System Design for Sustainability
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Week – 09
Lecture – 01
Sustainable Product-Service System Design - Methods and Tools

Hello everybody. Welcome to this week's lecture. This week we will only have 1 lecture and rest of the week, I will expect you to complete your assignment for this particular module that we are going through right now.

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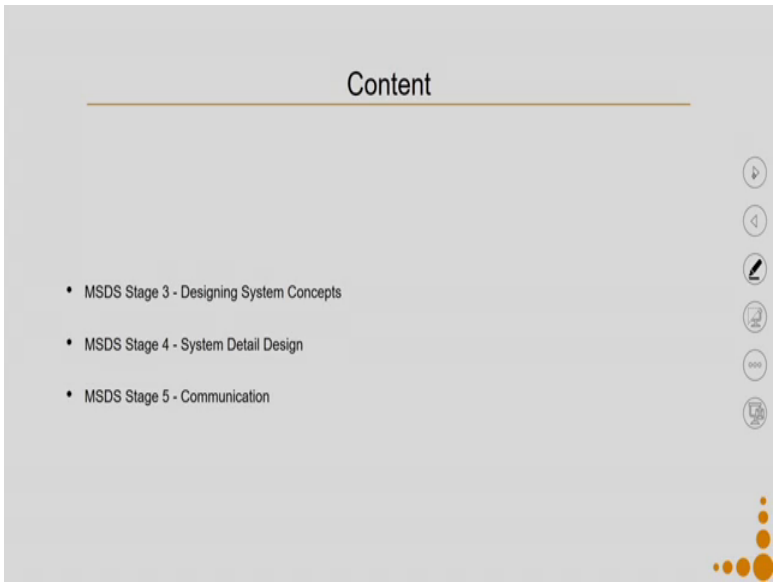

So, what we are going to discuss today is the third, fourth and fifth stage of the MSDS method that is Designing System Concepts, System Detailed Design and Communication.

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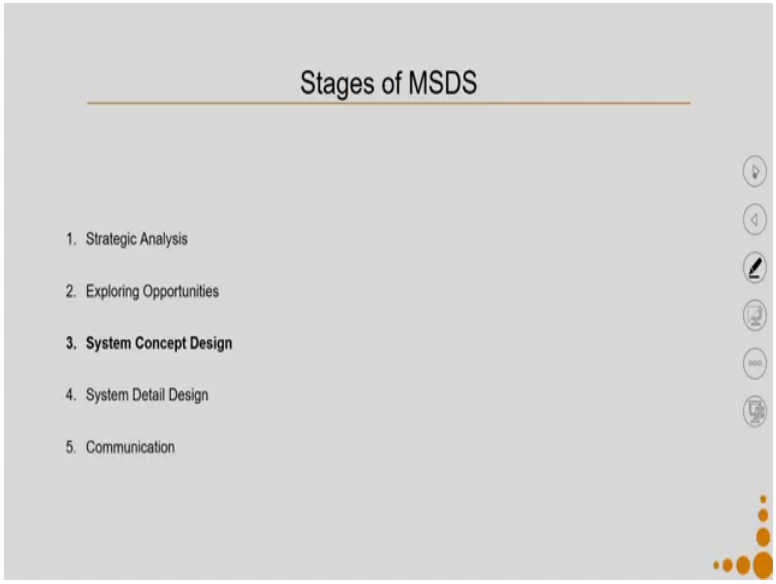

So, the stages of MSDS let us go through them again. Strategic Analysis; Exploring Opportunities; System Concept Design; then, System Detailed Design and Communication.

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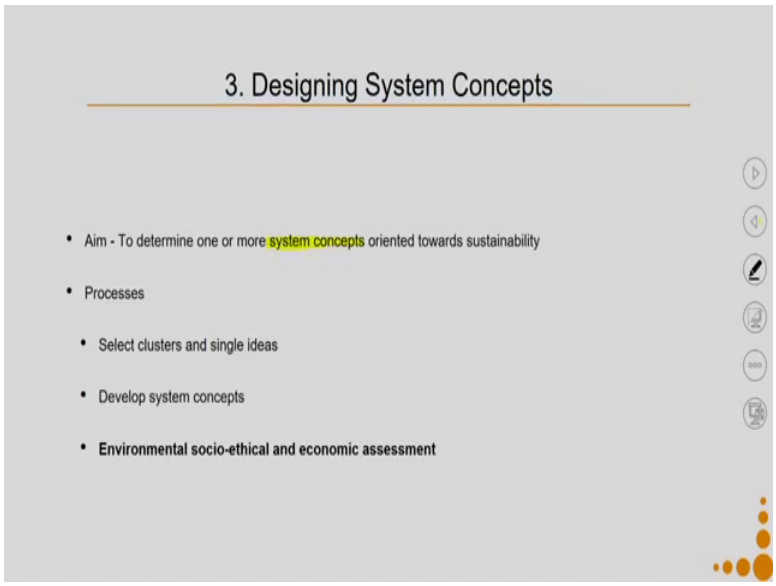

So, in Designing System Concept, the aim is to determine one or more system concepts oriented towards sustainability. You will determine one the number of systems concepts that you will be generating will depend on the amount of time that you have or what your client wants you to do. Also like here you can see the word system concept design. So,

the difference between ideas and concepts is when we have single entities, single ideas say paper unit of water consume. So, that is what I called as a idea.

When you combine together many ideas, you formulate a concept. You need a concept at this particular phase when which will be formulated with all the ideas that you have generated in the exploring opportunities phase. So, the processes involved are first you will select clusters and single ideas, then you will develop the system concept out of it and then, you will see that the overall system has an environmental socio-ethical and economic sustainability. How do we do that? We will do it by using an assessment method.

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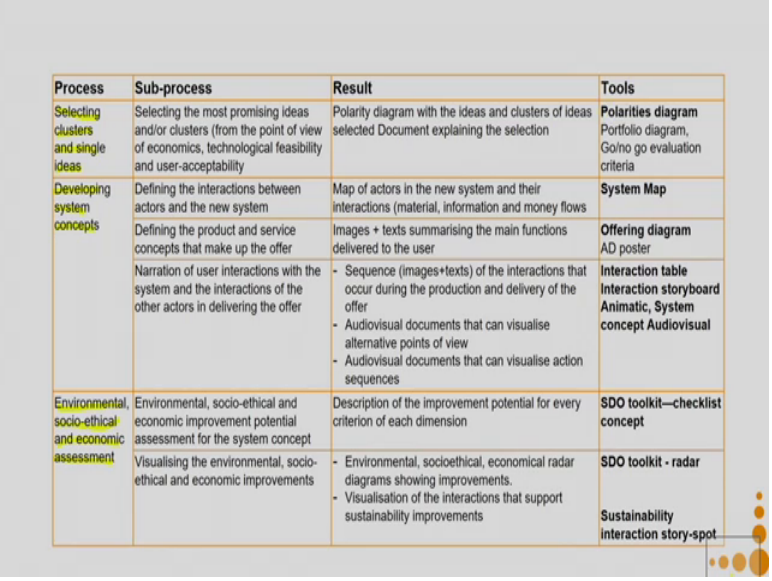

Process	Sub-process	Result	Tools
Selecting clusters and single ideas	Selecting the most promising ideas and/or clusters (from the point of view of economics, technological feasibility and user-acceptability	Polarity diagram with the ideas and clusters of ideas selected Document explaining the selection	**Polarities diagram** Portfolio diagram, Go/no go evaluation criteria
Developing system concepts	Defining the interactions between actors and the new system	Map of actors in the new system and their interactions (material, information and money flows	**System Map**
	Defining the product and service concepts that make up the offer	Images + texts summarising the main functions delivered to the user	**Offering diagram** AD poster
	Narration of user interactions with the system and the interactions of the other actors in delivering the offer	- Sequence (images+texts) of the interactions that occur during the production and delivery of the offer - Audiovisual documents that can visualise alternative points of view - Audiovisual documents that can visualise action sequences	**Interaction table Interaction storyboard Animatic, System concept Audiovisual**
Environmental, socio-ethical and economic assessment	Environmental, socio-ethical and economic improvement potential assessment for the system concept	Description of the improvement potential for every criterion of each dimension	**SDO toolkit—checklist concept**
	Visualising the environmental, socio-ethical and economic improvements	- Environmental, socioethical, economical radar diagrams showing improvements. - Visualisation of the interactions that support sustainability improvements	**SDO toolkit - radar** **Sustainability interaction story-spot**

So, the process over here consists of selecting clusters and single ideas, then developing the system concept and then, environmental socio-ethical and economic assessment. So, you can see in order to select the clusters in single ideas, I will start with using the polarities diagram.

