

System Design for Sustainability
Prof. Sharmistha Banerjee
Department of Design
Indian Institute of Technology, Guwahati

Week – 05

Lecture - 01

Sustainable Product-Service System Design – Definition, types & Examples

(Refer Slide Time: 00:46)

Content	
• What is Product-Service System?	Lecture 1
• Types of Product-Service System	
• Examples of Product-Service System	
• Sustainable Product-Service System Design	Lecture 2
• Examples of Sustainable Product-Service System Design	

Welcome to the third module, it will be about Sustainable Product-Service System-Design. So, we will start with trying to understand, what sustainable product-service system design is. So, in order to do that, in today's lecture, we will try to understand what is product-service system, the different types of product-service systems and now we will understand these two with examples of product-service system. And in the next lecture, we will try to understand what is sustainable product-service system design.

(Refer Slide Time: 01:06)



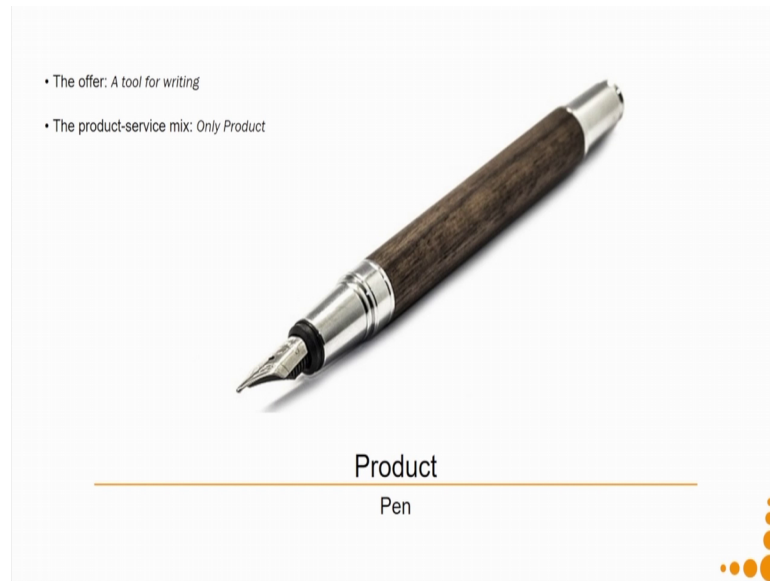
So, what is a product-service system?

(Refer Slide Time: 01:10)



Product-service system is an offer model, providing an integrated mix of products and services, that are together able to fulfill a particular demand of satisfaction. So, particular customers demand a customer satisfaction when it is fulfilled by an integrated mix of products and services, it is a product-service system.

(Refer Slide Time: 01:37)



Let us take an example. So, this is a pen, normal pen, this is a product. So, the offer over here is it is a tool for writing. There is no product and service mix, it is only a product. So, you go and buy this pen, you only buy a bought the product, and you can start writing with this pen.

If this pen gets damaged, you will throw away the pen or try to repair it, if it is possible, either you will try to repair it by yourself or maybe there is somebody somewhere who repair such pens. But, usually at the end of it, there is no service available to by the manufacturer to repair it, auto replace components all that. So, it is only a purely product based offering.

The satisfaction, what is the satisfaction you need to over here, it is a tool to write. Now, say for example, if I buy a very expensive pen, most likely the manufacturer of that pen will also allow you to buy component say for example, the nib; the nib is one of the part, which can get most damage. So, the manufacturer might give you this ability to get nib replacements is it is a product plus service combination or is it a product plus certain components, which are available to you.

So, in this particular case, where you can buy products, which will act as a replacement for certain components of an already bought product, it is still that you are buying products from the company. What the company is offering you in terms of service is a

facility a network of distributors, which is the service, from where you can buy those replacement components.

(Refer Slide Time: 03:32)

The slide features a title 'Insurance Policy' in a large, bold, black font, tilted upwards. To the left of the title, there are three bullet points: '• The offer: A service for insurance', '• The product-service mix: Only Service', and '• The satisfaction: Insuring against uncertainties'. Below the title, a green banner contains the text 'An insurance policy is'. Underneath the banner, the text 'A contract between the insured known as' is visible, followed by 'insurer promise' and 'for ar' on the next line. At the bottom of the slide, there is a horizontal line with the word 'Service' above it and 'Insurance' below it. In the bottom right corner, there is a decorative graphic of four orange circles of increasing size.

- The offer: A service for insurance
- The product-service mix: Only Service
- The satisfaction: Insuring against uncertainties

Insurance Policy

An insurance policy is

A contract between the insured known as

insurer promise

for ar

Service

Insurance

Insurance policy, it is a service. So, it is a service for insuring, it can be a car insurance, it can be a home insurance, and so on. So, this is a only service product, there is no product in, there is no tangible product, it is an intangible service.

