System Design for Sustainability
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Lecture - 07
Diverse Approaches to Design for Sustainability (Part B)

Welcome to the last lecture of this week. We will continue with our discussion on diverse approaches to Design for Sustainability. So, now we move on to the 2nd level which is the product service system innovation level.

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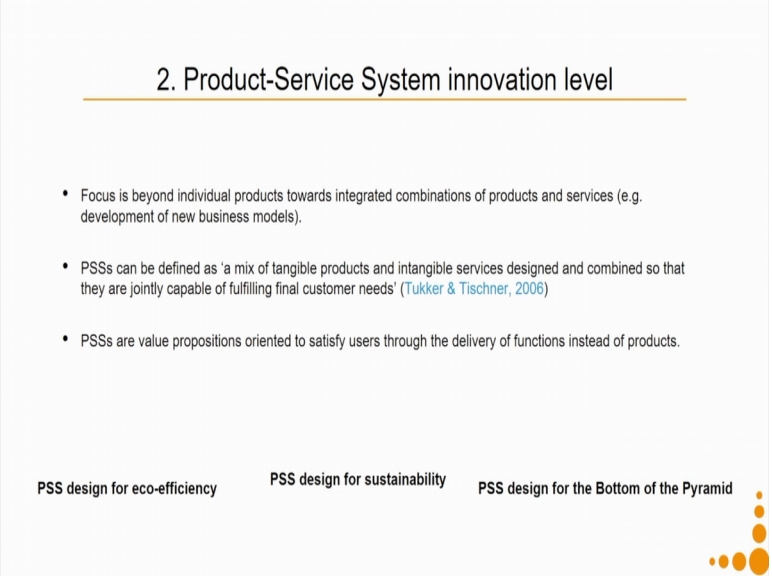

Here the focus is beyond individual products, towards integrating combination of products and services which means development of business models; on how the product will reach people, how will people pay for the product and so on. So, PSS can be defined as a mix of tangible products, tangible products which means products which you can touch, feel. So, say a architectural space because you can be there, that is a tangible product.

This mouse is also a tangible product; your computers are tangible product because you are touching them. So, it consists of a mix of tangible products and intangible services. Say for example, the cellular data that you get on your mobile phone is an tangible service as you cannot touch it. So, it consists of a mix of tangible products and intangible services designed and combined, so that they are jointly capable of fulfilling a final

customers needs. So, PSS are value propositions oriented to satisfy users through the delivery of functions instead of products.

So, we will come to what does this mean through some examples. In this category or in this level, we have three approaches; PSS design for eco efficiency, PSS design for sustainability and PSS design for the bottom of the pyramid which we touched upon in our previous lecture.

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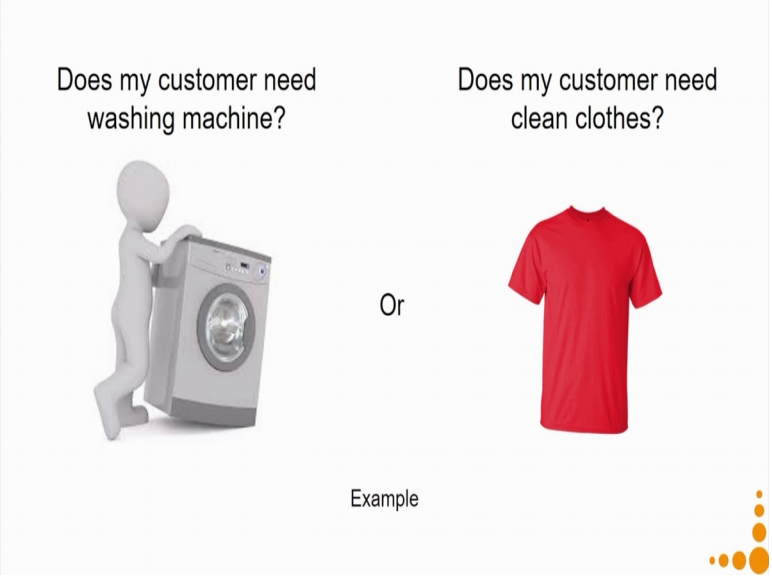

So, now to understand PSS and the basic crux of PSS, let us go through some examples. So, does my customer need washing machines or do they need clean clothes? Obviously, we need clean clothes. So, our unit of satisfaction that is the functional unit over here is clean clothes and it is not giving a washing machine. So, the product level intervention would always talk about making a better washing machine, but the product service level intervention tries to understand what is that basic need which I am trying to fulfil and how through combining a product and service, I can bring that need fulfilment.

So, in this case my basic need is clean clothes. So, this can be fulfilled by many different ways. You can hire a person to clean your cloths at your home or you can take your cloth to a laundry service, you can also own a washing machine and clean it, you can also go to community washing machine and get your clothes clean or maybe you can design cloths which do not get dirty. Another example does my customer needs air conditioner?

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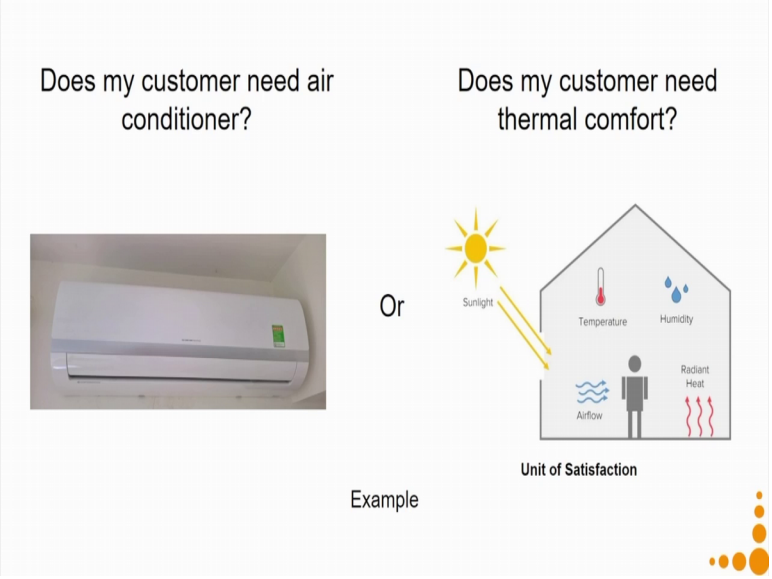

So, that is the product level of thinking that I need to build air conditioners, but the PSS level is no, my customer does not need air conditioner; my customer actually needs the actual unit of satisfaction here is thermal comfort; you give it in any particular manner. You can also give it through proper architectural design, you can also give it through safe hands, you can also give it through central air conditioning rather than having one air conditioner which is placed in every room. There can be many different ways of doing it.

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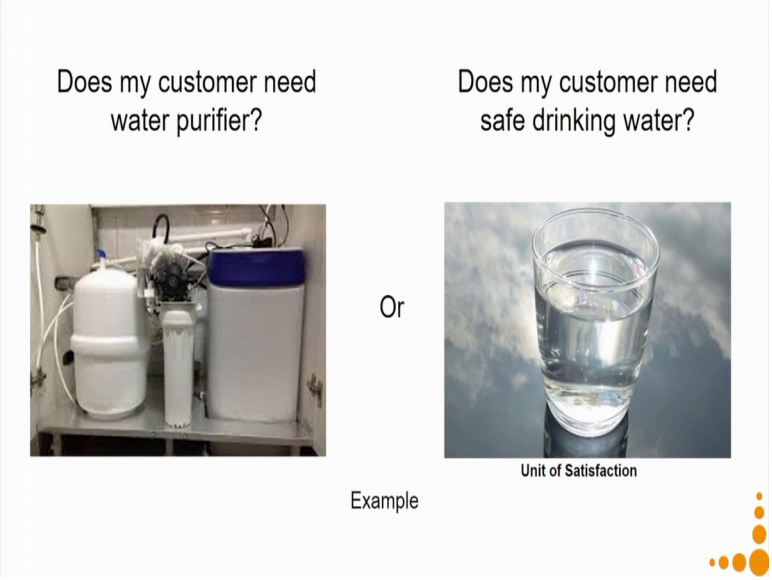

Does my customer need water purifier? Again no, the customer does not need water

purifier. That is a product level approach. My customers actual unit of satisfaction is safe drinking water. So, when in a previous lecture we were discussing about the Piramal Sarvajal Water ATM's, what we were trying to say is because we took PSS approach, it is product service approach, I know that my customers requirement is safe drinking water. So, I figured out, let me develop a product which is the community water dispenser, let me bring in a service which is like paper use. So, this is like an ATM where you can swipe your card or you can put your coins or you can put in currency notes and get water.

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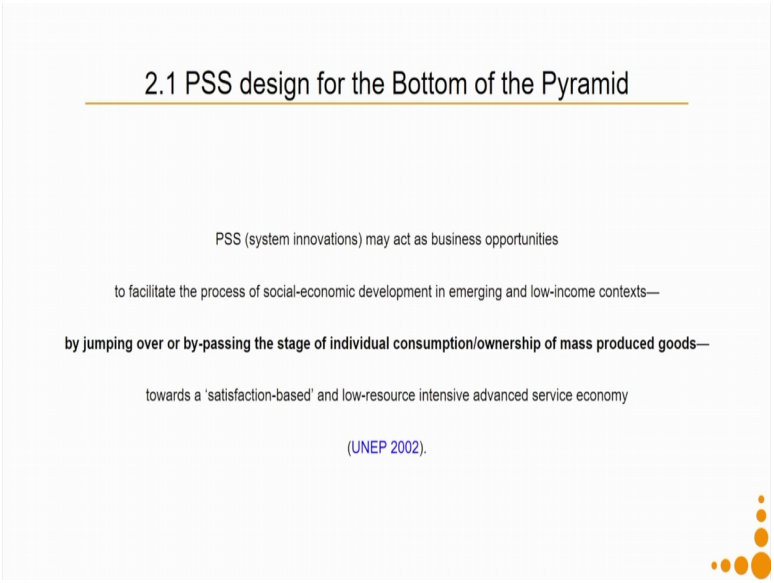

So, PSS system innovations, they may act as business opportunities to facilitate the process of social and economic development in emerging and low income context. So, when we are talking about PSS design for the bottom of the pyramid, what it helps to do is through a business opportunity, it facilitates the process of socioeconomic development.