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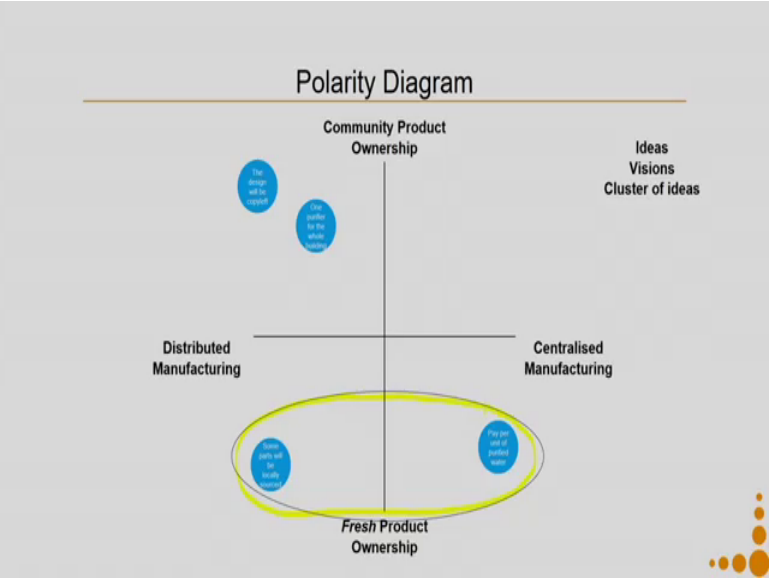

So, as you saw in our previous lecture that we can think of prospective ideas which looks similar or which can be grouped together into a particular system. I pick up those single ideas make a cluster and create a systems idea.

So, I can do this by using my polarities diagram from the previous step. So, next let us go down to the next method. It is called as the Portfolio Diagram. So, what does Portfolio diagram imply is if the portfolio diagram sustainability and feasibility check? So, what I do is I check on the sustainability and the feasibility.

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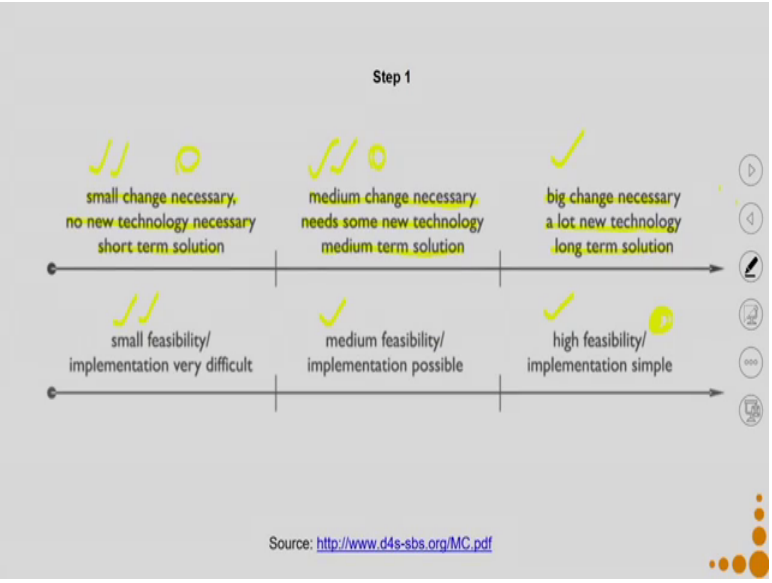

So, I will pick up each and every idea or each and every cluster of a ideas which I make down into a system concept now by using the polarities diagram and I will check.

So, the first check is on the technological aspect. Is it small change necessary or no new technology necessary or is it a short term solution or is it a medium change necessary, needs some new technology medium term solution or is it a big change necessary, a lot new technology and long term solution? When we are checking the feasibility, it depends whether it is a small, it is a medium, or it is a big change. For a big change, one might need much longer time duration to implemented also more resources need to be committed from the promoter side.

So, this is my first check. The second check is about the small feasibility that is or implementation is very difficult. Medium feasibility or implementation is possible. High feasibility or implementation is simple. So, I will check where does my solution lie on these two case. So, see for example, I have a solution which is very high feasibility because implementation is simple. What it might mean is it requires no new technology or it requires some new technology and it is easy to develop that.

It might also imply that there is a small change requirement or a medium level changes necessary, then I can see that particular idea is high feasibility and the implementation is simple. See if I have a small feasibility and implementation is very difficult that is even if that particular idea is very high on sustainability, because I know implementation is so very difficult. The implementation might be difficult because of technological reasons. It can be also difficult, because there are no loss or regulations in that field all the loss and regulations at a point of time prevent you from getting into that particular area. Say for example, if I want to bring in electric cars into the market, I need a charging mechanism.

So, since charging is not the charging facility is not available so easily, so wide spreadly at this particular moment. So, my implementation of electric vehicles at the current moment is relatively difficult. As a result of feasibility is smaller. Since, in case if I had develop that charging mechanism say for example, petrol and diesel vehicles, it is very implementation is very simple because the infrastructure to fuel those vehicles are very easily available. So, I do this particular comparison, post this comparison is done.

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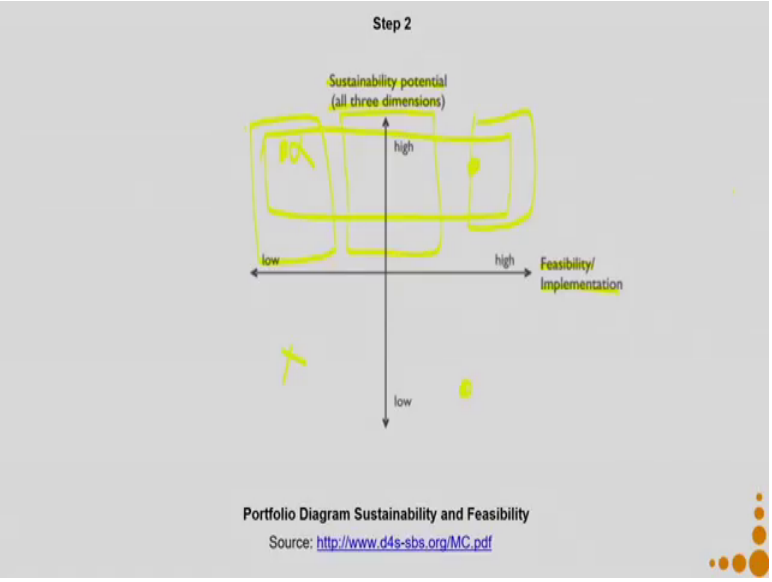

My next step is, I will put it into a quadrant. In this quadrant, first I have a sustainability potential on all the 3 dimensions and feasibility or implementation on the other axis. So, a particular idea which lies in this quadrant that is high one sustainability potential, all the 3 dimensions as well as feasibility and implementation is possibility is very high and then it lies in this quadrant that is the favorable solution. In case there is a very low sustainability solution, but feasibility or implementation is very simple, we should mostly discard that because our whole focus was to bring in a sustainable solution.

Of course, this quadrant is a complete known know. In this particular quadrant, if feasibility is or implementation is very difficult, feasibility is low; but sustainability is high, you can consider how can you make it more feasible. But again, this solution becomes very very difficult to implement it. You might think in those terms that let us have a longer term perspectives. So, if we come back to this particular slide, you can see a big change is require or a lot of new technology development is required or a long term solution is required.

So, it is possible to go that particular way, but you have to try to figure out how will you implement that; how will a company move into that particular direction, move into bringing those changes; what are the finances required; what are the companies sources required and so on. So, any idea which lies in this particular zone can be a prospective idea. Just that I might have to I have a smaller time frame in this zone or kind of a

medium time frame in this particular zone and a long term time frame in this particular zone.