The satisfaction over here is insuring against uncertainties, which can be against any kind of uncertainties, your insurance policy document will tell you which are the uncertainties against, which it is going to insure in you or your life or your health or any other product and so on.

(Refer Slide Time: 04:19)



Now, there lies (Refer Time: 04:12) we saw two examples, which are either purely product or purely service, then there lies is spectrum of other solutions, which are a combination of product and service. Say for example, a digital pen. The product product in this particular case is this digital pen.

(Refer Slide Time: 04:30)



The service in this particular case can be an app or a software, which decodes the writing. So, when using my digital pen, I write something. This app or software which is either in my computer or in my mobile or in my tablet, which decodes the writing to

various format, it might only converted into a jpeg, it might converted into a pdf or it might also do text recognition for certain languages.

It might also have a cloud based storage, which let us me keep my notes stored into it. So, what I am having, a digital pen is a product, which comes along with a services. So, the pen as such is the product, it is if it was providing me just the product and not this app service, then it would be no different from a normal pen.

So, the offer over here is a tool for writing and digitizing the content together, it is my offer. The product-service mix consists of the digital pen and the application or the software. The satisfaction over here is a tool that digitizes my hand written notes. So, I want to do handwriting written notes, which is very different from type notes. But, I do not want to scan my notes and then digitize it, I want as and when I am writing the notes, it gets digitize, and it also does some text recognition, so that is a satisfaction, which is being offered by these two the product and the service combination together.

(Refer Slide Time: 06:35)



• The offer: A tool for conducting survey where the data is collected using a pen and automatically digitised.

• The product-service mix: Digital Pen + Special Paper + App

• The satisfaction: A tool that automatically digitises my survey data taken through conventional mode of paper-based form and pen.

Service

An app or a software which takes these notes written on a survey document and automaticity digitises the data.

Say another example, let us say I develop a special application along with a special form, what these two together can do along with the digital pen is I have this form, which is meant for taking surveys, my form is map to my software or app that I have. So, I take my survey data, so I take somebody's name, age, number of people in the house, occupation and so on, other data. And the data is automatically populated in my survey database. So, this is a specialized service, which has been created.

The offer over here is a tool for conducting the survey, where the data is collected using a pen, and automatically digitized. The product-service mix over here consists of the digital pen, the special paper, which has been developed, and the app or the software. The satisfaction over here is a tool that automatically digitizes my survey data taken through conventional mode of paper based form and pen. So, I do not need to train my staff, who are going to go and collect the say survey data, because they are already trained in collecting the data in certain forms, which are paper based forms using pen. So, this is another example of product plus service combined together to offer you the satisfaction that you want to have.

(Refer Slide Time: 07:29)



Say a car, it is a product. The offer over here is a car, it my mostly this offer of a car, so when you go and buy a car, you are also given car plus a maintenance contract. So, say for 1 year or 2 years, the manufacturer sells that I give you free maintenance contract. So, of course, it is free in the sense that during the maintenance, you are not giving the person the manufacturer money, but when you bought the car, the price of the maintenance was already includes into your car.

So, and after that period of so called free maintenance, you will have another you will be able to still maintain your car by paying a fees, because your manufacturer has set up a service network. So, you buy cars from company x, company x will have varies service centers. So, in this case although I am buying the car, I am also getting a maintenance as

a service on paying certain fees to the manufacturer, but the main component over here is I am going and buying the car. The satisfaction over here is a means for point-to-point travel.


(Refer Slide Time: 08:51)



Now, say for example OLA, is a service. What OLA gives you, the offer over here is on-demand mobility service. My previous example of a car, where I could buy a car that was the mobility solution that I was buying, but in that case, I own the car; here in case of OLA, I do not own the car. What I have is whenever I need the service, I can ask for the service. So, the offer is an on-demand mobility service. The product-service mix available to you over here is a vehicle and an app. So, you do not own the vehicle, you do not own the app what you do is when you need the service, you ask for the service and you pay for the service for the time that you are hiring the service.

So, the satisfaction here is again a means for point-to-point travel. So, the same means for point-to-point travel was taken in the previous context, where you bought a car. So, the same satisfaction could be achieved through only a product model or a product model with small component of service into it, where the from the manufacturer of with from whom you have bought the car, can set up various service centers, and you can take your car to those service centers for servicing. Or it can be also satisfied by a service provider like OLA, where you get the service on demand, and you pay only for the time frame in which you are using the service.

(Refer Slide Time: 10:30)



"We're a different sort of car company. We'll never sell a car as a product." "We offer mobility as a service."