So, now since the community has access to safe drinking water, there will be lesser diseases, there will be as a result lesser losses in work hours or kids will use lesser number of hours from school because they do not fall sick anymore because of water. So, to facilitate the process of socioeconomic development in emerging and low income contexts by jumping over or bypassing the stage of individual consumption or ownership of mass produce goods.

So, the product level intervention is individually every family or every person owns product, but this is case what I am talking about because that level of consumption is the source of sustainability issue. So, why not by using this PSS, let us jump that towards the satisfaction base and low resource intensive advanced service economy. This definition has been coined by United Nations environmental programme in 2002.

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So, the PSS model is shipped from a consumption based on ownership, you are still doing consumption, but it is not based on ownership to a consumption based on access and sharing. So, I have access to clean drinking water even though I do not own it and I

am sharing the resource with everybody. As a result, lesser number of those products needs to be produced and the machine which is produced will be used more efficiently; more will be used for a larger part of the day than it would be if it was on an ownership basis in my own household. Another example, so say solar water heating is very efficient, but the initial cost of installation is very high.

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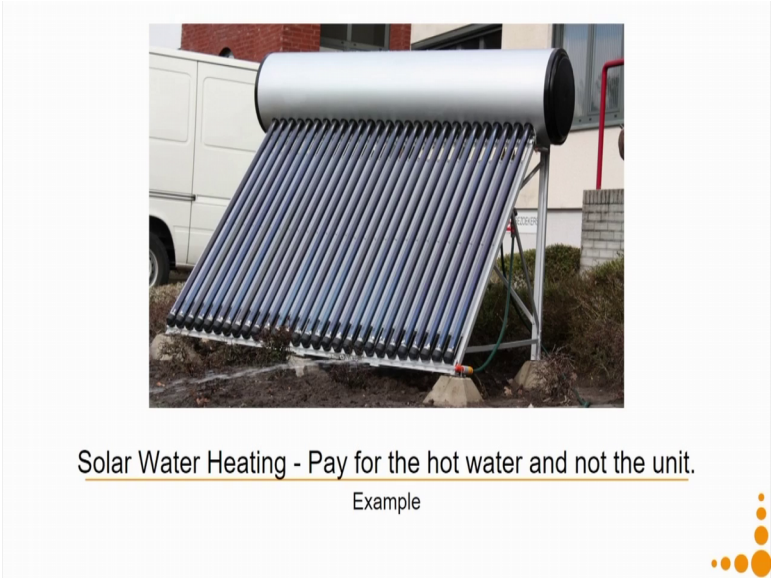

Again, my need is not a solar water heater or a geyser based electric, geyser based water heater; my need is hot water. So, in case a company comes up with a model in which I do not need to own all these solar water heating unit, it is still owned by the company, it is serviced by the company. What I do is, I just favor for the hot water and not the unit. So, now it is in the interest of the company that they will come with the very long lasting, very efficient solar water heating system, so that they do not have to spend much money on maintenance of it or on running of it.

So, what do we learn from here is since manufacture keeps the ownership of the product, right now our way of consuming is once I buy the product, the product belongs to me. So, the manufactures liability is very small. They might have a warranty for 1 year, they might have a service facility given to it, but I always pay for that service. So, it does not give the manufacturer and incentive to build up, build a very energy efficient or very long lasting product.

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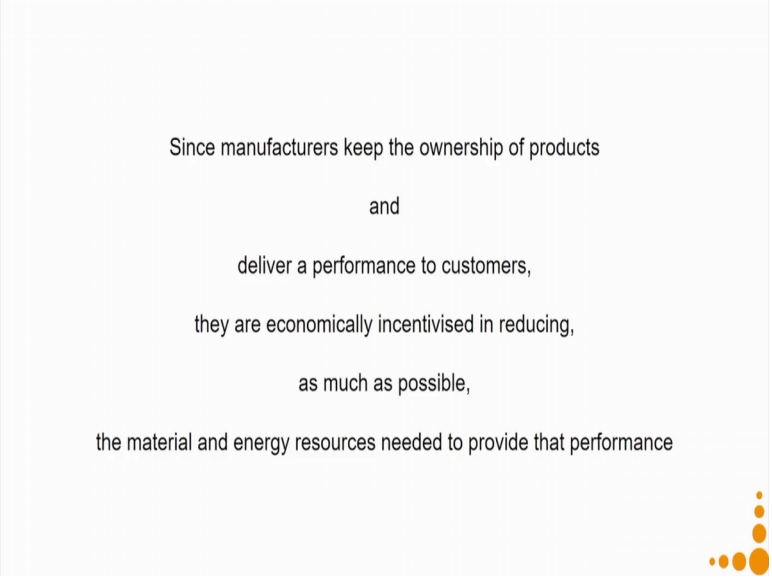

So, in this case what we are talking about is, manufacturers keeps the ownership of the product and deliver a performance to customers. When this customer delivery is happening, the customer is only paying say for example, for hot water, not even for the energy consumption. You heat the water the way you want to I mean the manufacturer can heat with the water the way they want to. Since, it is now manufacturers responsibility, the running cost of at the maintenance cost of it, they are economically incentivised in reducing as much as possible, the material and energy resources needed to provide that performs.

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It was something similar to what we discussed with Kluber lubricant service because they. So, this is the concept and this concept is called as PSS designed for eco efficiency where what it implies is an offer model.

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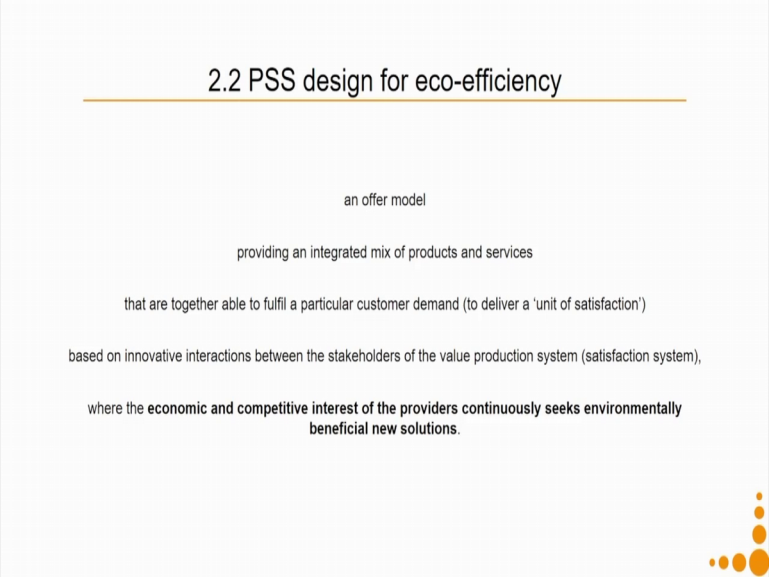

So, an offer model means a product service plus a business model. So, an offer module providing an integrated mix of products and services that are together able to fulfil a particular customer demand to deliver a unit of satisfaction based on innovative interaction between the stakeholders of the value production system. So, value production system is the satisfaction systems. So, the manufacturer and set of other stakeholders whom the manufacture might have collaborated with to provide the servicing, the maintenance and other activities, so the stakeholder of the value proposition system where the economy and competitive interest of the providers, they all form the providers group.

Providers continuously seek environmentally beneficial new solutions. So, it is in the economic and competitive interest no longer an ethical value. So, whenever it becomes economic and competitive interest, the companies or the providers set of providers will obviously want to be more economy, more environmentally sustainable.

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So, this can offer the possibility to find new strategic market opportunities for companies. So, the Kluber experience or the solar water heating experience, they are new strategic market opportunities for companies. It increases their competitiveness because they are offering something more than what the other competitors might be offering. Far from if I need to buy lubricants from another company, I will have to spend more money, I will have to spend money in doing my in house lubricant maintenance which now I do not have to do when I taking the service from Kluber.

So, it increases competitiveness, it establishes longer and stronger relationships with the customers which is quite obvious and builds a barrier to entry for potential new competitors. So, if a new competitors needs to come into the market, they have to build up the whole PSS model for themselves and build up a better PSS model for them to be successful in the market so, hence the barrier to entry.