The last step in the selecting clusters and single ideas process is a go, no go evaluation criteria. At this particular phase, so in this particular step 1 on system designing, I will design couple of systems and in the Go No Go phase I will decide which system to take forward to. There are many ways of doing a Go No Go evaluation.

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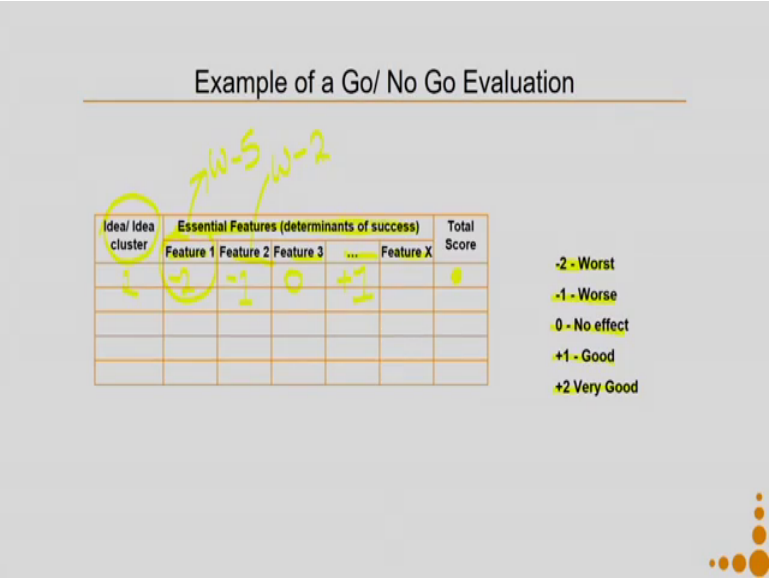

Again, Go No Go evaluation should not be done by the designer alone; but it should be a process in which you should involve all your actors because the actors have to act on to it to bring that particular change. So, this is one way in which you can do a Go No Go evaluation where you write down your idea or idea clusters over here.

Then, you have a list of all essential features which according to your project are the determinants of success of the project. So, you will write Feature 1, Feature 2, Feature 3 and so on. If your particular so your idea 1, if it is doing very bad on that particular feature, you put a minus 2. If it is at the next level of bad, you put minus 1. If it has no effect on feature 3, then or the feature 3 is absent. Plus 1 in the feature is being well enough manner met and similarly the last one is very good.

Then, I can put a total score over here and this gives me a way of comparing my ideas. This is the qualitative way of I doing a Go No Go evaluation. There can be other ways;

say for example, you identify that the Feature 1 is very important feature. So, even all other features do not exist Feature 1 should exist. So, there can be ways of resolving that issue either you can introduce something like weightages.

So, your Feature 1 which is very important, I give it a weightage of 5. So, then I will multiply over here because I have a minus 2. So, I can multiply 5 by minus 2. So, my overall effect becomes minus 10. Say I can determine Feature 2 has a weightage of 2. So, 2 multiplied by minus 1. So, that is one way you can make a distinction between the importance of the features rather than having all features that the same level of a importance. You can also do the same activity by say it is not a feature based Go No Go evaluation, it is more like a function based Go No Go evaluation.

So, you say function 1, function 2, function 3, and then you evaluate how function 1 is performed better; how function 2 is performed better. You can also have a criteria on to like the expenditure to their company and the profits that the company can make out of it. All these aspects can be built into this Go No Go evaluation. The Go No Go evaluation is very subjective and how you are going to design your evaluation depends on your particular project and you should do it along with your stake holders.

After you have done the Go No Go evaluation; because now you have selected which ideas to go ahead with which system to go ahead with; so now, I get into developing my system concept. So, to develop the system concept, first I will define the interactions between the actors and the new system; then, I will define the product and service concept that make up the offer. Then, I will create a narration of user interactions with the system and the interactions of a others in delivering the offer.

So, let us look at the first one which is like defining the interactions between actors in the new system by using a systems map. What I am going to do is Map of actors in the new system and their interactions material, information and money flows. So, if you remember the systems map from the strategic analysis, systems map is the same thing. So, in strategic analysis we made a systems map of the existing system. How Fresh was doing business at that particular time all the actors involved the material and the information in the money flows happening.

Now, I will from the selected system that I selected, now I will try to define the system map for this new proposed system.

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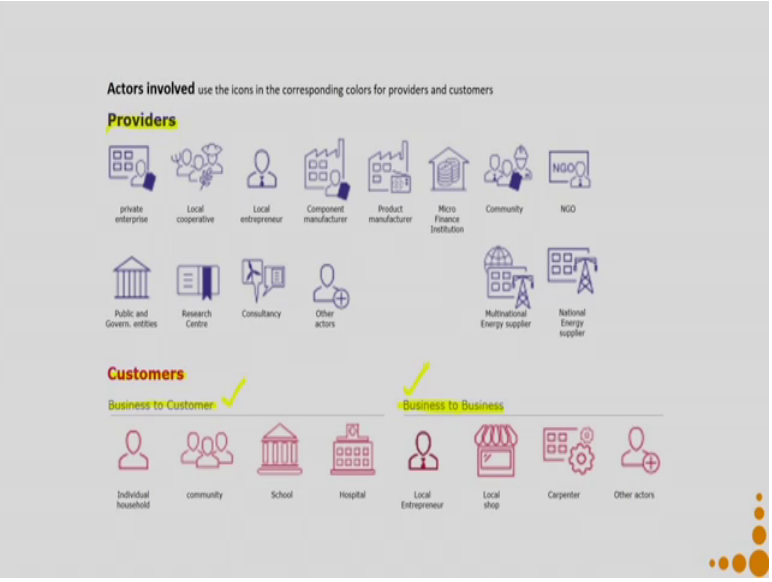

So, first you will identify all the actors involved, you will use the icons which you have used in your existing system, you will add on more icons because you might more actors newer actors. So, you will group your actors into providers and customers. You can also divide your customers into business to customer and business to business. Say for your particular context the whole product market you assume that it is going to be households.

So, in that case you have a business to consumer market. Say you want to have that as your main market where you are targeting into households or to societies; you think but your projects products scale is so that it can be also implemented in small shops or say for example in some marketing complexes and so on. So, then you can also have business to business customers.

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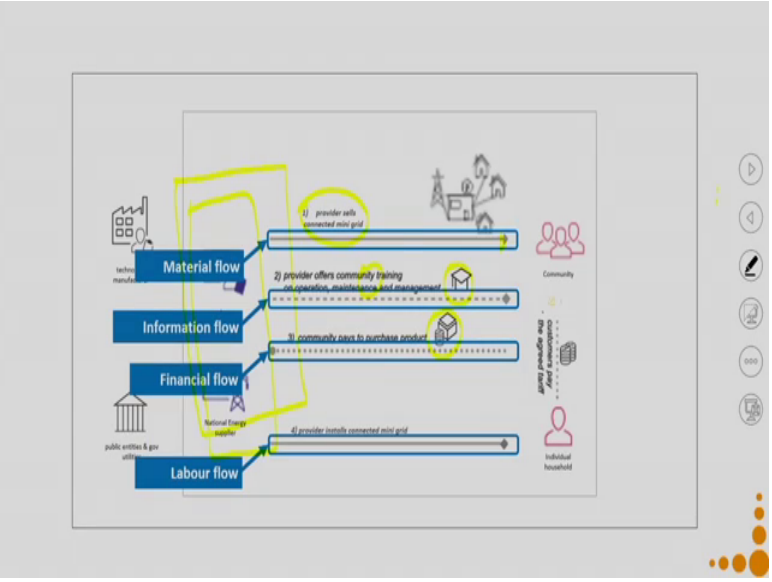

Once, I have set all the icons identified all the actors, I will try to put them on this particular map, where I will show between 2 actors what are the materials which is flowing amongst them, you put a direction to it, you can again go through the strategic analysis systems map lecture if you want to have a total recap on to how to make the systems map.

Then, you will identify the Information flow between the actors; next the Financial flow and the Labour flow. You will also try to identify who the owner of the product is? So, say this group is the owner of the product; who is the provider of the service; what are the different types of thing which is flowing through; are there other services involved. So, all these will be put into the systems map which is the new systems map you are designing. Once, you have completed your systems map; you will do your offering diagram.