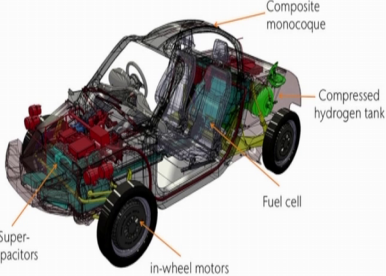
Product - Service

Riversimple - UK Based Hydrogen Fuel Cell Eco Car Company

Another company, this company is called as Riversimple, it is a UK Based Hydrogen Fuel Cell Eco Car Company. What they say is we are a different sort of car company, we will never sell a car as a product, we offer mobility as a service.

(Refer Slide Time: 10:49)

- The offer: *A means of mobility*
- The product-service mix: *pay-per-month car (including energy, maintenance, repair, insurance)*
- The satisfaction: *Access to mobility*



Composite monocoque
Compressed hydrogen tank
Fuel cell
in-wheel motors
Super-capacitors

"For a fixed monthly fee our customers will receive a car – **their car** – and all the maintenance, insurance and fuel to run it. One payment to cover everything – at the equivalent monthly cost of running a normal, average car."

–Riversimple

So, what they do is for a fixed monthly fee, our customers will receive a car, which will be called as their car, and all the maintenance, insurance and fuel to run it, one payment to cover everything at the equivalent monthly cost of running a normal average car. So, here you can see in this case, so OLA was a different kind of a car service, where you

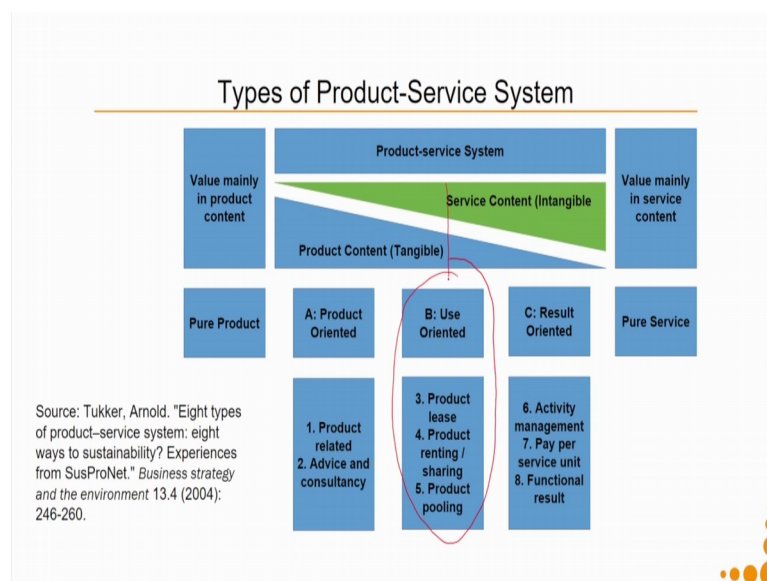
hire the car for a certain duration of time for which you required the car, you also got a driver along with the service.

This is another kind of service in the segment, which is mobility, in which case, I hire this car on a monthly fee basis, what comes in this whole monthly fee package is the car, the maintenance of the car, the insurance of the car, and the fuel to run it. So, the company is responsible to take care all of these, I do not need to bother about any of these different aspects. What I do is I pay a monthly fee for having the service.

Now, they divide the service in a particular manner in which the payment comes out to be almost equivalent to the monthly cost of running a normal average car, in case you were an owner of the car, because in that case, you will have to pay for the maintenance, you will have to pay for purchase of the initial car, the insurance, and the fuel to run it.

So, the offer over here is again a means of mobility. The product-service mix available over here is at pay-per-month car, what you get is car including energy, maintenance, repair, and insurance. The satisfaction over here is again access to mobility, and this is more equal to like your own car, because this car is going to be always with you at least for the month for which you have paid for it. And little different from the OLA service, which is a on-demand service. So, you get it for a particular time frame for which you are hiring it.

(Refer Slide Time: 12:58)



So, from these examples, you can see that there are several types of product-service system. So, let us try to discuss what are these different types of products and service systems. So, I can divide all the product-service systems into two parts. As we studied in a product-service system, you need product plus service, so you have product content. What we mean by product is mostly anything which is tangible is the product, so which you can touch. And service content means all the intangible aspects of it, which you cannot touch.

So, on one side of this spectrum, you have value mainly in product content, so which is basically a product only system. And on the other edge, so it is a pure product. And the on the other edge, you have value mainly in service content, which is pure service. So, our pen the first example that we saw the normal writing pen that comes in the pure product category, because there was no service attached to it. Whereas, the second example, which we took off the insurance that is a pure service, there is no product associated with it.