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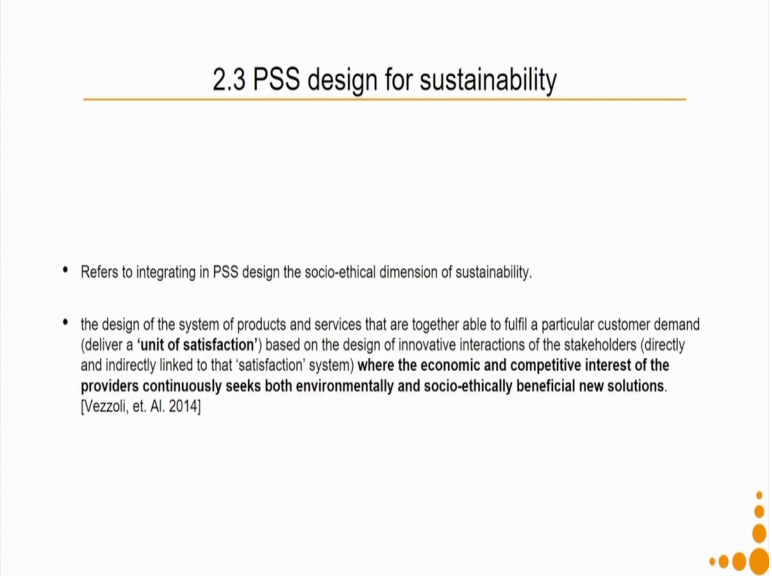

Now, comes the third concept which is PSS design for sustainability. It refers to integrating in PSS design, the socio ethical dimension of sustainability. So, when we were talking about the PSS for eco-efficiency, we were talking about the economy interest in being environmentally friendly. So, we are still not talking about socio ethical dimension. So, PSS design for sustainability at another layer to the echo efficiency definition, it says socio ethical plus economic.

So, how do we define it? The design of the system of products and services that are together able to fulfil a particular customer demand, that is delivered a unit of satisfaction based on the design of innovative interactions of the stakeholders where the economic and competitive interest of the providers continuously seek both environmentally and socio ethically beneficial new solutions.

So, this same definition is applied to the PSS for base of the pyramid. So, you can see we could bring in socio economic benefit, we could bring both environmental and socio ethical benefits to them. So, when it is up, this particular principle is applied to base of the pyramid, it becomes PSS design for base of the pyramid. When it is applied to society at large, it is PSS design for sustainability.

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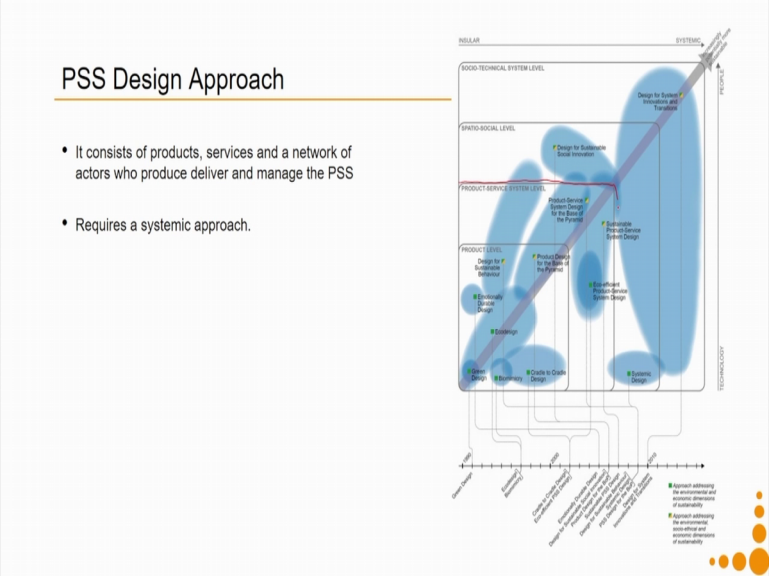

So, as you could see from the examples, PSS design approach consists of product services and a network of actors who would together produce, deliver and manage the PSS. Also you can see it requires a systemic approach. So, that is why in this graph you can see as the whole, the product service system has more systemic components as compared to the product level.

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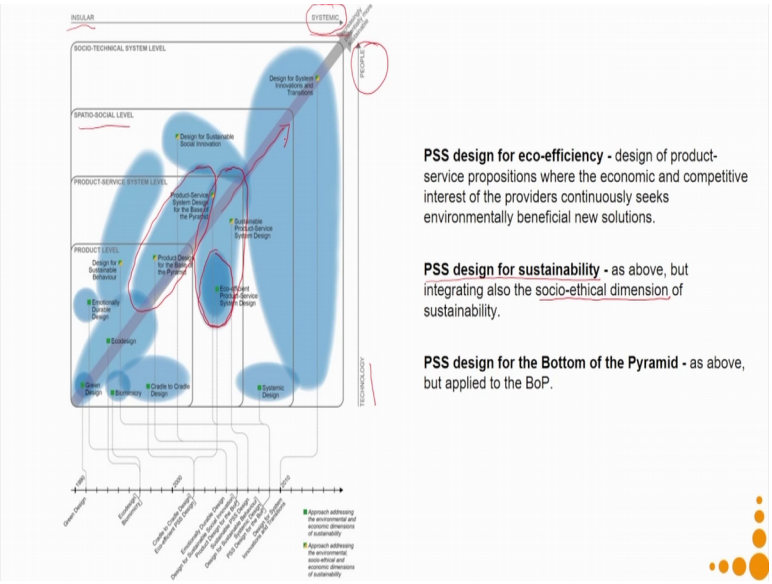

Now, let us put all these 3 PSS design approaches. So, as I told you PSS design for eco efficiency is the first layer which talks of design of product services propositions, where

the economic and competitive interest of the providers continuously seeks environmentally beneficial new solutions. PSS design for sustainability is the second layer as ever, but integrating also the socio ethical dimension of sustainability along with the environmental, PSS design for bottom of the pyramid is, it includes both the two layers so as ever but applied to base of the pyramid.

So, if we try to see them on the graph on the left side, so you can see eco efficient product service design lie somewhere here because we are still talking about technological development, but we are also talking about unit of satisfaction which is brought in by people. So, it goes little, but higher up on this particular graph because we need to involve more stakeholders. So, it is again somewhere in the middle between insular and systemic level as soon as I bring in the PSS design for sustainability which also involve the socio ethical dimension. So, you can see sustainable product service. So, we are somewhere here. So, we include more of the people domain, we become more systemic.

The product service system design for the base of the pyramid lies somewhere here. You can see it crosses between three sub levels. So, at the product level we discussed about it in the previous section, previous lecture. Now, we discussed about it in the product service system level. Next we will also discuss how it comes in the spatio social level. Higher it claims, more involvement of the people domain and more it get systemic. Also higher it goes in levels, the potential for becoming more sustainable increases.

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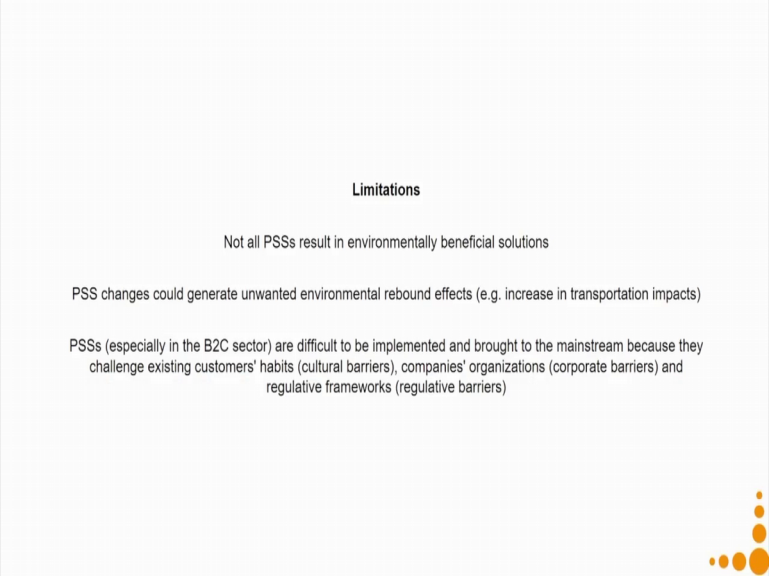

Coming to the limitations for this particular approach, you will see all the four approaches that we discussed. Each one of them have its own benefits and have their limitations. So, our solutions lies at how do we exploit the benefits and optimised on the limitations by transgressing between the levels. The levels are not hard defined; it is not like you cannot cross between levels, you can bring in features from 2-3 or more levels.

So, the major limitations are not all PSS result in environmentally beneficial solution. You have to build an environmental benefits, otherwise you might give a product and service system. So, your handset along with mobile cellular data connection is also product service system, but it does not result in any kind of environmental benefit.

PSS changes could generate unwanted environmental rebound effects say for example, increase in transportation. See in the case of the water purifier, if the water purifier keeps on breaking down too often and the materials required for repairing them is not to readily available, my transportation cost of getting my service engineers, getting my service components might increase. So, when I am designing this PSS, I have to consider that what all environmental rebound effects can happen and how through design I can optimise it.

Then, PSS especially in B2C sector, B2C is business to consumer like the water purifier that was the business to consumer are difficult to implement and brought to the mainstream because they challenge existing customer habits say for example, if people

are used to splitting here and there, then water purifier will soon start getting looking very dirty and people might not like to get water from there.

Say for example, what if people start washing their hands after having food in that water purifier. Again that is going to become very dirty and it does not have a mechanism to the, product is not built with a mechanism to digest all those food components. So, soon it will be a rafting place. So, challenge existing customers habits, also companies, organisation because now you have to collaborate with couple of other organisations, build a new business which might be completely new for you. So, that might be a problem and also regulative frameworks because there might not be laws and regulations for your kind of business model or the laws and regulations might prevent you from implementing something of that sort in the market.