How is the offering diagram different from your offering diagram that you made during the exploration exploring of opportunity stage? So, there is no difference, you have the same thing. You have you represent the core functionality, the basic functionality, the added value functionalities. The only difference that lies is in case of exploring opportunities, you make many offering diagrams because you have many ideas and many a cluster ideas. In this particular case you make the offering diagram for your final design.

So, the design for which you made the system map, for the same design you will make one offering diagram. This might be something one of those offering diagrams which you have made during your exploring opportunities or one of those diagrams with modifications because now your system has taken more and more.

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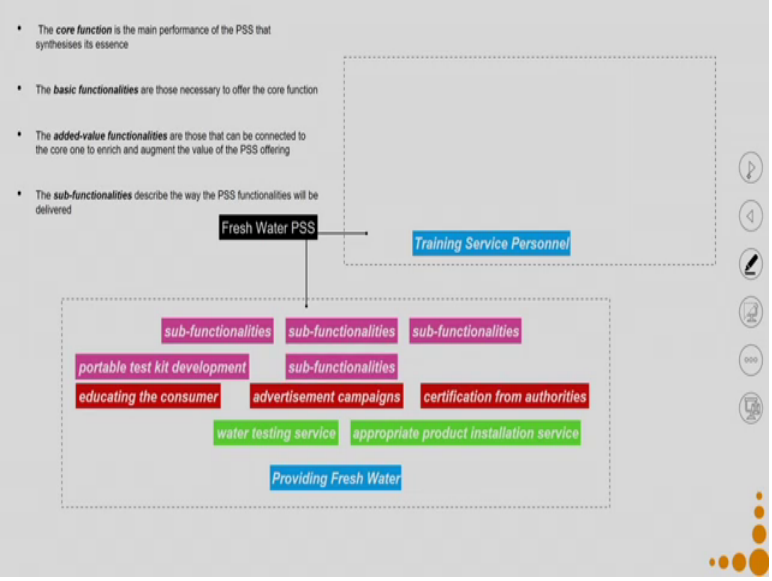

So, you are offering diagram, the core functions which will be the main functionalities of the PSS, the basic functionalities are those functions to offer the core functions. Then, the added value functions are those that can be connected to the core one to enrich and augment the value of the PSS.

Then, comes your sub functionalities. They describe the way in which the PSS functionalities will be delivered. Once, your core functionality is done you can also create a ad poster which will consist of images, text summarizing the main functions deliver to the user. This particular ad post can be used as a communication tool for your client or the client can use it for pitching for finances and so on. So, this ad poster is not a must have, but you can do it as a communication material.

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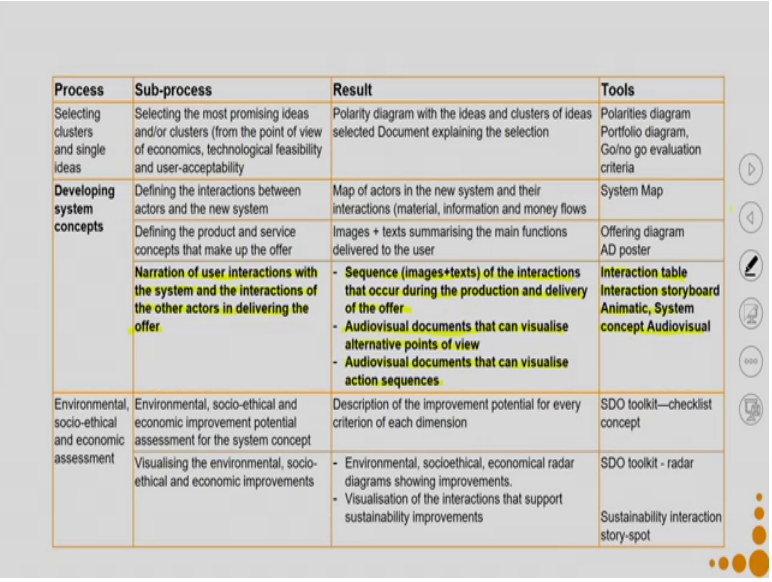

Process	Sub-process	Result	Tools
Selecting clusters and single ideas	Selecting the most promising ideas and/or clusters (from the point of view of economics, technological feasibility and user-acceptability	Polarity diagram with the ideas and clusters of ideas selected Document explaining the selection	Polarities diagram Portfolio diagram, Go/no go evaluation criteria
Developing system concepts	Defining the interactions between actors and the new system	Map of actors in the new system and their interactions (material, information and money flows	System Map
	Defining the product and service concepts that make up the offer	Images + texts summarising the main functions delivered to the user	Offering diagram AD poster
	Narration of user interactions with the system and the interactions of the other actors in delivering the offer	- **Sequence (images+texts) of the interactions that occur during the production and delivery of the offer** - **Audiovisual documents that can visualise alternative points of view** - **Audiovisual documents that can visualise action sequences**	**Interaction table Interaction storyboard Animatic, System concept Audiovisual**
Environmental, socio-ethical and economic assessment	Environmental, socio-ethical and economic improvement potential assessment for the system concept	Description of the improvement potential for every criterion of each dimension	SDO toolkit—checklist concept
	Visualising the environmental, socio-ethical and economic improvements	- Environmental, socioethical, economical radar diagrams showing improvements. - Visualisation of the interactions that support sustainability improvements	SDO toolkit - radar Sustainability interaction story-spot

So, once we are done with this particular stage, we will move on to the narration of user interaction with the system and the interactions of a other actors in delivering the offer. So, how do I do it? First step first result that I want is sequence of the interactions that occur during the production and delivery of the offer. Then I can also make a audio visual document that can visualize the alternative points of view, I can also do an audio visual document that can visualize the action sequences.

So, the animatic system concept and audio visual, they can be added to it as communication material in case you would like to spend time on doing it. They are very very important very powerful tools because they can really give picture to your client to whomever you want to explain, what you have designed your system idea. They are very very important tools. Words are less expressive as compared to the images and the audio visual they can clearly depict what you are trying to show.

So, interaction table and the interaction storyboard is something that you should target to do for sure. So, we had already discussed about the interaction table and interaction storyboard during our strategic analysis.

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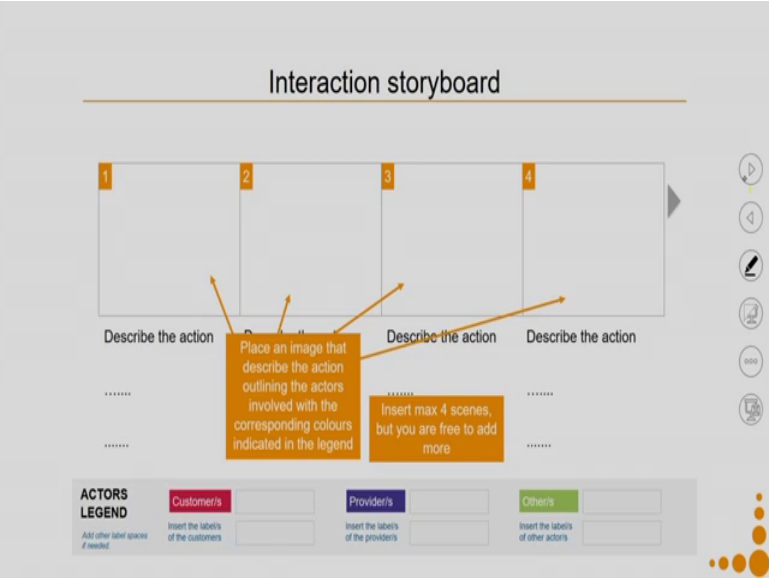

So, the way of doing it remains the same; in strategic analysis we did the interaction storyboard to analyze the current interactions. In this particular stage, we will make the interaction board to show how the interaction will happen in our new design.