Now, let us come to product-service systems. So, the first type of product-service system is called product-oriented product-service system; it includes all those product-service systems, all those PSS systems, which are related to product in which the product has maximum say advise and consultancy. We will come to examples for each of this.

The second is somewhere in between, it is called as use-oriented PSS; it covers when we can have a product on lease, a product on renting or sharing or a product by pooling. The third is result-oriented PSS. Since, it is very close to the service, and it has very less product component, it has mostly service component. So, result-oriented PSS which includes activity management, pay per service unit and functional result. Let us look at each of these in more detail now.

(Refer Slide Time: 15:19)


Product - Oriented

- the business model is still mainly geared towards sales of products, but some extra services are added.
- **Product-related service** - The provider not only sells a product, but also offers services that are needed during the use phase of the product. This can imply, for example, a maintenance contract, a financing scheme or the supply of consumables, but also a take-back agreement when the product reaches its end of life.
- **Advice and consultancy** - In relation to the product sold, the provider gives advice on its most efficient use. This can include, for example, advice on the organisational structure of the team using the product, or optimising the logistics in a factory where the product is used as a production unit.

Source: Tukker, Arnold. "Eight types of product-service system: eight ways to sustainability? Experiences from SusProNet." *Business strategy and the environment* 13.4 (2004): 246-260.

A: Product Oriented

1. Product related
2. Advice and consultancy



So, the product-oriented. So, the business model is still generally geared towards sales of products, but some extra services are added. Say for example, you buy a car you are buying a car, so the whole business model is around selling cars. And it is this business model is enhanced by setting a various service centers, where you can take your car, pay for the maintenance, and get your car maintain.

In case the service centers, where not available, one could have still bought the car, and could have taken it to any other independent service provider. In that case, we might have to the company the business would have to create a network of spare part providers from which these service providers, for maintenance of the car, could buy the spare parts, and maintain the vehicle.

So, as you discuss, there are two types in this case product related, and advise and consultancy related. So, product related service, the provider not only sells a product, but also offers services that are needed during the use phase of the product. This is the same like you sell a car, and then you have a service center for repairing the car. A manufacturer sells washing machine, they also have a service network, which goes on repairs this washing machines.

This can imply for example, a maintenance contract. Say for example, when we buy a water purifier we buy the water purifier, in the first year of the water purifier, in the cost of the water purifier itself maintenance is covered, say for example, but from year 2, year

3 and so on. Each year I need to buy a maintenance contract, which means in a year's time, however number your water purifier breaks down or it require some servicing, at that particular amount, the maintenance fees which has been paid, in that whole year servicing will be done by the company itself.

So, this can imply for example, a maintenance contract, it can be also happening without a maintenance contract, which is like my car breaks down and I take it towards service center, it can be also financing scheme or supply of consumables. Say for example, I have coffee machine and I like to buy coffee pots, which are the consumables in this case.

So, the company has to also setup a service network, which will deliver these coffee pots to the consumer. It also takes back, it can also include things like take-back agreement, when the product reaches its end of life. So, the manufacturer takes back the product at the end of the life, and takes it into remanufacturing, reuse or recycling or proper waste disposal.

The second type in product-oriented is advice and consultancy. In relation to the product sold, because we are very close to the product-oriented zone. So, again this one is also in relation to the product sold, the provider gives advice on its most efficient use.

Say for example, when you buy a washing machine, the manufacturers will have a service center, the someone from the service centre will come to your house, and teach you on the best possible ways to operate the washing machine. So, they are giving you advice and consultancy on the product that you have bought. There are times when they might charge you there are other times when you are buying the product itself in the product's price, the service components price has already been added, so you do not make a separate payment for the service.

So, this can include for example, advice on organizational structuring of the team using the product. Say for example, I sell a particular software, which is a tangible product and along with that I would require the office staff to be organized in a certain manner, so that they can efficiently use that particular software. So, I will conduct training programs, so that is again a advice and consultancy, where it is in relation to the product, which has been sold or optimizing the logistics in a factory, where the product is used as a production unit.

(Refer Slide Time: 19:49)

	Product-oriented	Use-oriented	Result-oriented
Value creation	Provider takes responsibility for the contracted services.	Provider is responsible for the usability of the product or service.	Provider is responsible for delivering results.
Value delivery	Provider sells and services the product sale and service (e.g., maintenance or recycling).	Provider assures the usability of the physical product along with service.	Provider actually delivers result.
Value capturing	Customer pays for physical product and for the performed services.	Customer can make continuous payments over time (e.g., leasing).	Customer payments are based on outcome units; that is, they pay for the result.

