially advanced.

So, the kind of contradictions of capitalism which should develop between the working class and the capitalist existed, lot more in Germany. Than in Russia so Isaiah Berlin says certainly therefore, Marx did not teach Lenin how to make a revolution, because there was no lesson for Russia from Marx. So, where did Lenin learn it, so according to Isaiah Berlin Lenin learnt it from the secret societies of pre-revolution France. The Jacobins he said they were the early secret of societies, which knew how to organize to understand groups, will understand organizations is a particular ideal and then, how to successfully make revolution, which the Jacobins structure did in France. So, according to Isaiah Berlin there were Jacobins of Russian variety like, people who are Russian Jacobins in the sense nineteen century Russians, who believed in the Jacobin philosophy of over throwing the zaar and making a revolution etcetera.

So, according to Isaiah Berlin it is people (( )) and the Russian Jacobins would taught Lenin, how to make a revolution in Russia and not Marx. Fundamental issue, because Berlin says the crisis of capitalism, which should lead to revolution existed more in Germany than in Russia, because capitalism did not exist that much in Russia. So, this means that, even in doing is revolution Lenin had broken the boundaries of Marxian, understanding of revolutionary situation. And very true because Lenin made his revolution, not as workers revolution in Russia. He called it the smychka, smychka is a Russian vehicle with three horses driving. it is along with three horses and it is called smychka, he says there are three horses, which draw the Russian revolution, when the workers another the presents and third the soldiers.

So, the Bolshevik party created discontent in the name of revolution, in these three segments of Russian society and created the mass base for revolution. So, already Leninism had challenged Marxism as a paradigm, see what I mean, which is why later day the by the nineteen thirties Marx's, were talking about not Marxism, but Marxism Leninism right. Here is a classic case, where Marxism as a paradigm adapted, adapted become Marxism Leninism by 1940s Mao had successfully, contacted his revolution in china not smychka, but entirely presents. There were no working class in Chinese revolution there was no soldiers.

The soldiers were actually people's liberation army which was selected from the presence. So, there was not even in an excuses of smychka with Maoists, but still communist international had to adapt the paradigm it cannot simply say it is relevant. So, they said Marxism Leninism Maoism so, you can see in the history of Marxism this adaptive process, it very is very much at work right. This adaptation goes on and on and on till a man like, gorbachev comes up and says you cannot adapt anymore. You cannot so far away from your ideals that the system is breaking down.

So, he talks a something else he talks a perestroika, but you talk about perestroika you are basically dismantling the system. So, that finally, soviet Marxism Leninism dismantled itself, has a logical consequence of it is own actions of the past. But what is important here is to see adaptation at work. In the paradigm of Marx let us now look at another example that of Keynes, when Keynes was writing there were three or before Keynes started writing, there are fundamental assumptions in economics.

One that markets always deliver, the free market economy is the only solution to social welfare that is from Adam Smith onwards.

And the theoretical foundations of Walrasian economics and Marshalling economics and saysian economics confirmed that, theoretically this is so. And the next was people were rational and it is this innate rationality of people combined with their hedonism, which ensure that this invisible hand worked right. By the time Keynes started writing in the 1920s these things came under question from the world of experience, from the world of experience. It was found that from the later half of 19th century onwards, market mechanism was not working as theory predicted it would work.

According to theory as we have seen already, the automatic adjusting mechanism in classical economics lay in the flexibility in the wages and process. So, when there is an external shock wages and prices move and make adjustments so that the system is restored to an equilibrium, we have seen how this happens, we have also seen that as a matter of experience. In the last quarter of nineteen century wages and prices became more and more rigid across year up.

So, this automatic adjustment mechanism because, more became more and more difficult to defined. So, by the time Keynes was writing people, had come to understand that this there was something that had to change. Second when Keynes was writing one of the very backbones of the classical system, of thinking gold standard had collapsed. Now, gold standard existed when all the counties accepted that their money was measured in terms of a particular quantity of gold and therefore, money supply was regulated according to the stock of gold in the country. This rested on very strictly discipline on the part of the governments and maintaining the gold to money supply ratio.