So, you will place an image that describe the action, outlining the actors involved with the corresponding colors indicated in the legend and then, you will describe the actions that they do. You can insert maximum force is, but you are free to add more. So, this will clearly show me what are the different actions it is happening over there and how they are interacting. Let us come to the final process in this particular stage in which I will do a environmental, socio-ethical and economic assessment. In order to do this assessment, this is our qualitative assessment. So, I had already described to you using this SDO toolkit concept checklist and how to work on the SDO toolkit and a Radar when we were discussing about using the SDO toolkit.

So, once you have created all your concepts, then you do a qualitative judgment whether you got a minor improvement or you got a major improvement or you got no improvement and so on ok. So, after you have done the SDO toolkit checklist and the SDO toolkit Radar diagram. The last step for the visualizing the environmental, socio-ethical and economic improvements is making something we call as a sustainability interactions storyboard a story spot. So, it is something similar to the interaction storyboard; the only difference is in this particular context, we highlight all those

interactions which are actually the ones which bring in say environmental sustainability, socio-ethical sustainability and economic sustainability.

Why we prepare this particular diagram? Because we would like to further enhance those interactions and we should know that those are the most important interactions and they should not be lost. So, you take the same interaction storyboard and highlight all those interactions which are key interactions for bringing in the sustainability on the 3 dimensions. And again you describe the action and follow the same process. So, you mentioned the sustainability orienting interactions.

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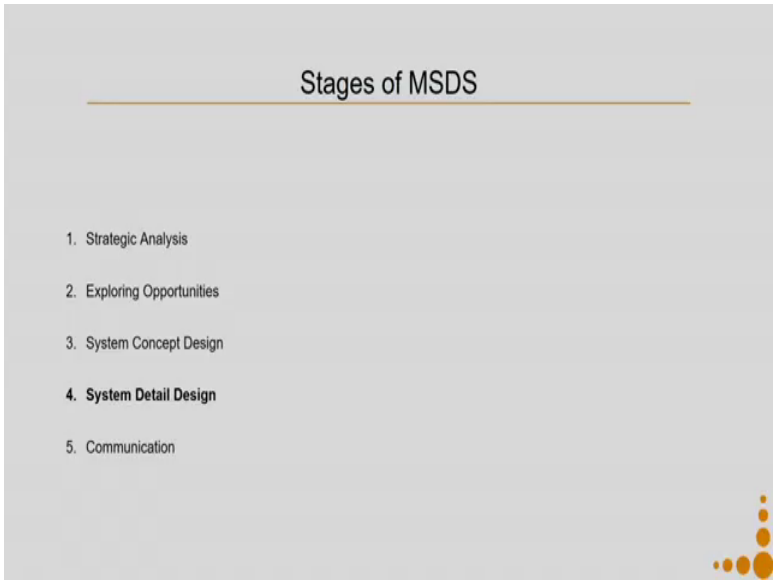

Now, let us come to the fourth stage of MSDS which is system detail design. So, in step 3, what we did? We created couple of system design ideas, then we did a Go No Go evaluation selected one, we further developed it by bringing making the systems map and also trying to figure out what are the interactions. Now in these four stages we will further detail that particular system.

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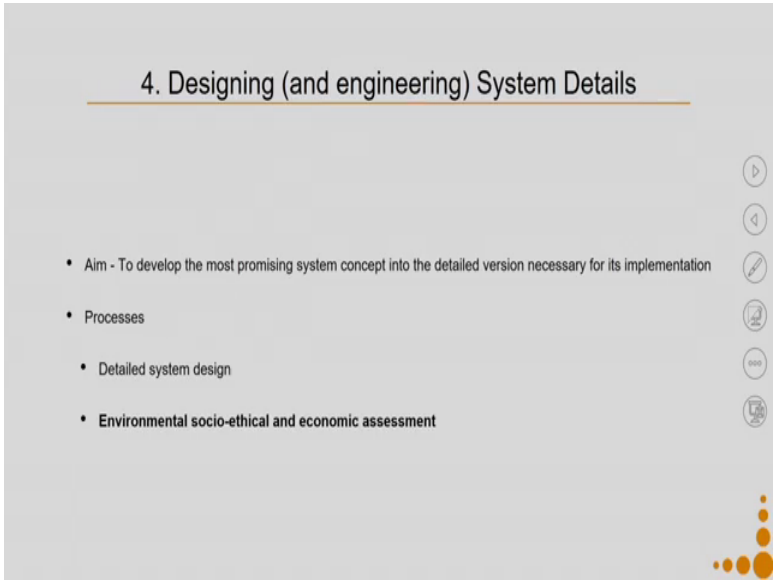

So, the aim is to develop the most promising system concept into the detailed version necessary for its implementation.

So, the processes over here are detailed system design and environmental socio-ethical and economic assessment. We repeat the assessment part again because after the whole system has been design detailed in a manner that now it is ready to be implemented, I need to do a final check of environmental socio-ethical and economic assessment. You can use the same SDO toolkit; the toolkit on which you were developing your concept and you can make changes if any from your previous assessment stage.

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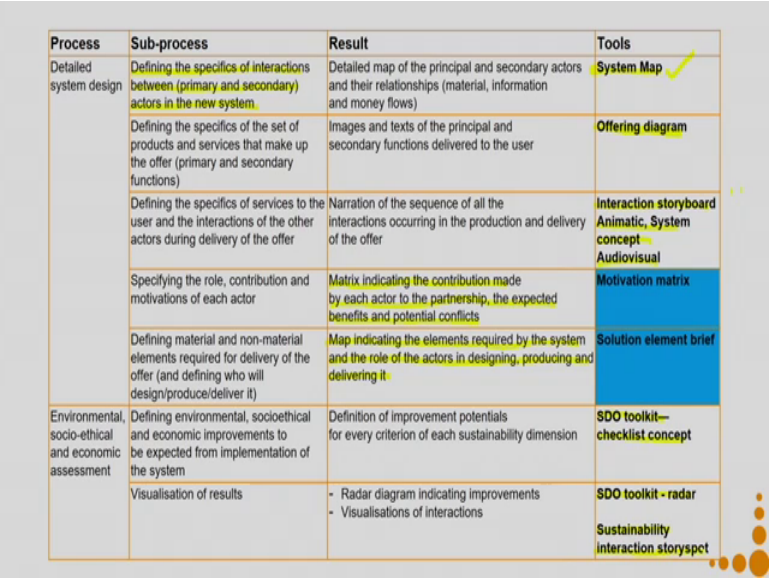

Process	Sub-process	Result	Tools
Detailed system design	Defining the specifics of interactions between (primary and secondary) actors in the new system	Detailed map of the principal and secondary actors and their relationships (material, information and money flows)	System Map
	Defining the specifics of the set of products and services that make up the offer (primary and secondary functions)	Images and texts of the principal and secondary functions delivered to the user	Offering diagram
	Defining the specifics of services to the user and the interactions of the other actors during delivery of the offer	Narration of the sequence of all the interactions occurring in the production and delivery of the offer	Interaction storyboard Animatic, System concept Audiovisual
	Specifying the role, contribution and motivations of each actor	Matrix indicating the contribution made by each actor to the partnership, the expected benefits and potential conflicts	Motivation matrix
	Defining material and non-material elements required for delivery of the offer (and defining who will design/produce/deliver it)	Map indicating the elements required by the system and the role of the actors in designing, producing and delivering it	Solution element brief
Environmental, socio-ethical and economic assessment	Defining environmental, socioethical and economic improvements to be expected from implementation of the system	Definition of improvement potentials for every criterion of each sustainability dimension	SDO toolkit— checklist concept
	Visualisation of results	- Radar diagram indicating improvements - Visualisations of interactions	SDO toolkit - radar Sustainability interaction storyspct

So, how do we do it? There are two processes Detailed system design and then, Environmental and socio-ethical and economic assessment. So, the first step is defining the specifics of the interaction between primary and secondary actors in the new system. So, you further detail out the systems map. In case in your third step you had already created a very detailed systems map, then you have already done the particular process. In case certain details are missing, you need to refine them. You have to always keep into mind that what you are creating now is something is the document which you will take to put it into implementation.

So, all details need to be put up. Say for example, you have an idea that the filters can be composed it and you want to bring into that in your new system concept in a design. But what happens to that composed who goes and compose it; who collects the filters; who does the composting; after the composting is done who uses that compose? The person who is going to use that concept; to whom does this person pay; how the whole accounting system works in that particular context? Now, this whole system around collection to compose making to compose selling and finally usage; how that is going to be profitable for fresh?