Reim, Wiebke, Vinit Parida, and Daniel Örtqvist. "Product-Service Systems (PSS) business models and tactics—a systematic literature review." *Journal of Cleaner Production* 97 (2015): 61-75.

So, what do we see in this case, how is the value being created in a product-oriented system, the provider takes responsibility for the contracted service. So, I buy the car, I buy the washing machine or I buy a food processor or I buy a software, although I am me as a consumer, I am paying for it, for the service which the company will provide. But, the provider is giving me undertaking a responsibility, that in case of any breakdown, I will come and provide you the service, you pay for the service, but I will come and provide for the service. So, you do not need to look for who is, who can provide me that particular service.

So, the value is created, because the provider takes responsibility for the contracted service. So, many a times when we want to buy a particular product, we also try to see within our city, we have a service provider from that same manufacturer or not, in case we do not have that, we know that something wrong happens to our product, we will have to wait for a long time to find somebody to service my product. Hence, in this case in the product-oriented PSS, value is created by the manufacturer by taking responsibility for the contracted services.

How the values delivered, so the provider sells the product and the services. How the value is captured, the customer pays for the physical product and for the performed services, both of them. In this case, once the product is sold to the consumer, the product is owned by the consumer. So, once I buy the washing machine, it belongs to me, it no

longer belongs to the manufacture. Now, let us look at the use-oriented product-service system. Here you can see, it is in between, so it has both the characteristics of having a tangible product and having a intangible service content to it.

(Refer Slide Time: 21:57)

The slide is titled "Use - Oriented" and features a horizontal line below the title. On the right side, there is a blue box containing the text "B: Use Oriented". Below this, another blue box lists three business models: "3. Product lease", "4. Product renting / sharing", and "5. Product pooling". The main content of the slide consists of four bullet points:

- the traditional product still plays a central role,
- but the business model is not geared towards selling products.
- The product stays in ownership with the provider,
- and is made available in a different form, and sometimes shared by a number of users.

At the bottom left, there is a source citation: "Source: Tukker, Arnold. 'Eight types of product-service system: eight ways to sustainability? Experiences from SusProNet.' *Business strategy and the environment* 13.4 (2004): 246-260." In the bottom right corner, there is a decorative graphic of four orange circles of varying sizes.

So, the traditional products still plays a central role over here. But, the business model is not geared towards selling products. So, in the product-oriented model, the business model was oriented towards selling products, and those products were augmented by a service. Here in use-oriented all the selling product is a key element sorry, although the product is a (Refer Time: 22:25) element, selling the product is not the key element. So, the aim is not to sell the product.

So, the product stays in the ownership with the provider, so the manufacturer owns the product. And is made available in different form, and sometime shared by a number of users. So, we as consumers in a use-oriented PSS, we will not own the product, but we will rent the product, lease the product, share the product or pool the product. So, we are paying for the use of the product, the ownership still remains with the manufacturing. Let us see how.

(Refer Slide Time: 23:06)

Use - Oriented

- **Product lease** - Here, the product does not shift in ownership. The provider has ownership, and is also often responsible for maintenance, repair and control. The lessee pays a regular fee for the use of the product; in this case normally he/she has unlimited and individual access to the leased product.
- **Product renting or sharing** - Here also, the product in general is owned by a provider, who is also responsible for maintenance, repair and control. The user pays for the use of the product. The main difference to product leasing is, however, that the user does not have unlimited and individual access; others can use the product at other times. The same product is sequentially used by different users.
- **Product pooling** - This greatly resembles product renting or sharing. However, here there is a simultaneous use of the product.

Source: Tukker, Arnold. "Eight types of product-service system: eight ways to sustainability? Experiences from SusProNet." *Business strategy and the environment* 13.4 (2004): 246-260.

B: Use Oriented
3. Product lease
4. Product renting / sharing
5. Product pooling

So, product lease, here the product does not shift in ownership. The product has ownership and sorry the provider has ownership, the manufacturer has the ownership, and is also often responsible for maintenance, repair and control. The lessee pays a regular fee for the use of the product. In this case, normally he or she has unlimited and individual access to the leased product.

Say for example, when you lease a house for the duration in which you have lease the house, you do not become the owner of the house, the owner of the house is still the person, who lease the house to you. But, for the period in which you have lease the house, you have unlimited and individual access to the house.

Another example of it, say for example, I go to a particular transportation service provider, I want to transport certain goods from point a to point b in a small truck, so I will lease the services of transport provider for a certain period of time. I can, in this case what I am doing is, I take the truck for 2 days, in those 2 days I am the sole person, who can use the truck for an unlimited period of time. The trucks maintenance, repair, and control all will have to be taken care of the owner of the truck and not to the by the person, who takes it on lease.

