How would you briefly define circular economy, and sustainable consumption in one sentence each?

T: Circular economy is one where resources extracted from the earth are put back into the economy with minimum waste. So, in contrast with the linear economy where resources are extracted, waste is thrown away, and there is not any recycling at all. There is the assumption that there are limited resources, unlimited spaces to dispose of waste - the circular economy seeks to address that problem. I guess for sustainable consumption I would follow the Brundtland definition. So, sustainable consumption is consumption that uses resources to meet people's needs in such a way that it doesn't prevent future people's meet from being met in such a way that their quality of live is as good as ours today.

How would you explain the future circular economy to others friends, or relatives who don’t really know anything about the circular economy?

T: I would say that the circular economy is a framework for understanding how the economy should be managed and it represents a substantial change from the traditional model. In my view, there are two elements to it material recycling takes place and material reuse takes place. And that is necessary because of the concerns about long-term resource security but it also involves the slowing of flow of materials in the economy as well. So what would I do is predicated on an assumption that all materials, their extraction, their use, and their disposal involve energy use and typically fossil fuel use. The circular economy is partly about recycling because of the need to reduce waste but it is also about other environmental issues such as climate change because our flow of materials in the economy uses energy.

Imagine a truly circular economy, how would consumption change and why?

T: The nature of consumption would change, if it is a truly circular economy, and that is an approximation because you can't get 100% recycling. There would be a change in the types of products that we buy. So, in particular many more products would be made from recycled so in other words from reused materials than in the past. That would have indications for design and manufacturing but in addition for circular economy to work effectively there need to be changes in how we consume things not just in what we consume. So, once you start having to apply constraints to material flows sufficient to achieve genuine sustainable development we have to look at those materials and we have to look at the number of products we consume and then by indication how long those products last. So, that means that products in the circular economy will not only tend to last longer than current products do but also the means by which we obtain the services those products supply they may be supplied in different ways than just individual people owning individual products. There might be more shared ownership, there might be more different ways in acquisition such as rental and who knows - other approaches that we are yet to discover.

The sustainable business model has three aspects: the value proposition, the value creation & delivery, and the value capture. And each of these aspects have several sub-elements… How should companies shape their value proposition when implementing circularity and sustainable consumption?

T: That is a difficult question and I think one gotta be careful about generalising between different sectors as well. There will be different approaches in different product sectors. So we do for example at my University clothing, vehicles, and appliances in particular. We are also moving in other areas, possibly furniture, garden products and the like. So, there is a caveat - one has to be careful about generalising. In terms of the value proposition - what the company could be offering to the consumer. Let me give you one example, we are doing work on vehicles. There is a need for people to be mobile these days but the trouble is that we are highly unsustainable in how we achieve that mobility. Contrast that with 50-70 years ago when far fewer households owned a car, public transport was much greater, far less air travel and the like. One thing companies could change is to change from being suppliers of vehicles to being suppliers of mobility. For example, the kind of companies that want everyone just to buy cars and replace them regularly I think that has got to change in the future. There is no necessary reason why a car would have to last for 13-14 years and then be thrown away. Heaps of metal of which a growing proportion is plastic, often not recycled, and also battery is another non-recyclable component. In order to change towards a circular business model a number of things have to happen in terms of what they are offering to consumers. The first is the nature of the product might need to change. So, historically it has been quite a particular way of selling vehicles which has to do with a car programme (??) "power" in particular thrust, style, an assumption is made about the durability of a car so it is designed for a certain number of years and then you replace it and when you don't it is not environmentally beneficial. So, all that has to be thought through is how to deliver getting a person from place A to place B. Contrast that with car sharing which is another approach. So, in the UK we have seen traditional car hire companies look to buy up car clubs and several of them have done that. That is a completely different value proposition; the car club model is when somebody want to get somewhere you go somewhere and pick up a car somewhere. You won't have the car being used for 95% of its time in your garage so basically cars would be used in a very different way. So, if a company wants to sell that kind of model to the consumer, the company has to do several things, it has to look up (??) the relationship it has to the consumer. For example, the car manufacturer probably doesn't really follow through to the consumer in terms of loyalty particularly effectively. I happen to have a Citroen but I have not been contacted by Citroen in the seven years and I don't expect to be either. On the other hand, if I would have joined a car club there would probably be more of a personalised relationship. Chances would be that it would be more community-based and community-focused. Working on the assumption that the future will probably will be a blend of different modes of mobility the kind of car a circular economy supplier might supply to me might be more modular. So, we supply you a car that is designed to last for 25 years, maybe even longer than that. The chassis and the broad shell are designed according to biomimicry principles, it would be designed so that the ergonomics are right, the comfort is right, and also in terms of resistance is right. So, there aren't many intrinsic improvements in terms of shape. It might even come with a guarantee, like if we have hydrogen cars in 15 years you can actually convert one to the other. So, you keep the stock. That goes back to the earlier point about embodied carbon in the material because 10-15 percent of car impacts, so carbon emissions, are in production and not in use. In summary, they have to sell something in a different way or sell a service in a different way to what they do at the moment.