So, all those details need to be created in the systems map. So, you have to identify all the different actors and the material information money and finance flow which will happen between them so that this particular system can be implemented. After this is

done, again I create my final offering diagram. This is again for the refinement of the offering diagram that I had created in my previous step because now my whole systems map is ready. So, I will be able to further improvise on my offering diagram.

Then comes my Interaction storyboard, Animatic, System concept design. Again, these are things that you had already done your previous step. Now, if you have further improvements or further details to be added, you add them further. So, that anybody who picks it up; anybody who does not even know about your project, one picks this report up can implement it. There are 2 new steps that you will do in this particular stage when you are doing the detailing and this is called as the motivation matrix. It is a matrix indicating the contribution made by each actor to the partnership, the expected benefits and the potential conflicts.

So, it is not only to each actor; so, it is like me versus a company. So, if I am one actor and that company is one actor. So, it is not only the benefits and potential conflicts and the contributions made, but it is also like what is my own motivation to do that. Because, we already define our sustainable PSS as a offering in which it is in the economic benefit of the providers to be socially socio ethically and socio ethically and environmentally friendly.

So, I have to identify why each one of them will do that. So, their motivations, the contribution made by each actor to the partnership, the expected benefits and potential conflicts. After I have done this, my next step is solution element brief. What it implies is it is a map indicating the elements required by the system and the role of the actors in designing producing and delivering it. So, in this case, I will put down all material and non material rules that each and every actor is going to put in and divided into three categories; designing it, producing it, delivering it.

So, one can do one of them or all of them and then, again in the assessment, we will be using our SDO tool toolkit checklist, we will refine it if we need to the radar diagram and the sustainability interaction story spot.

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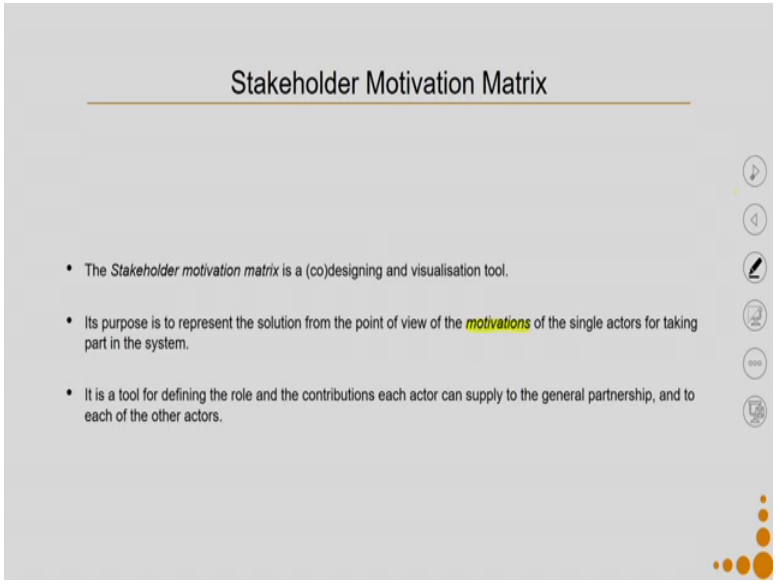

So, let us see what the motivation matrixes. So, it is called as stakeholder motivation matrix. It is a again co design tool and it is a visualization tool. So, you do this creation of this map along with the actors.

Its purpose is to represent the solution from the point of view of the motivations; very important, motivations of the single actors for taking part in this particular system. Then, it is a tool for defining the role and the contributions each actor can supply to the general partnership and to each of the other actors.

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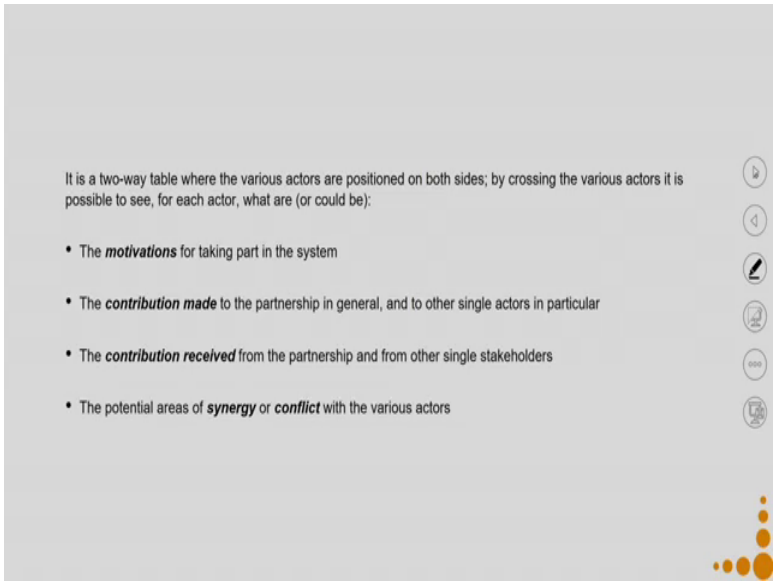

So, it is a 2 way table where the various actors are positioned on both sides by crossing the various actors, it is possible to see for each actor what or could be the motivations for taking part in the system. The contributions made to the partnership in general and to other single actors in particular. The contribution received from the partnership and from other single stakeholders; the potential areas of synergy or conflict with the various actors.

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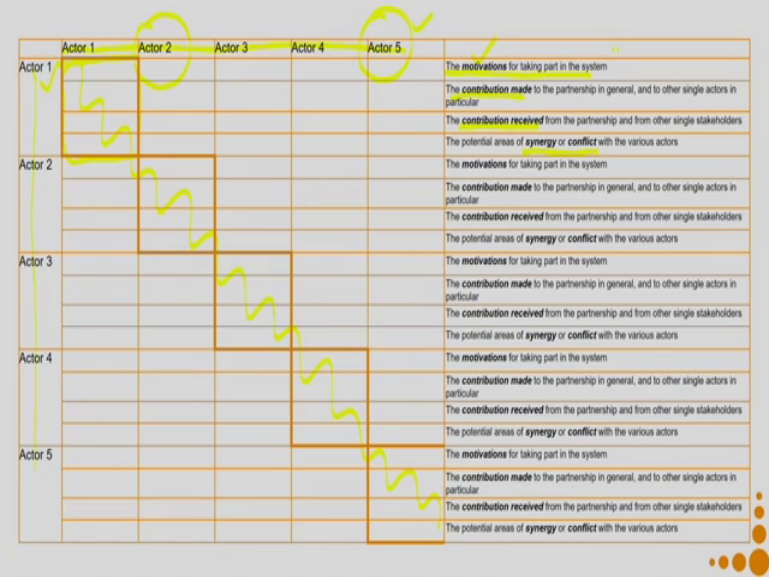

So, let us see the diagram. So, this is how the diagram will look like. So, you will place all your actors on the horizontal as well as on the vertical axis. On the vertical axis for each actor, you will make 4 columns: one for motivation, one for contribution made, one for contribution received and one for synergy or conflict.

Here, you can see the highlighted boxes. This is for actor 1. So, here I will mention of what is the actor ones major motivation in taking part in the system; what kind of contribution they are trying to made? So, here I will make a generic statement of what kind of contribution, say for example, I take the context of Fresh. What is Fresh motivation to participate in this? In general, they want to increase their revenue, they want to expand their market, they want to also need to the emerging requirements of corporate social responsibility.

They also want to be looked upon as a responsible company as a sustainable company and project that as a marketing tool. Now what is the contribution that they make to this

particular partnership to themselves? So, this is like the contribution that they make to the entire partnership. So, their main contribution is they might be the people who bring in the money; they are the people who are the main drivers of this particular system. They are the major owners of this system and so on and what contribution do they receive from other partners.

So, this can be in terms of um material product service and so on. The potential areas of synergy or conflict, you can identify. Say for example, your actor 5 is also one (Refer Time: 30:21), the actor 5 provides you with the technology which is required to make these dispensers. So, actor with actor 5 you have a position of conflict; although this is a product oriented business and yours is a SPS oriented business; now it is going to be, but still you can see there is a situation of conflict.