Another model which is close, but different is based on product renting or sharing. Here also, the product in general is owned by the manufacturer only, who is also responsible for maintenance, repair and control. The user pays for the use of the product. The main

difference to product leasing is, however that the user does not have unlimited and individual access.

Others can use the product at other times; the same product is sequentially used by different users. So, say for example, when I take a OLA cab or an Uber cab what I am doing is renting. So, as for the time frame in which I am renting it, I will use it, and after that it will be used by someone else. Another concept which again shares some similarity with the lease and the renting or sharing is product pooling. This greatly resembles renting or sharing; however, here there is a simultaneous use of the product.

Say for example, when you are oft for Uber share or OLA share you are doing product pooling. So, the car is being pooled by 3 to 4 people depending on these share service. So, in case of use-oriented PSS the ownership the responsibility for maintenance repair and control remains with the manufacturer or the provider of the service, the user only pays for the time frame or on the basis of the use.

So, in use-oriented PSS the value creation happens because provided is responsible for usability of the product or service. So, I am expecting that if I am renting a vehicle from somebody, the person who is renting it on who is the provider of the service will ensure the product is in a usable condition, it is in a comfortable condition, it is well maintained and well taken care of I do not have to worry for that.

So, two or three providers who are providing same kind of service, I might choose provider A over provider B and C, because provider A is maintaining its products way much more better than B and C. So, value creation is happening over here because provider is responsible for the usability of the product or service.

How the value gets divide delivered. So, the provider assures the usability of the physical product along with the service. How the value capturing happens, customer can pay continuous payments overtime. So, leasing renting pooling sharing all other different ways in which the consumer is paying a making continuous payment over time depending on what is the nature of the contract. So, here you can say you are only paying for leasing, renting or pooling you are not paying for the product in itself. So, that is use-oriented PSS. Coming to the third type, which is result-oriented PSS. You can see the intangible the service content is very big and the product content is very small.

(Refer Slide Time: 28:10)

The slide is titled "Result - Oriented" and features a horizontal line below the title. On the right side, there is a vertical sidebar with two blue boxes. The top box contains the text "C: Result Oriented". The bottom box contains a list: "6. Activity management", "7. Pay per service unit", and "8. Functional result". In the center of the slide, there are two bullet points: "• the client and provider in principle agree on a result," and "• and there is no pre-determined product involved." At the bottom left, there is a source citation: "Source: Tukker, Arnold. 'Eight types of product-service system: eight ways to sustainability? Experiences from SusProNet.' *Business strategy and the environment* 13.4 (2004): 246-260." In the bottom right corner, there is a decorative graphic of four orange circles of varying sizes arranged in a vertical line.

So, the client and the provider in principle agree on a result. What a result might mean is in this particular room I need certain amount of lighting for my activities. So, reading requires different amount of lightening, working on a computer requires different amount of lighting. So, I know that in this area I want to do certain activities and I need certain amount of lighting. So, I am the client; I reach a particular provider I tell them that I need so much amount of light in this room I will pay you for the end result which is the amount of light. So, amount of light can be measured in lumens. So, I will pay you on the basis of the result.

Now, how you provide me the result I will not be much bothered about it why because I am not paying for the electricity bills, I am not paying for the maintenance, I am not paying for repairs and so on all that is manufacturers or providers worry. I have agreed only to pay on a on the basis of result which is so much of lightning.

So, there is no pre determined product involved. The provider is free to of course, the provider will always discuss with the client that I can bring you these offers not that the clients choices are ignored, but in this case there is no pre determined product involved. So, the provider can creatively design a set of products or a way of delivering it, so that the expenses for the provider is as less as possible which is like the provider can provide the results very efficiently to the client.

(Refer Slide Time: 29:55)


Result - Oriented

C: Result Oriented

- **Activity management/outsourcing** - Here a part of an activity of a company is outsourced to a third party. For example, the outsourcing of catering and office cleaning in companies.
- **Pay per service unit** - The PSS still has a fairly common product as a basis, but the user no longer buys the product, only the output of the product according to the level of use. Pay- per-print formulas now adopted by most copier producers.
- **Functional result** - Here, the provider agrees with the client the delivery of a result. The provider is, in principle, completely free as to how to deliver the result. Typical examples of this form of PSS are companies who offer to deliver a specified 'pleasant climate' in offices rather than gas or cooling equipment, or companies who promise farmers a maximum harvest loss rather than selling pesticides.

6. Activity management
7. Pay per service unit
8. Functional result

Source: Tukker, Arnold. "Eight types of product-service system: eight ways to sustainability? Experiences from SusProNet." *Business strategy and the environment* 13.4 (2004): 246-260.