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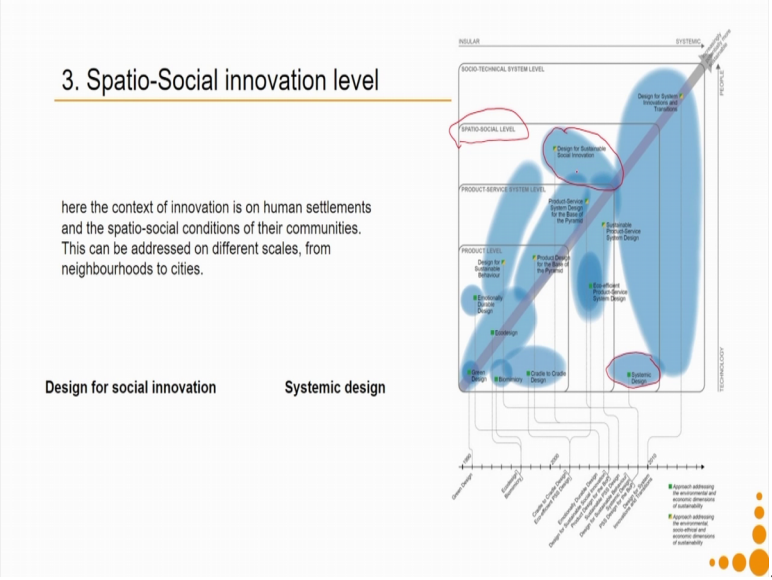

Coming to the third level which is the spatio social level, here the context of innovation is on human settlements and the spatio social conditions of their communities. What do we mean by spatio social condition say for example, a community living in a desert area will have a very different kind of space which is hard, dry, full of sand. Another place like hilly area will have a very different special characters and they might be on the top of the hill, they might be on the foot of the hill, there water situation at the top of the hill, you also have deficit of water because all the rainfall which happens in goes downhill, you have higher amount of soil erosion, that is certain transportation related issues

because of the hilly terrain.

So, in spatio social innovation level, we are talking about how this space and the social conditions of the people living over there, how do we innovate in those contexts considering the human settlement. So, this can be addressed on different scales, this can be from one small neighbourhood to as large as cities districts and so on.

So, it has to types of approaches design for social innovation and systemic design. This might be very surprising that systemic design is lying so close to the technology domain, it hardly has anything to do with the people whereas, the other which is designed for sustainable social innovation that fairly involves the people domain, but it does not involve much of the technology domain. It goes very far away from the technology domain.

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So, let us see what do the mean. So, design for social innovation, so the focus here is assisting with conception development and scaling up of social innovation. Now, what is social innovation? So, there are different interpretations and perspectives on what social innovation is and also, what role design can play in social innovation processes.

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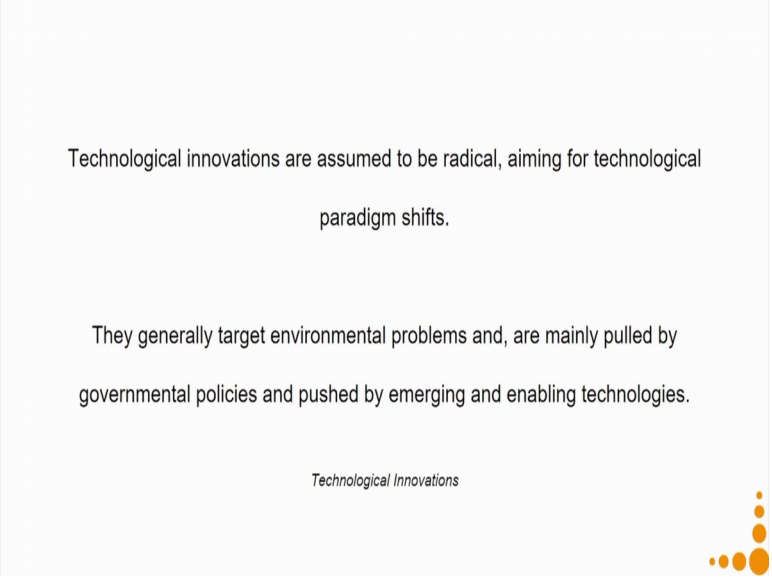

So, first let us understand what technological innovation is and then, go to what social innovation is and continue further. So, technological innovations are assumed to be radical aiming for technological paradigms shifts. They generally target environmental problems and are mainly pulled by government policies which means the government might set norms that your product should not lease more than this amount of smoke or your product should not consume more than this amount of energy and pushed by emerging and enabling technologies. So, new technologies might come in that can also push the environmental paradigm shift which might be independent of our politic government policies.

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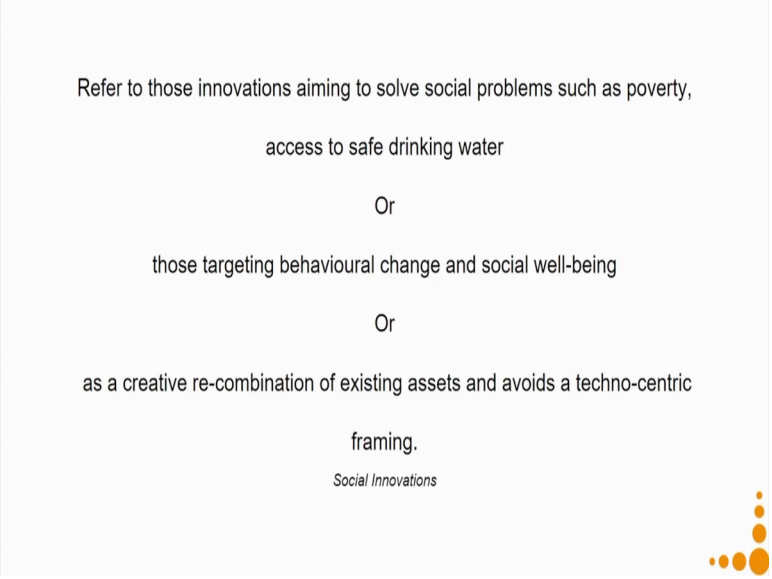

Now, what is social innovation? It refers to those innovations aiming to solve say social problems like poverty, access to save drinking water and so on or those targeting behavioural change and social well being or as a creative recombination of existing assets and avoid ethnocentric framing. What this one means is whatever knowledge on whatever infrastructure or whatever facilities you have at this moment which is your existing assets and avoids a techno centric framing.

What this one means is whatever knowledge or whatever infrastructure or whatever specialities you have at this moment which is your existing assets, recombine them with and avoid techno centric framing. So, recombine them in order to solve certain social problems. So, you can see there are many different interpretations of social innovations.

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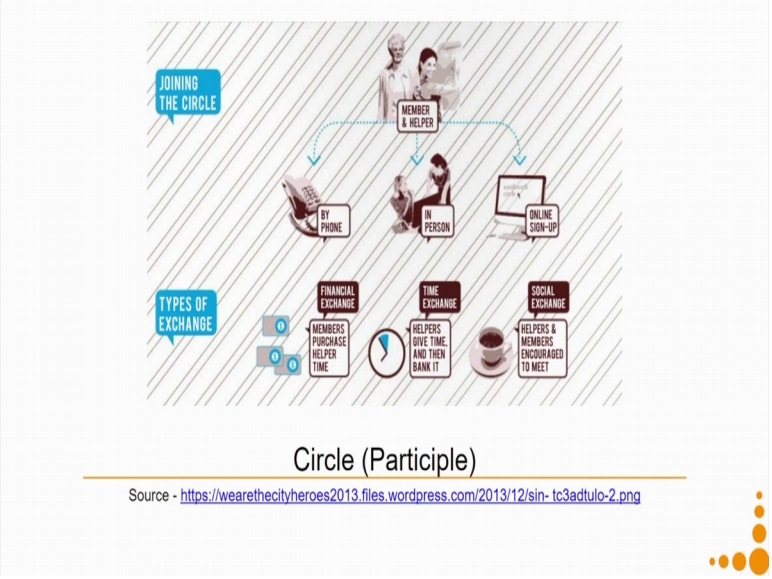

Say for example, like I told you in the social innovation category, there is hardly much technological innovation. It is only in this particular domain is talking only about social innovation. So, we use existing technology. So, this is one examples in this case a neighbourhood, people in a neighbourhood can join hands and help each other. The help can be of different types depending on what someone might need at that particular times. So, there is always a number. So, anybody could call in that number and get help from people in the same neighbourhood.

So, this is purely a social innovation and it can work by the existing mechanism of phone. It can also be as in person and it can also be an online sign of version. So, not much technological innovation, purely a social innovation where benefit of the society of that neighbourhood. So, everybody tries to bring in benefit to each other which is like social well being through security through helping each. So, this is an example of social innovation.

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So, in social innovation a key role is played by people and communities. Creative communities is commonly used term to indicate that social innovations usually emerge from the inventiveness and creativity of ordinary people and communities. So, sometimes these collaborations can also be with grassroots technicians and entrepreneurs between local institutions, between civic society organisations and so on, these ordinary people and communities. So, according to Manzini, it is defined as design for social innovation. Now, we are designers.

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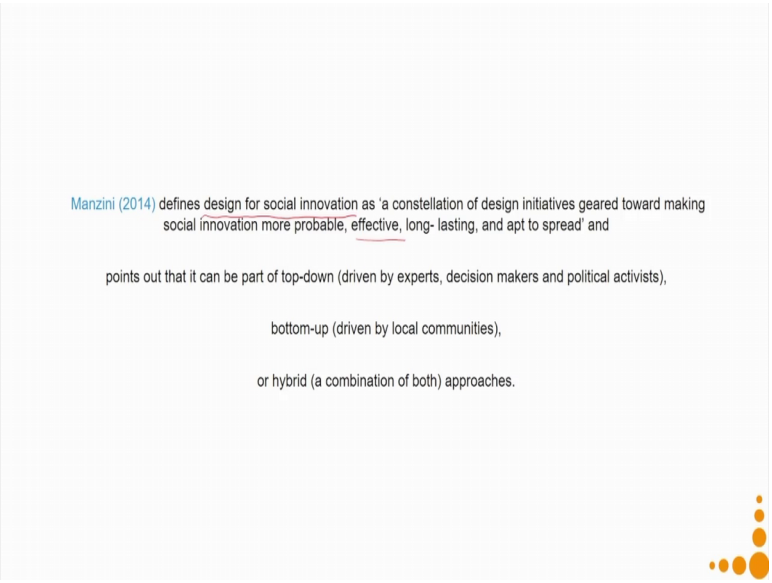

So, we need to understand what is design for social innovations? From this previous description, you can clearly see that a key role is being played by people and communities. So, not necessarily social innovation comes from the side of a designer, mostly it comes from the interplay between the people, communities and these are ordinary people and communities, but now as designers if we have to use this method to design social innovations to design for sustainability, what should it imply. So, Manzini defines design for social innovation as a constellation of design initiatives geared towards making social innovation.