Whereas, a actor 2 might be someone who provides service. So, all the service personnel are trained at by actor 2. So, actor 2 is a training agency. So, here I can identify all the possible synergies. So, I will fill up all these particular blocks, the middle block should hire indicate what it is they are offering to the whole system and what is the main motivation to do the same.

When you do this particular exercise what it helps you in understanding is each actor should have good enough motivation to participate into this particular system that we are developing. In case they do not have enough motivation, it might be very difficult to keep them participating. So, in case you have missed onto the building motivation for somebody, then this is an opportune place where you can build up enough motivation.

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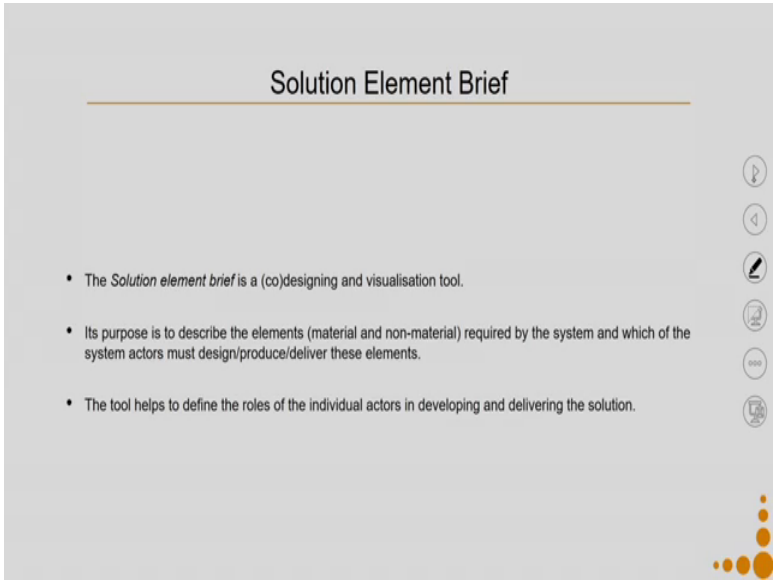

Now, coming to Solution Element Brief: what this particular step helps you is its again a core designing and visualization tool. Its purpose is to describe the elements material and non material required by the system and which of these system actors must design, produce or deliver these elements. So, the tool helps to define the roles of the individual actors in developing and delivering the solutions.

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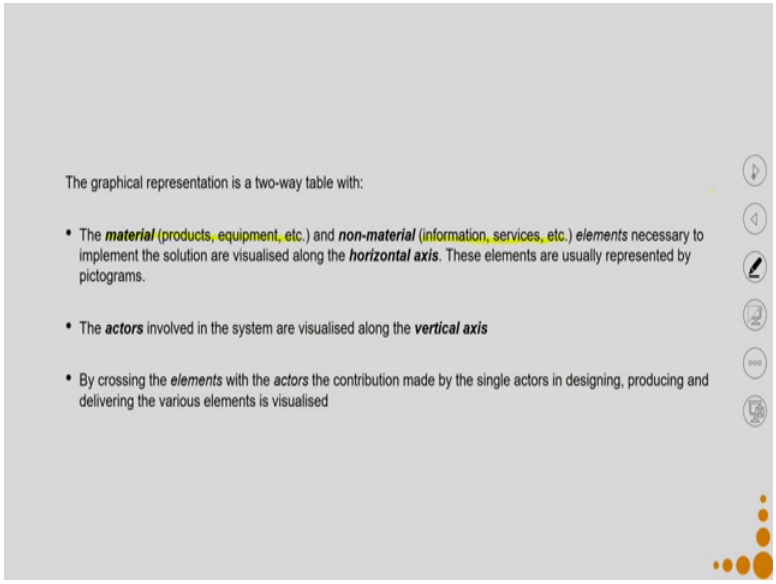

How do we do it? It is a graphical representation in a two-way table with the material. So, again this solution element brief table construction will vary from project to project.

So, you have to keep in mind that you have to represent all the material and non material elements of that particular system on the horizontal axis. So, your material aspects can be products, equipments and so on. Non-material can be information, services, finances, and so on. So, elements necessary to implement the solution are visualized along the horizontal axis.

These elements are usually represented by pictographs, then you have the actors involved in the system and they are visualized on the vertical axis. By crossing the element and the actors the contribution made by the single actors and designing producing and delivering the various elements is visualized.

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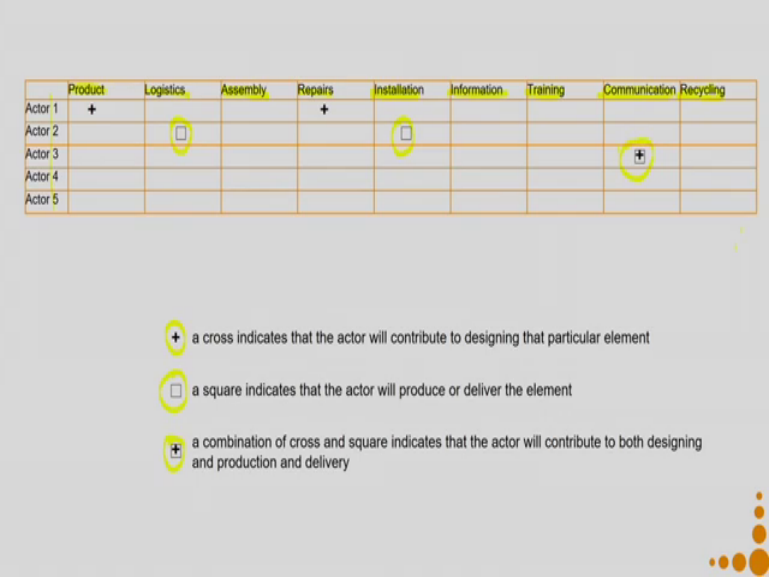

So, let us see the visualization. So, this is how the visualization will look like. So, say for example, for the material aspect, I have put product, I have logistics, I have assembly. Then, I have the non material aspects which are different kinds of services that I have might require for the success of my product.

So, I require repairing services, I require installation services, I require some kind of information exchange happening, some training services, some communication related services and some recycling related services. So, your map can differ from project to project. Then on the vertical axis, I will put all my actors. You can have a cross a cross indicates that the actor will contribute to designing that particular element. So, say for

example, if I put a cross against actor 1 for product, it means that actor 1 will contribute towards the designing of that particular element.

The actor 1 because I put a cross on repair; so the actor 1 will also contribute to designing that particular element that is designing repair activities or designing the service of repair, how it is going to happen. Next is your square a square indicates that the actor will produce or deliver that element. So, when actor 2 you put logistics and a box, it implies that actor 2 will produce or deliver the logistics. So, in case of a logistics, we are not producing logistics, but you are delivering logistics.

So, actor 2 is responsible for in a delivering the logistics and actor 2 is also responsible for installation. So, first they will deliver the um product and then, they will also install the product when they are delivering it. So, this particular maps helps you to tell this. What this whole exercise helps you in checking is there a consistency. Say for example, actor 2 is responsible for logistics and actor 3 is responsible for installation which means both of them will have to communicate with each other that ok. Delivery has happened, now you need to do installation which means in there is nothing good or bad about that it is just like you have to check whether that is the most sustainable way of doing it or not.

If it is the most sustainable way of doing it, how will you implement it; what are the material flow, information flow, finance flow, labour flow which is supposed to happen in the system in order to make the system operationalized in that particular manner. Then, you can also have a combination of cross and square, it implies that the actor will contribute to both designing and production and delivery.

So, say for actor three for the communication, I say that they are going to design the communication material and they are also going to be responsible for delivery the production and the delivery of a communication material to the appropriate audiences. So now, you can see the once, I would have completed my solution element brief, I would be further able to refine my systems map in case while I am doing my solution element brief or my motivation matrix, I identify that there are certain gaps which are still left which will not which will come in the way of a implementation, I can make modifications into my systems map offering map my interaction storyboard.

So, once this whole process is complete that is I have done the detailed system design, then my next step will be the final filling up of the checklist and final radar diagram

generation. So, you do not need to create another SDO toolkit file for that, same you can go back to your previous file which you were using till your stage 3, and you can make the modifications in that particular file itself to get your final results.