So, this can happen in three different ways. The first one is activity management or outsourcing. Here a part of an activity of a company is outsourced to a third party for example, outsourcing of catering services or outsourcing of office cleaning services. So, the provider to whom the contract has been given, they will take care of the cleaning, they will take care of the catering and the client pays for the result which is the food or which is the cleaning per square meter say for example,. So, this is activity management or outsourcing so, again a result-oriented payment.

Pay per service unit, the PSS still has a fairly common product as a basis, but the user no longer buys the product only the output of the product according to the level of use. Say for example, I want to make photo copies. I can buy copier machines I want to take print outs I can buy printing machines, so that is a product ownership model. So, I bought the product. The manufacturer will of course give me certain services. So, in case my product breaks down I can contact them and at a particular cost they will come and repair my product, so that is the product-oriented model.

If it was the use-oriented model, I could have gone to a particular provider's place and either taken the printer on lease, rented the printer or did a product pooling. I am not going to own the printer, but I can do leasing of the printer, renting of the printer sharing of a printer and product pooling and get my friend services. Whereas, in my result-oriented PSS what I will do is paper print. So, when I pay sorry when I need a particular

print I get the payment I as a producer of photocopier machines get the payment when somebody ask for me that you pay for it.

So, what I am paying the, I am not buying the printer, I am not renting it leasing it the printer, what I am doing is pay for print which is the printing is the results. So, I am paying for the results that I got.

The third point in result-oriented PSS is functional result here the provider agrees with the client the delivery of a result. The provider is in principle completely free as to how to deliver the result. Why do we say in principle? Because of course the provider will discuss with the client and they will mutually reach to a particular negotiations, but the provider is actually free to deliver the result in a manner which is most suitable to the provider.

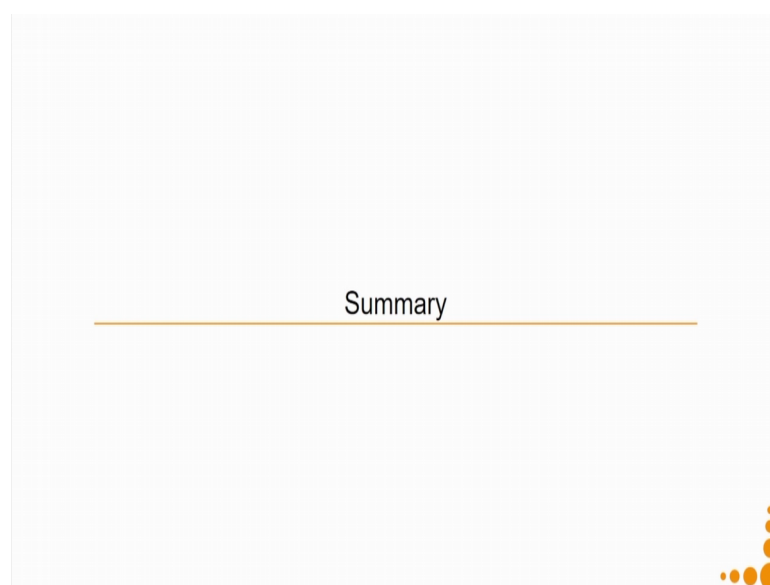
Typical example so the lighting example that you that I gave you falls under this particular category. I am paying on the basis of the amount of light that I mean which is amount of light is the result. So, for that function I am paying and my provider is free to provide me the function in the most optimal manner and I will not be paying for any maintenance, repair, electricity and so on. I will just be paying for the amount of light. Other examples are like rather than cooling or heating of rooms by a company can a client can pay for pleasant climate. And the provider has to ensure how they are free to choose the way in which they are going to deliver this result which is pleasant climate.

So, in result-oriented PSS value creation happens because provider is responsible for delivering the results. When you give a somebody a catering job, it is the caterer's responsibility to deliver the results. You do not have to worry for how the food will be cooked and so on. You do not have to worry for where to get the utensils from, where to get the gas connections from, the caterer provide everything is a result the result is the food and you pay per plate. You do not have to think about how each and every component of the kitchen will have to be organized so that the caterer can cook that is the caterers job.