More probably it is very difficult to guarantee that social innovation will happen. Even if you did all the things right, people might not accept it. So, that is why I am saying making social innovation more probable effective, so whether it could bring in some kind of social benefit or not, whether it could achieve sustainability or not. So, that is part of effective. Then, very importantly long lasting some initiative must just die out within a very short span of time and how apt it is to spread.

So, it happen in one neighbourhood. Can it be replicated to another neighbourhood? So, design for social innovation is all design initiatives which can be geared towards making social innovation more probable, effective long lasting and apt to spread and points out that it can be part of top down approach also. So, what is a top down approach? When it is driven by experts or decision makers and political activists, so the community or the people did not really initiate the process, but it was more driven initiated by the top level which is like experts or the designer can be one of the experts decision makers and political activist or it can be bottom up, where it is driven by local communities or it can be a combination of both of these approaches.

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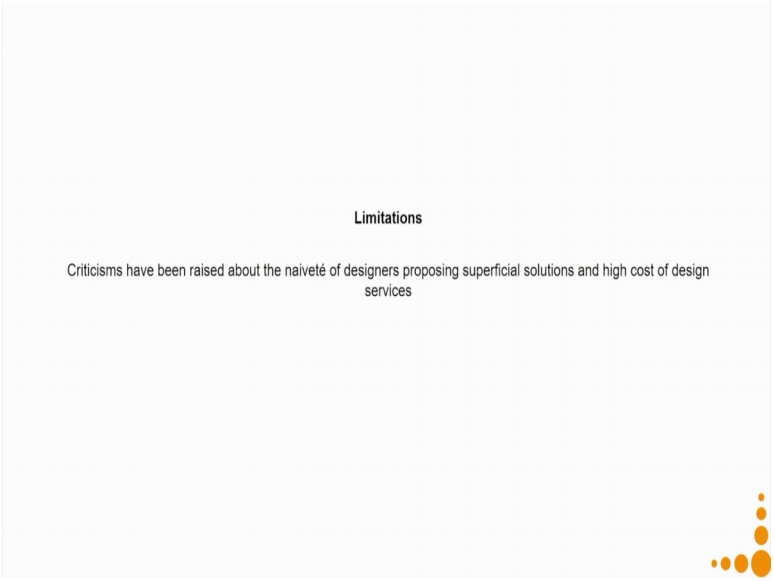

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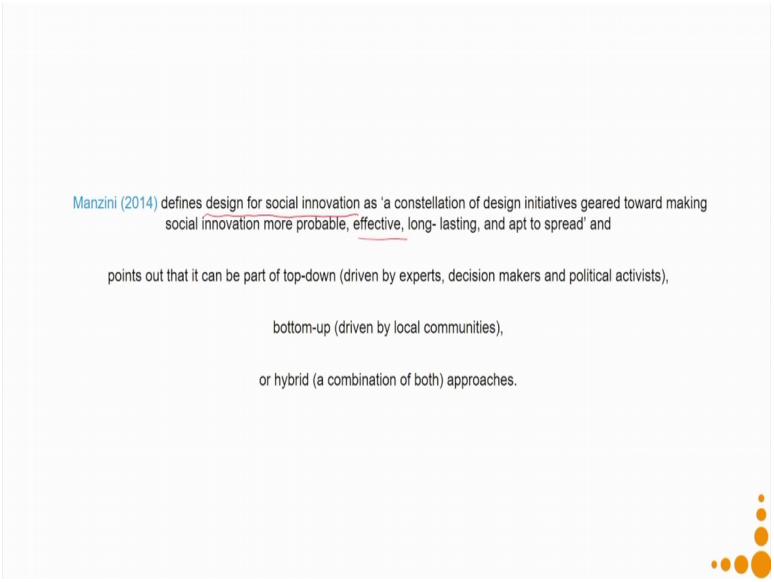

The limitation of this approach is like you say saw the definition itself of how design can play over here. It clearly shows that it is very difficult for a designer who might be an outsider to a particular community to come in and make any effective social innovation or long lasting social innovation. Most examples of social innovations have actually been driven by the local communities.

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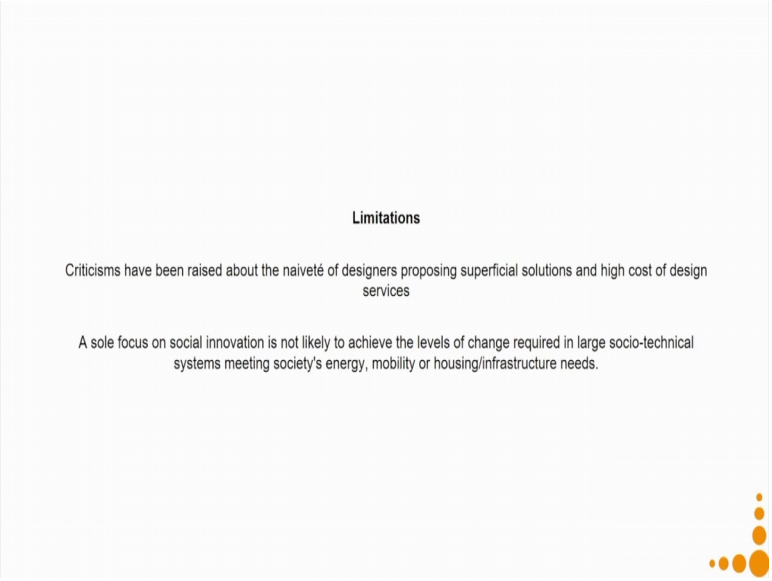

So, thus the criticism arises from that many and when designers design and not many a times when designer design it and not many design curriculum exist which will train designers to do this, but designer are very naive in proposing superficial solutions and also, the designers are very costly, then a sole focus on social innovation is not likely to achieve the levels of change. We require a large sociotechnical systems meeting societies energy mobility or housing infrastructure needs. Why? It is because you need technological innovations as well along with it.

We will discuss more about this aspect. So, when social innovation is combined with technological innovation which is my next level which is the sociotechnical level of innovation, how we overcome this second limitation because we bring in social plus technological together, but we have more problems added on because the picture becomes just too big and the timeframe required for doing such activities becomes too long. Coming to the second approach in this particular level is called as Systemic Design.

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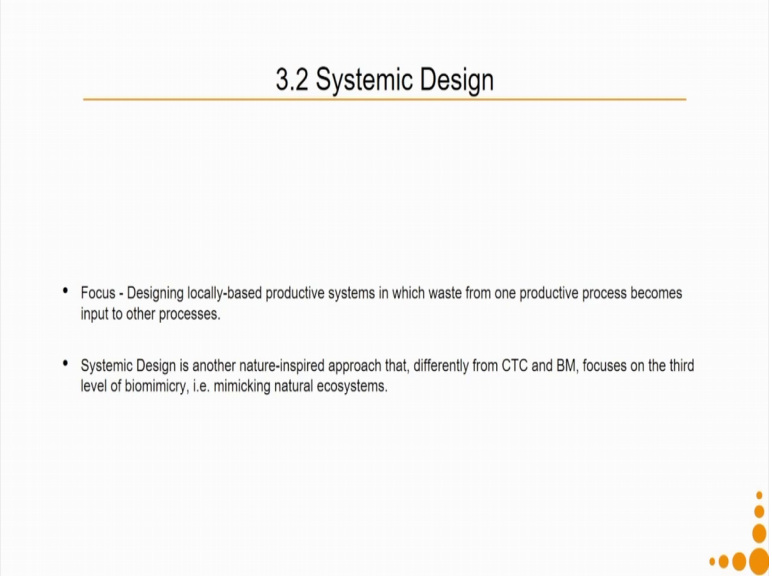

Its focus is on designing locally based productive systems in which waste from one productive process becomes input to other processes. You might find it very similar to our cradle to cradle definition or the bio-mimicry kind of a process. So, yes systemic design is another nature inspired approach, but it is different from the cradle to cradle or biomimicry approach because it focuses on third level of biomimicry. If you remember we were talking the biomimicry can be done at three levels; the form level, the process level and the ecosystem level. So, in systemic design we are talking about the mimicking natural ecosystems.