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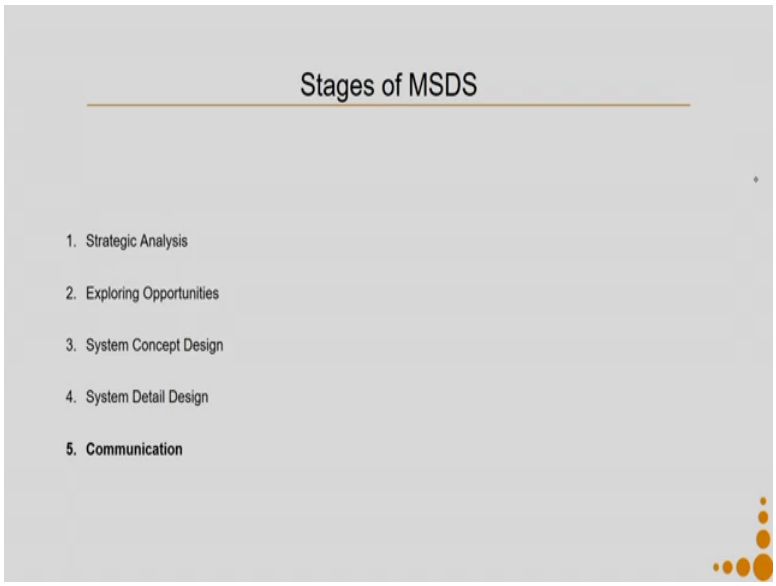

Once you are done with the system detailed design, the last step left is communicating it.

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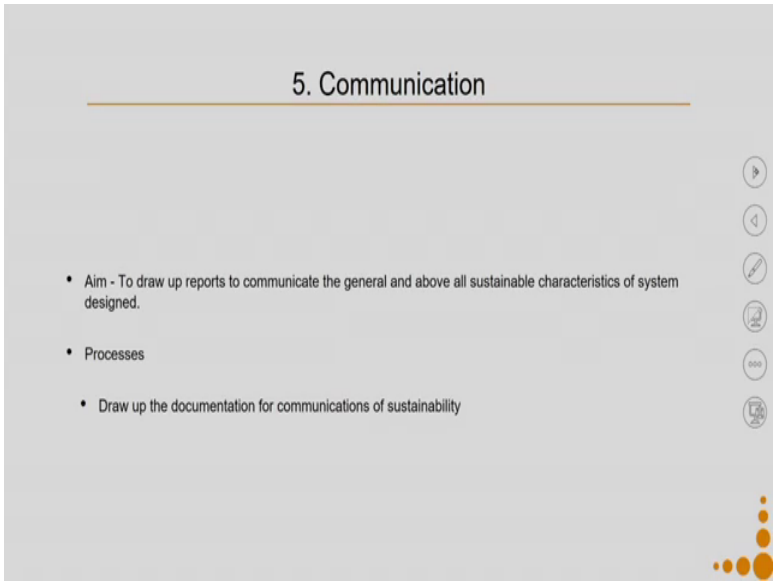

So, the aim over here is to draw up reports to communicate the general and above all sustainable characteristics of system design. This report might be aimed at various kinds of audiences. So, certain audiences might have certain specific requirements. But the

format that I am going to present to you is more like a end of project report to your client.

Some rating agencies or some agencies which give you certification on how green your product is and so on, for them this might not be a good reporting document. But this document very nicely summarizes all the sustainability characteristics of the system design. So, the process over here is you draw up the documentation for communication of sustainability.

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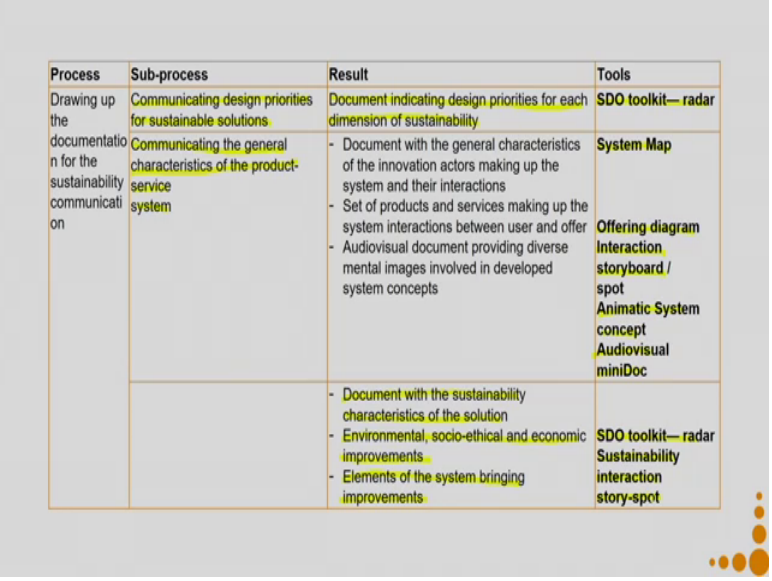

So, in order to do it first you need to first you need to communicate the design priorities for sustainable solutions.

So, it is a document indicating the design priorities for each dimension of sustainability. So, you show your SDO toolkit radar diagram because in the SDO toolkit radar diagram, it shows the level of improvement brought in. But along with that, it also shows to which criteria you had given much higher priority. So, if system life optimization had high priority and you got incremental improvement, then it has a different meaning. So, that is what is presented by this radar diagram.

So, I communicate my design priorities and the level of improvement that I have got on each of these parameters. Next is communicating the general characteristics of the product service system. So, how do I do it? So, I will present my systems map which I

have designed in the previous step. The offering diagram the interaction storyboard and I can also have some audio visual content. I can also write a document onto this particular aspect. The final communication is when I want to document with the sustainability characteristics of the solution; environmental, socio-ethical and economic improvements and elements of system bringing improvements.

I can again, end with my radar diagram along with the sustainability interaction story spot. Why the sustainability interaction story spot? Because it highlights those interactions amongst the stakeholders because of which sustainability is being brought into all the 3 dimensions.

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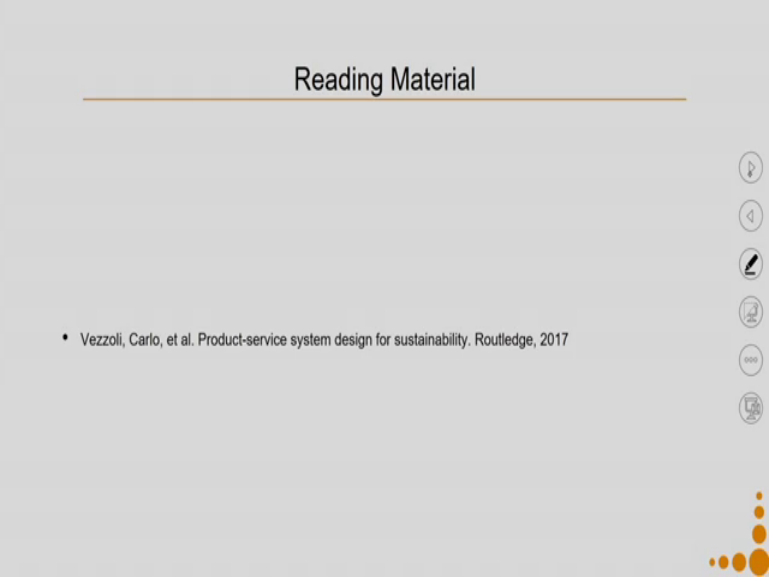

So, that is the end of our methodology: methodology for sustainable system design the MSDS methodology. You can read through this particular book which has been a constant source of inspiration for all our recordings. And after this particular week, we will focus on some other sustainability ways of designing for sustainability which are drawn off from other fields.

So, this particular methodology that we discussed it is a generic method which can be applied to any kind of product service system design. But then, there are different fields say for example, architecture, say agriculture or green design or carbon foot printing. So, there are these specific domains and exports in those domains have developed tools

which are specifically required or which is specifically suited to the requirements of those particular domains.

So, we will start discussing about those particular tools.

Thank you.