Value delivery the provider actually delivers result, value capturing how the customer captures this value. Customer payments are based on outcome units. Say for example, per plate basis payment that is they pay for the results. So, if you try to compare the product-oriented, use-oriented and result-oriented PSS you can see in product-oriented

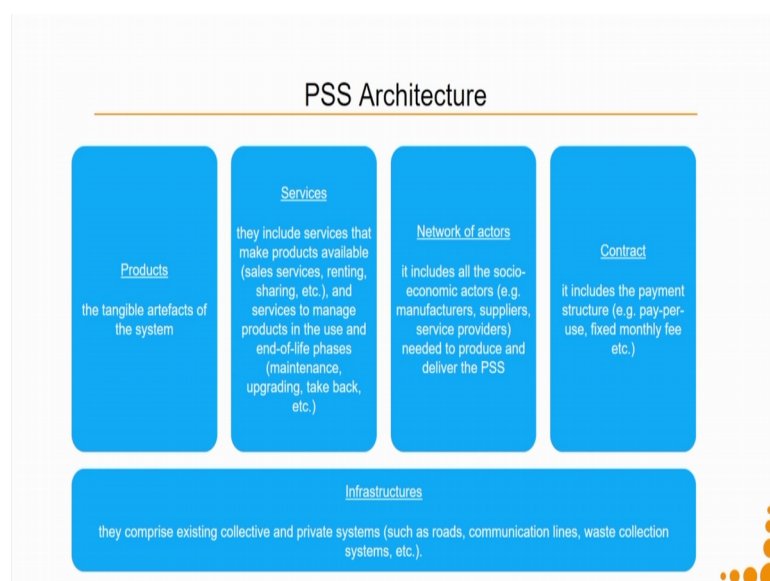
customer pays for the product as well as for the service. Customer is responsible for maintenance of the product, repair of the product. Customer can make continuous payments overtime in a use-oriented PSS. In this case the provider is responsible for the products, for the product for the maintenance, for the repair and so on. In result-oriented PSS, the provider is completely free to provide the results in the best possible manner; the customer pays only on the basis of the results.

(Refer Slide Time: 35:28)



So, how can we summaries this PSS as a system.

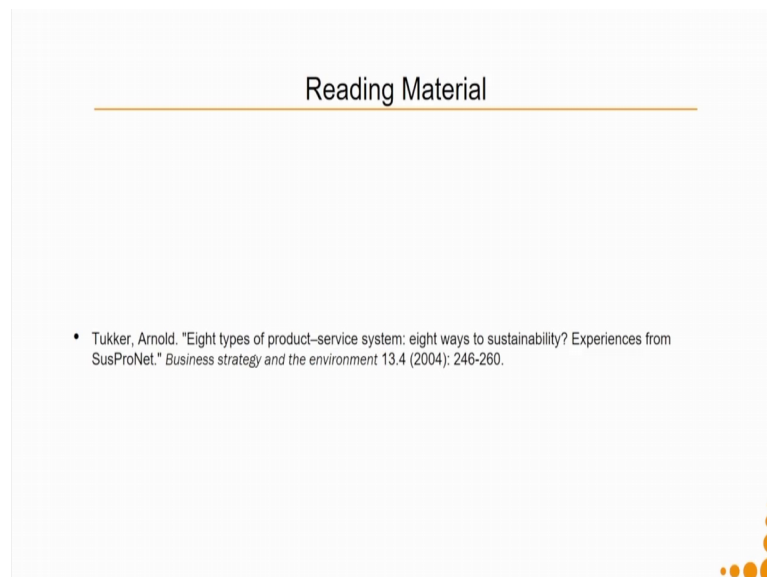
(Refer Slide Time: 35:33)



So, the basic PSS architecture, it consists of products which are all tangible architecture of the system. Services they include services that make products available like sales services renting, sharing etcetera, and services to manage products in the use and end-of-life phase. Say for example, maintenance up gradation take back. The product how the product and service will be provided is through a network of actors. It includes all the social economic actors, examples suppliers, manufacturers, service providers needed to produce and deliver the PSS, so which is the product as well as a service.

A very important aspect of any PSS architecture is the contract; it includes the payment structure that is pay per use fixed monthly fee and so on. And it requires a particular infrastructure. They comprise of existing collective and private systems such as roads, communication lines, waste collection systems etcetera. So, a PSS architecture cannot function if this infrastructure is not available, and not it is the setting up the infrastructure facilities in terms of roads, communication lines or waste collection systems is not as sole responsibility of the provider. The provider other network of actors as we call them they will depend on existing collective and private systems for taking those infrastructure; otherwise it will not be very comical for them to provide the PSS.

(Refer Slide Time: 37:10)



You can go through this particular pay per it talks about eight types of product-service system and eight ways to sustainability. So, in the next lecture, we will discuss about product-service system design with the sustainability angle, where will see why what all

we can do in each of these eight types of PSS to get sustainability. We can also compare the sustainability of one type versus another. Certain type say for example, product ownership based product-service systems they have much larger ecological footprint.

Because I am owning the car, but I am not going to use it so extensively. Whereas, a use-oriented or a result-oriented where I am not owning the product a particular product like a car can be used for delivering service to a large number of people, and it can be used be way much more efficiently. It can be also maintain more efficiently. So, they are more sustainable solutions than the product-oriented solutions.

Thank you.