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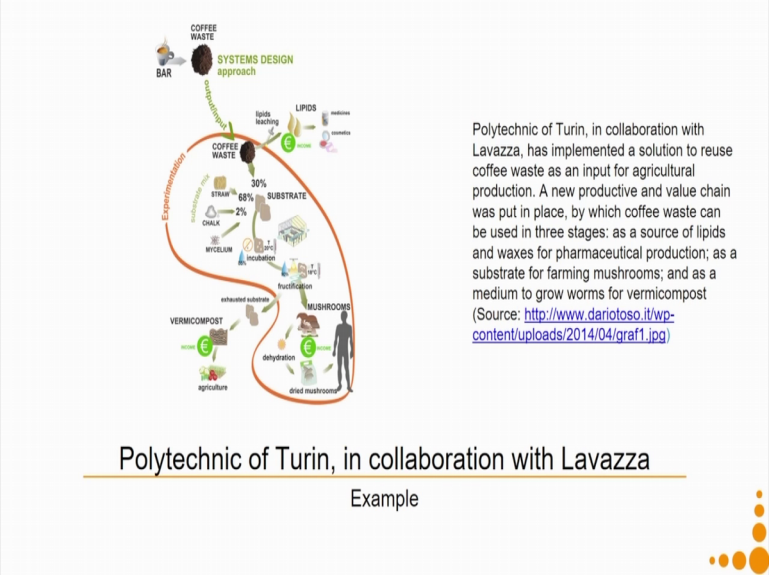

So, for example, polytechnique of turin in collaboration with lavazsa came up with a solution. So, they implemented a solution to reuse coffee waste as an input for agricultural production. You heard about this even in the blue economy case study that we discussed. So, a new productive and value change was put in place by which coffee waste can be used in three stages as a source of lipids and waxes of pharmaceutical production as a substrate for farming mushrooms and as a medium to grow worms for vermicompost.

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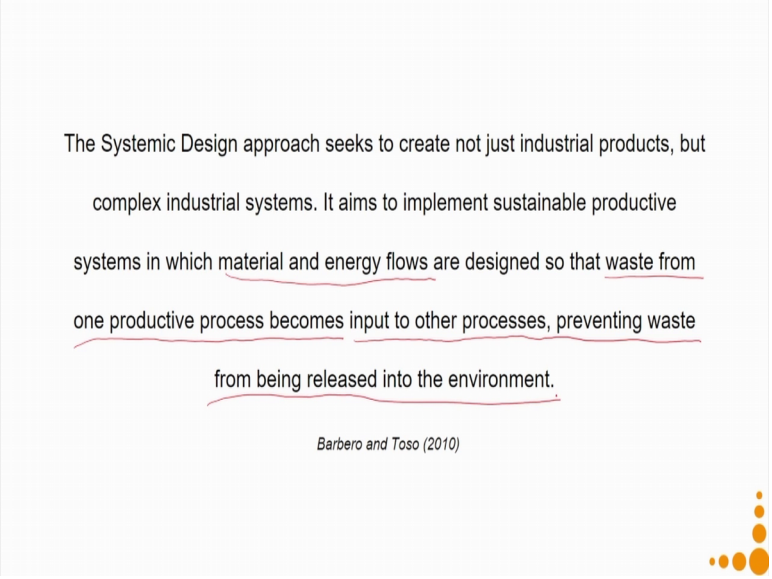

The systemic design approach seeks to create not just industrial products, but a complex industrial system. So, you can see in this particulars solution, the agricultural production was combined with the industrial production in which a complex ecosystem was created with three different processes in which the coffee waste can be integrated.

So, it aims to implement sustainable productive systems in which material and energy flows are designed, so that waste from one productive process becomes input to the other process preventing waste from being released into the environment.

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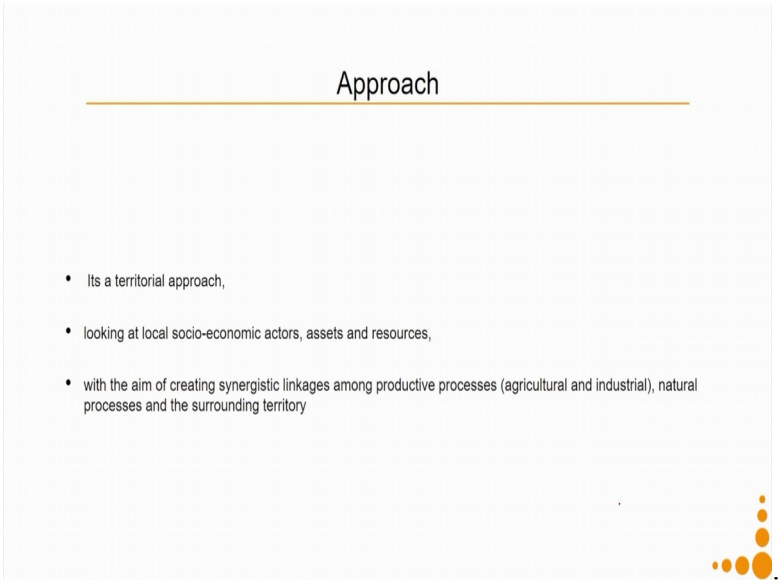

So, it is a very territorial approach because one region might be very different in terms of geography, in terms of agricultural production, in terms of industries that can be set, in terms of conditions and so on. So, this is a very territorial approach. It looks at socio economic actors, the assets and the resources available with the aim of creating a synergistic linkage among productive processes that is agricultural and industrial natural process and the surrounding territory.

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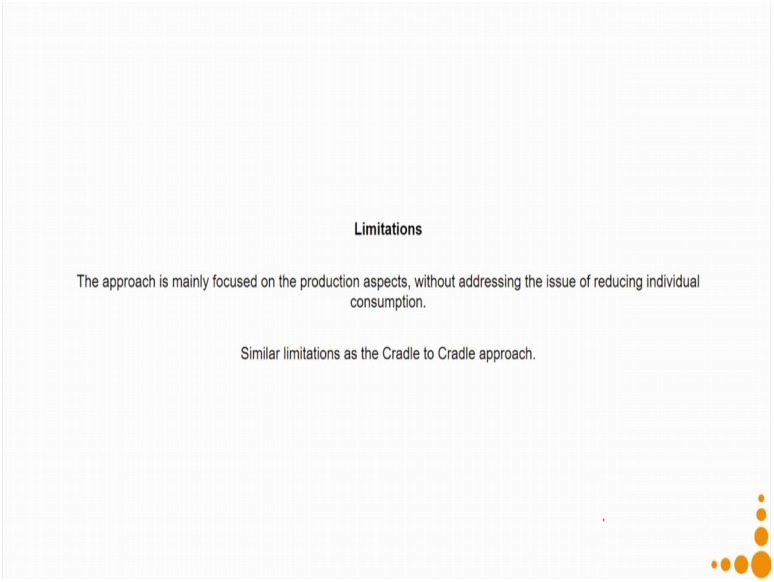

The limitation of this is the approaches mainly focused on the production aspect as was

the limitation of cradle to cradle or biomimicry. It does not have issues of reducing individual consumption. So, comes all the limitations of cradle to cradle approach like we discussed in our previous class. So, problems related to the fact that if you produce infinite amount of ways that does not mean the ecologic and observe all that at after at high concentrations, it becomes damaging to the human beings.

Also, you cannot recycle anything 100 percent. Even if you are able to recycle 100 percent, the quality is no longer 100 percent and in order to keep up with the increasing consumption, we have to keep on adding more and more virgin material to it to meet of those consumptions. Thirdly, there is no consideration for the energy or other material consumption which will happen during the use ways because the consumption is not considered. So, these are the limitations.

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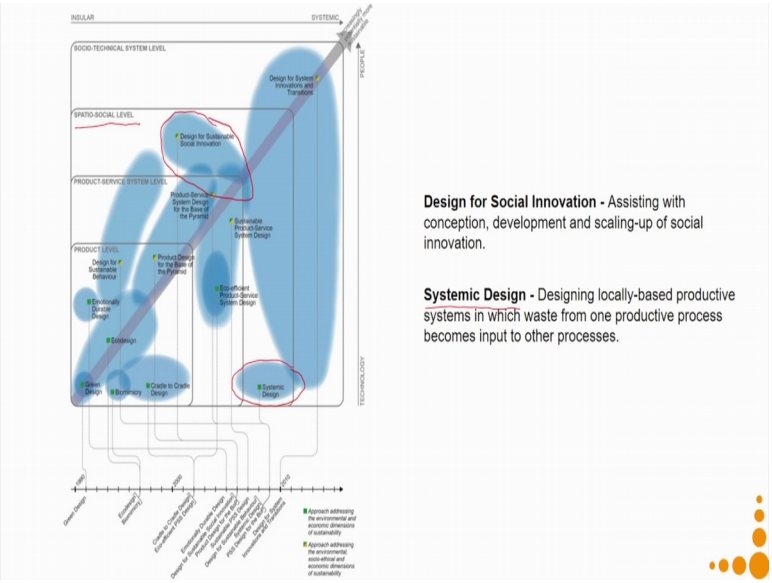

Now, putting them back into the maps, so you can see design for social innovation. It is way high up here. It does involve people, it is also systemic in nature to a great extent, but it does not involve technology. So, it cannot really solve bigger challenges of a society like energy requirements, transportation and so on. It talks about reorganising the current assets and how do we use to get the desired results.

Then, coming to the systemic design, it lies somewhere over here. It again does not involve the people domain because it is not considering consumption. What it is talking about is technology technological development, but it is very territorial in nature and that

is why it lies at the spatial level. It also depends on the agricultural activities of the people and other allied businesses of the people. That is why it falls in this spatio social level. It is because it involves the collaboration of many different types of stakeholders in the whole system and that is why it is very systemic in nature. Now, coming to the final innovation level which, is the socio-technical system innovation level.