What do you think could be the value proposition that the companies offer to the society and the environment?

T: I'll link that in part to the first one. What value the company offers to society links to what it offers to the different consumer segments as well because it brings in the triple bottom line approach. So, there are in my view social implications of the circular economy even though as a model, compared to for example the term sustainable business model, when you use the term circular business model you tend to focus on the material side rather than society. If we use a fairly loose definition of circular economy to include the society there are implications. The first is in terms of social sustainability and justice and so on. So in the change towards circular business models there are implications for different consumers within society. So for example if there was an attempt in raising standards in products that they last longer costs would go up and the company would have to think what does this mean for my lowest income consumers. There are issues about social justice whenever you talk about circular economy because was with most green things it is more expensive to do the right thing. That raises issues about for example rental; does that mean that reach people are still going to own and poor people are going to rent more or not? I think there are going to be issues related to what it means for the infrastructure of society. So, this kind of model, it can be done in different ways, it can for example be done in the context of Industrial Ecology whereby there might be quite localised change. The attempt towards circularity is at a town or regional level. There may be implications also in terms of pollution as side effects of circularity because as anyone who has been inside a waste plant knows, once you’re starting to bring back materials and recycle them you are much more likely to release pollutants into the environment than if you just take them and put them into a hole in the ground. So, trying to do the right thing has potentially negative side effects as well.

Value creation and delivery: How do you think companies should create and deliver value in the transition to a circular economy?

T: That is an interesting one. Companies need to understand the process of value creation in the context of materials used more than they do now and they could probably be helped better to that end to have proper pricing of energy and materials. So, I am a believer in green fiscal reform and environmental taxes. If that happens materials and energy will go up in price and labour will go down in price. So, what I am suggesting is that at the moment materials are relatively cheap and the use of labour is relatively expensive. In terms of creating a product that is suitable for the circular economy - it is hard and that is why it doesn't happen and that is why we aren't having to have the discussion about it. Because if the cost of finite raw materials was more expensive than it is now, then people would have moved in the right direction 30 or 40 years ago and would see things differently now. Let me give you another example, one of the problems is with the current economic variables is that it doesn't make sense to prolong the use of materials and components. So, the circular economy is seeking to displace the linear economy which says "you've got a used item, let's throw it away it doesn't have enough value". The circular economy would say "no, we need to see waste as a resource and moreover we have to try to capture the value from that resource". Clearly, recycling destroys value in so far as if you have a product, in particular one that still functions, especially because of the poor collection systems that residual utility is destroyed. For example, you might have some furniture that is then chucked into a lorry with the rest of the furniture, you can't use it at the other end. So, the value is lost at that point. The issue is can we through a circular economy have a way through a collection system and design a system whereby the components can be used either for the same product or for a different product. For example, there are certain types of components like motors that are transferrable between products, and a huge number of other things. And that value is completely lost once the product is disposed off and messed up and dirty when it is left out in the rain and so on. I think it is actually industries and governments that need to create value because the problem is systemic it is not something that you can easily do in isolation of the rest of the market. At the moment the prices are wrong.

What do you think about resources? How should they be used and how should their role change in the transition to the CE?