So, that exchange ratios were stable, when exchange rates fluctuated due to balance of trade differences, transfer of gold would ensure that prices would be at far and therefore, international equilibrium persisted this went on up to the first world war. In the first world war as we saw British government had to be profligate they had to spend oodles of money in the conduct of war, where did the money come from with the printing press. So, by the end of the war Britain had considerably perforce miss managed it is monitory system. The British pound was vastly over valued in term of gold at the end of the war. So, the British government set about trying to re-establish gold's standard and Keynes

wrote to say that what is happened is a fundamental macroeconomic disorder you cannot simply restore, gold like that it will be a chaos and it turned out to be that.

So, what I am trying to say is that the credibility of the theoretical apparatus had been questioned by the world of experience in a very fundamental way. The writings of Keynes offered an alternative paradigm, which explained it the word of experience more, loosely more credibly. In the first place Keynes assumed, very clearly and stated very clearly that unaided uninterrupted, market mechanism is useless. You have to think in terms of government as an active intervener in this system to sustain, the vary market process. This changes the fundamental assumptions, second Keynes said people are not rational, people's behaviour in the investment market follows animal's spirits, they invest money on the bases of, how they judge the market to be in terms of their confidence levels in the markets. In other words some irrational confidence factor, which fundamentally influenced in investment decisions and therefore, the marginal efficiency of capital and so on and so forth, in short investment, was a fundamentally irrational or a non rational activity which Keynes called animal's spirits.

Which was at the back of every economic crises so it is the irrationality of economic actors or non rationality of economics actors which Keynes, accepts as a reality and designs, a tool kit suited to accept this and then carry on and making adjustments in the economy. So, in a very fundamental sense when Keynes talks of consumption expenditure as a function of income and investment, as being autonomous of that he is talking very realistically about. The fact that it is expenditure decisions, which are crucial in the country. And not as says is production decisions, according to say when you produce something and market it automatically, you create a demand. Keynes says no it is expenditure decisions, which are crucial which determine the demand in the market level of effective demand.

And that determines how much is produced, it is the other way around and Keynes proves this in a world of non rational human beings to his tool kit. So, what is Keynes in economics it is a huge paradigmatic shift, it is a huge paradigmatic shift in terms of all three factors, which were mentioned as the underlined premises of classical economics. And Keynesian in economics gets accepted eventually, universally without any question.

Of course, without with the exception of Chicago and Milton Friedman, who remain staunch anti Keynesians right through for years afterwards, but the fact remains that Keynesian economics gets excepted otherwise universally.

So, Keynes then is a fundamental paradigm revolution in economics. In a very kuhnian sense at the same time this revolution does not happen very peacefully, for nearly twenty years there are attempts are continuously, synthesizing Keynes in economics with classical economics. The whole of the I S L M models, which you study in macro economics, is nothing but attempts to marry the two eventually, by the 1970s monetarism as an alternative theoretical view replaces, the significance of both Keynesian and the classical Keynesian synthesis models.

So, what we are looking at here is not just a revolution, but continuous attempts and adaptation classically, adaptations. Now, more recently with the coming into existence Obama's economic policies, it appears that there is a revival of interest in Keynesian policies particularly, towards government spending large volumes of money. So, we are seeing here illustrations of the way the things work, first paradigmatic revolutions then adaptation of existing establishment paradigms. And sometimes, when a paradigmatic revolution seems to of exhausted, it is energies it is gets revitalized source of energy subsequently. And it seems to get a new charge of life, in short it is an evolutionary political process.

What we have done so far is to a go through a quick resume of what, we have done in this course, I have tried to show that the evolution of theory in economics is very highly subject to historical conditions, ideological conditions. And the way the very process in which selection goes on, in the emergence of scientific ideas. To illustrate this we looked at the way scientific ideas are born scientific ideas, are sustained and scientific ideas get transformed and adapted. We came to the conclusion that, it is a highly evolutionary process; we came to the conclusion that it is a political process aided by evolution. And therefore, science is positively a social construct all the time.

Thank you.