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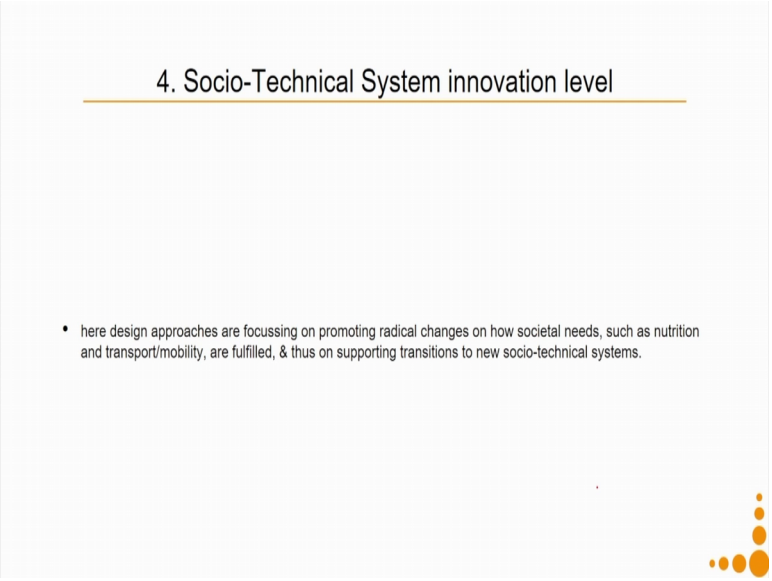

Here design opportunities are focusing on promoting radical changes on how societal needs, such as nutrition and transport, mobility are fulfilled and thus, on supporting transitions to new sociotechnical system. So, it involves both social innovation and technical innovation.

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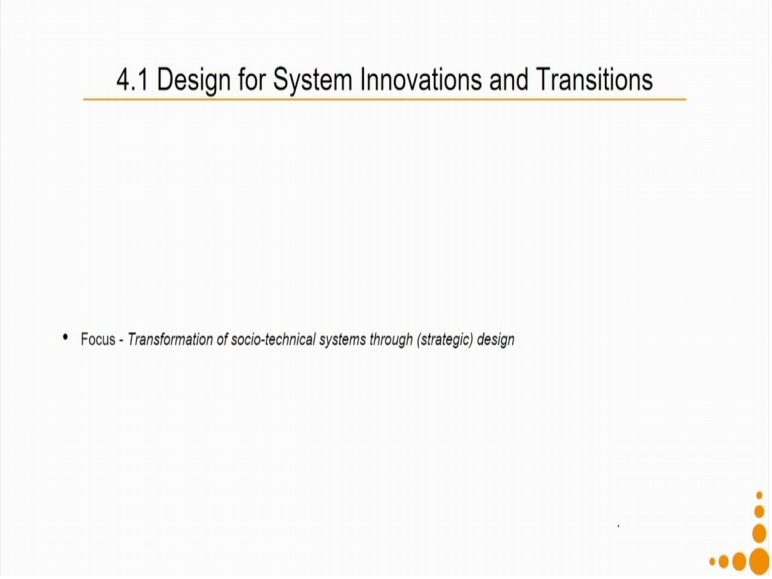

So, the focus is on transformation of sociotechnical systems through strategic design.

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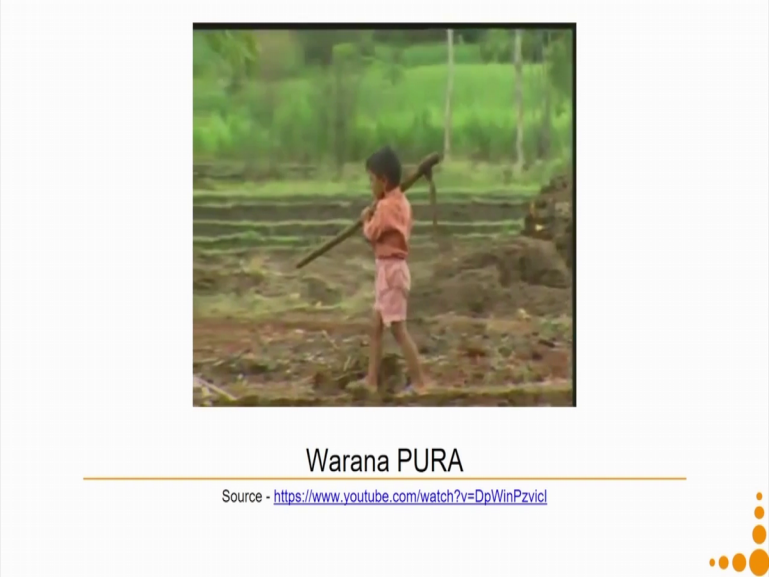

So, in our one of the previous classes, we discussed about the Warana Pura. That is an excellent example of a socio-technical innovation. We will again go through this particular video. Why? Because understanding socio-technical innovation, the length and the effort is very difficult in actual context. Many a times it is not one person, but it is the involvement of many people, many visionaries who bring in such changes. So, we will go through it again and then, we will try to discuss socio-technical innovation level

again.

Warana valley in Maharashtra a land of depravity of poverty illiteracy and crime a land that has wasted away in neglect, but were often robbed of even that. Yet from amidst this clue, there emerged a few young men Vishwanath Rao Kore, KD Patil and Yashwantrao Chavan of transforming this waste planet to a Vande Mataram. These youngsters left into the struggle for India's Independence a war the nation was the nation was. This was moment of realization for Vishwanath Rao Kore. He returned to his native village Corelli to fight the enemies at home first. Young Vishwanath Rao Kore was poised to chart a historic course as he serve the expanse of Warana Valley. As his visions crystallized a movement for renaissance, our revolution was born.

He started his fight with the setting up of Corelli High School. End of british raj, brought many new freedoms and opportunities for the farmers. Traditionally the farmers always process whatever little gain they had into jaggery. If instead cane was made into sugar, it would add value and earn more, but the farmers had no means to set up a sugar factory and that is when Vishwanath Rao Core hit upon an idea what if the farmers formed a cooperative. Convincing the farmers to be members,, telling them of this vision of Warana valley was not an easy job, but convince he did. He saw strengthen togetherness prosperity in cooperation. Finally, Tatyasaheb as Vishwanath Rao was now called, began a cooperative movement for sugar cane farmers.

The Warana cooperative sugar factory was set up. This brought dynamism to the one slumberous added Warana Valley. 80 determined villagers led by Tatyasaheb Kore crossed all hurdles, perseverance and confidence. The sugar factory grew in size and soon had the largest gain crushing capacity in India. Along with the sugar factory, the farmers of the Warana cooperative built 5 dams. The dams improved irrigation facilities and the yield of sugar cane rose dramatically. Sugar brought prosperity and it gave the farmers and their families a new lease of life.

Finally, Tatyasaheb Kore's dream of a farmers cooperative was realized. To improve the economic condition of landless labourers of the Warana Valley, Warana dairy was started. As an on the side enterprise of the cooperative, the Warana bank was founded to help the cooperative for financing new venture. The cooperative bank provided loans and necessary for cattle purchasing etcetera. The side business flourished and grew rapidly.

Today it has a state of the art milk collecting and processing plant with 3 lakh litres daily capacity. The Warana cooperative diversified by setting up for manufacturing humans to produce milk products like shrikhand, ghee, skimmed milk powder, lassi, cheese and butter. Today its shrikhand and lassi are market leaders. The women of Warana valley joined hands to form Warana bhagini mandal and contributed to the revolution. They have deprived themselves from the drudgery of household work. Tatyasaheb Kore's vision was to achieve a revolution, economic and intellectual.

Thus, Warana Vibhag Shikshan Mandal was born, the schools and colleges both in humanities and sciences was set up. Tatyasaheb's battles against poverty and illiteracy was slowly and surely won. The famous Baal Vidya Vrind became the voice of Warana Valley, world ever Tatyasaheb Kore military academy was founded with the objective of nurturing young boys to become a physician soldiers and citizens of the nation. Men, women and children, all have been transformed by it. There was no looking back after that and the other ideas followed.

The Warana Cooperative Poultry Farm an example of a rural enterprise turning even more profitable as a cooperative venture, the Warana bazar chain with branches and all the villages of the cooperative vegas, the waste from the sugar factory was used as raw material to manufacture paper, Warana distillery which uses molasses, a by-product of sugar to manufacture industrial alcohol, Warngau Agricultural Research Center devising environmentally friendly techniques for better farming, Mahatma Gandhi hospital enabling the villagers to easily access the best in health care.

The picture Warana valley the Tatyasaheb Kore's had envisioned was a reality for all to see and be inspired by the vision of Tatyasaheb was inherited by his sons. Shree Vilasdada Kore who envisioned the advent of Agro acknowledges is something equally dynamic. Vinay kore sow in Warana valley is carrying forward this vision. A mission is to enable every man in Warana valley to take control of his destiny, the need of the hour is to amalgamate the goodness and strength of our traditional Indian values and technological achievements of the 21st century.

We are determined for the upliftment of every individual through the Warana cooperative movement. Today in Warana valley a revolutionary concept is shaping up. The Warana wired village project where all the 80 villagers will be connected by their own net

abandoned project of the government being implemented here in Warana nagar WAGPCOS State of the Art Food Processing Factory was set up with the American voice and technology. Clearly the Warana farmers were put enough mortgage for International funds to in Warana nagar.

Every process is integrated, interconnected, interdependent and completely independent of outside assistance. The new generations in Warana nagar do not toil without rewards, svery farmer and these 80 villagers is a shareholder in the hugely successful cooperative story. There is true freedom here freedom from poverty, from inliteracy. The renaissance has happened, the vision, the sense what the value of hunger and depravity. Warana nagar is now a paradise, a role model of cooperative success for all to see and be inspired by.

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So, from this particular example what you can see is in a socio-technical innovation level, what we are talking about influencing technological innovations, social innovations, institutional innovations. So, all those cooperative banks, engineering colleges, processing units, they are institutional innovation and organisational innovations like how all these are organised with each other, how the interconnections happen. So, it influences all these four levels.

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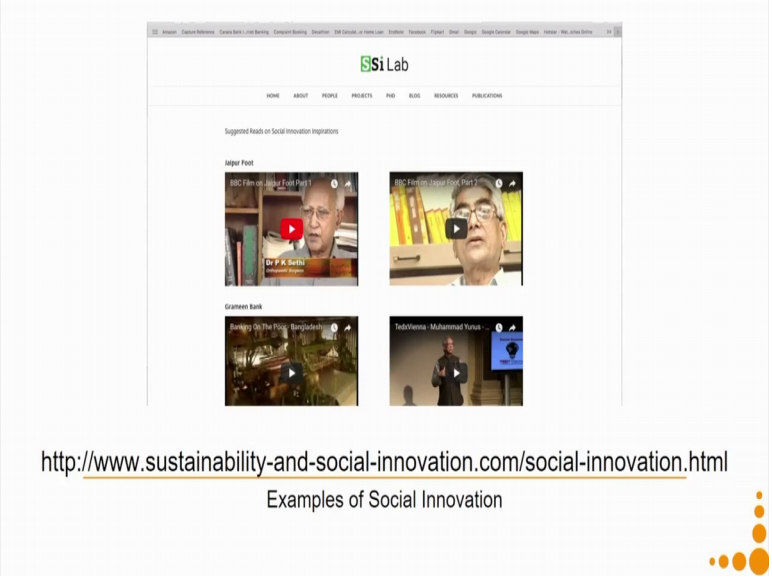

You can see more examples of this on our labs website. Our lab is called as Sustainability and Social Innovation Lab. There are many such examples of this kind, but there is a big challenge. All the examples that you can see because of the magnitude of impact because, of the magnitude of activities which need to be done.

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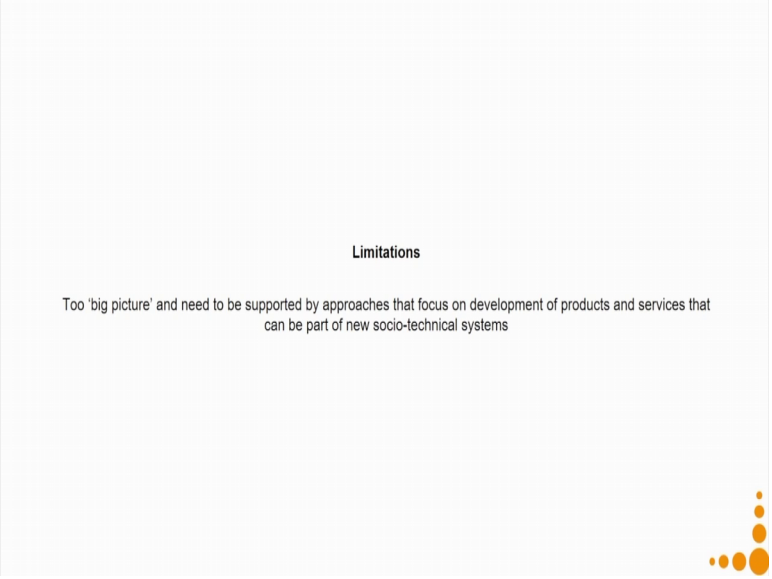

The biggest problem with it is too bigger picture and need to be supported by approaches that focus on development of products and services that can be part of a new socio-technical system. So, in size of the whole thing is its biggest challenge as well as

limitation. So, if you try to put this into our map, so you can see this is where our design for system innovation and transition lies.

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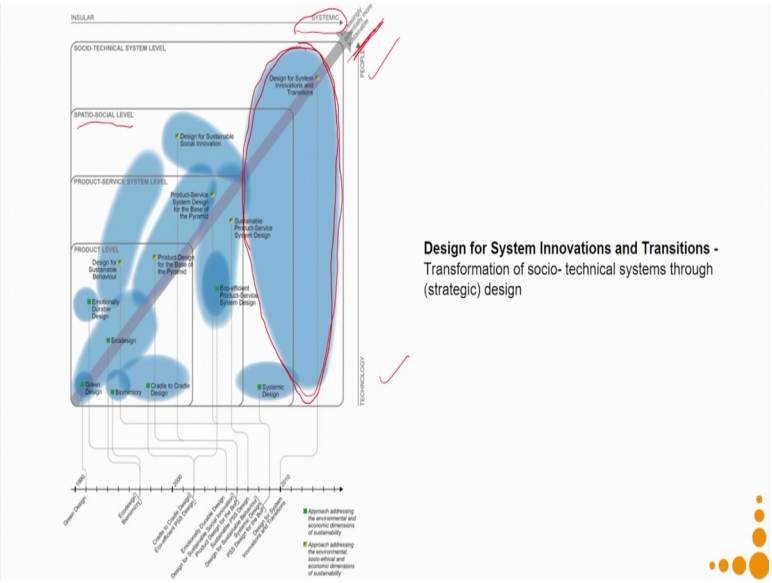

So, it does cover up the spatio social level as well as the socio-technical level. It has to because the concepts cannot be away from spatio social. Since we are talking about both people as well as technology, so you can see the whole size of it covers everything. All these aspects also it is very systemic nature. It cannot exist if it is insular; it has to be very system also. Its potential for sustainability is very highly depends on how you organise it, but its sustainability is again a long run testing. It is sustainability taking with how sustainable it is in a long run process.

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So, we learned that we can categorise the innovation levels at four levels; the product innovation level, the product service innovation level, the spatio social innovation level and finally, the socio-technical system innovation level.

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Sustainability as a concept is not a static goal. It is a very dynamic goal and if we keep on responding to our, we keep on changing our target; we keep on responding to it depending with our increasing understanding of interdependencies between social and ecological systems.

Sustainability is also a system property and not a property of individual elements of a system. So, a glass of water is not sustainable because it is an individual element only. When I put it into entire system, it can be sustainable or not sustainable? So, therefore, achieving sustainability requires the process based multi scale and systematic approach to planning for sustainability guided by a target or vision.

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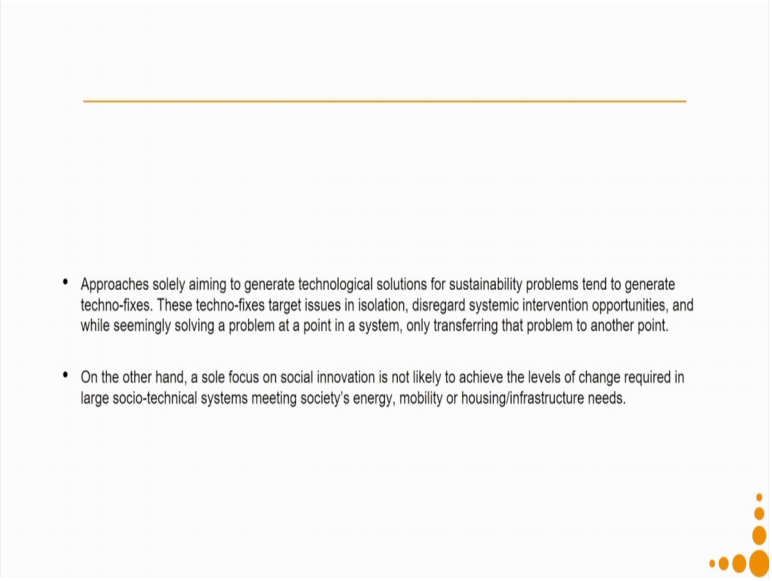

Approaches solely aiming to generate technological solutions for sustainability problems tend to generate only techno fixes. These techno fixes does solve the problem at a given instance of time, but they transfer the problem from A to B and this B comes in another point of time.

On the other hand, a sole focus on social innovation is not likely to achieve the levels of change required in large socio-technical systems, meeting societies, energy mobility housing or infrastructure needs, hence we need to combine both these approaches and come up with feasible and viable solutions.

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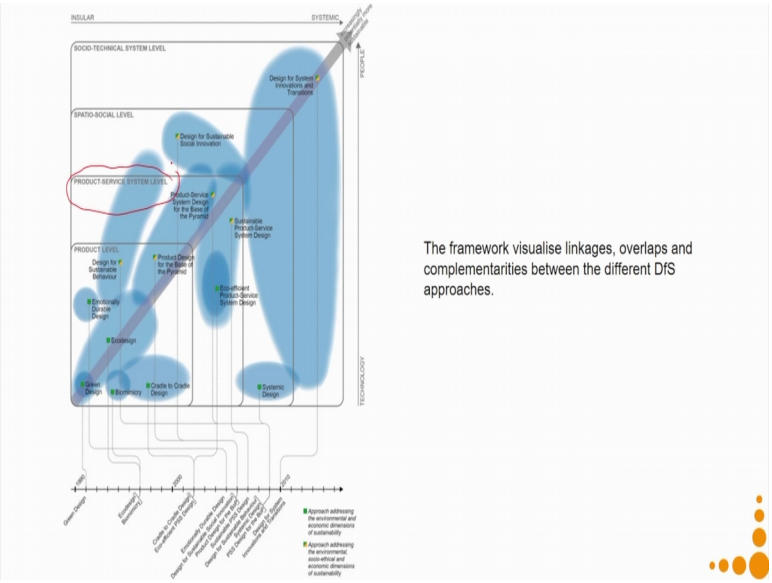

So, this particular framework it helps to visualise the linkages, overlaps and complementarities between different DfS approaches. In our course, we will be talking mostly about the product service system level and eco design and then, how do we combine them together. The other levels we will be very lightly touching upon them because of the complexities involved in design for them.

So, the reading material remains same as it has been for the whole week. In the next week, we will take one example and try to see relationship between the approach of design for sustainability that we take and the application context. Thereafter, in the next week, we will start with life cycle assessment and how to design for life cycle assessment which is the eco design part of it.

Thank you.