T: I think in most of the industrialised countries the mindsets of employees is still in linear thinking. So, you only have to look in my university waste bins and have a look whether materials are separated into paper, metal, plastic and residual waste... and no, to many people it is just an inconvenience. It is just something "they" are telling me to do. So half of them and half of them might not. There is still not the thought that as I put something away it is a resource for the future. For many people it is too inconvenient. That is reflected in industries, although I would believe less so. Some would argue that companies are more efficient than households in terms of making the best use of waste. I would argue against that. For example, we know from companies that we had contact with in the car industry and the clothing industry, there is still huge amounts of waste at the sites of production and materials are just wasted, "it is inconvenient, too hard work to collect, we are not going to invest in it because it is not worthwhile." So, arguable the very language of the circular economy is still probably only understood by 10% of the population. I have not any reason for suggesting this exact figure, I suggest that educating classes, students, young people, business people who are becoming familiar with that language. That thought of treating waste as a future resource will not be in their mindset yet and so the process has to start from school right through to universities and above. It goes deeper than education as you really need to communicate those values to change people's mindsets.

What do you think about distribution channels? The way a firm goes to market and how it actually reaches it’s customers? How should they change in the transition to the CE?

T: We have a system which distinguishes very clearly the new and the shiny product from the management of resources. So, the Americanisation of shopping probably also in the Netherlands whereby we increasingly shop in malls which are essentially for leisure shopping, where things are always new and nearly always mass-produced, things are associated with fun and leisure rather than utility. Hence the growth of things like the cinemas and other facilities such as restaurants as part of these malls. Whereby the process (??) focused on utility is marginalised in the back streets, into vintage markets, and put on Ebay. So, this is a radical separation. Let me give you another example, we did a little bit of work on footwear. Why is it that in the UK no footwear shoe retailer repairs shoes? Why is it that this is done by a different type of company? So, in terms of distribution the service and the sale have to be brought together locationally. So when people see a product being sold to you they see the service that underpins the utility of this product is also available from this supplier. So all companies that retail should also offer the maintenance of their products and that means massive reshaping of the way in which we buy things and it might be the only way in which retailers can survive in the internet age. Obviously, with the growth of internet shopping people often go into these shops use them for information finding and acquisition and then buy on the net. If a company moves towards "I selling you the service, I will be with you long term, I am in this geographical place where you can come and see me all the time" that might lead to change in how we buy our products.

Very interesting, so this already touches on partners and suppliers. For example, these services should they really be integrated or only co-located?

T: I think probably it ought to be integrated ideally because won't have the value that the... Well, that is an interesting one. You've got the manufacturer and the reseller, you've got the shops where the manufacturer actually produces the products. Obviously, raising questions about the brands when for retailers like Marks & Spencers where everything is Marks & Spencers they use different manufacturers but they only use one brand name but other retailers they buy in. (28:20) There are issues about that, you gotta think about how a company tracts (??) its profit in the future. So, in the future I believe the company will be getting its profitability partly through the product and partly through the services it provides to maintain the products over time. I think in the future in the sustainable economy there will be quite a shake-up a mix-up; I mean already you are seeing partnerships emerging in reuse. For example, some of the high street stores are interested in reuse and they link up with reuse organisations, in Britain we have FRN (First Reuse Network) which also deals with appliances. You had the example of Marks & Spencers linking up with the charity Oxfam about getting used clothes. I think in the circular economy you will see more of this kind of complexity of companies working together, where some might be quite specialist and they might be separate rather than integrated but they specialising in one particular process that might be repair. So, many companies are themselves obviously quite complex so you might have one parent company and within that a retail company and a repair company and maybe even a up cycling company that have their own competitive goals but are also part of the whole to make it more efficient.

What should be the role of technology and product features? How can this aspect help the transition to the circular economy, and how should companies utilise these options?

Well, some of the obstacles for example if you look at electronics, clearly to maintain a ... to take advantage of increased knowledge in areas such as electronics there has to be a credibility in products which has big implications for design. I gave the example of the car but we could do the same for mobile phones or whatever. The actual shell could stay the same but within the components you might want to be able to take things out and replace them. Clearly, many of the insights from design for recycling, mainly design for disassembly being key also apply to the whole circular economy thing in terms of repair and reuse but it also has other issues being raised in terms of recycling because there are potential conflicts between some of the environmental goals. Take clothing, you got the basic core materials, core fabrics, cottons and synthetic polyesters but poly-cottons as well. So you have to make decisions which are not easy, between poly-cottons, which historically have been more durable than cotton, that is why they have been taking off. But once you have a poly-cotton at the moment there is no technology yet to separate the polyester from the cotton and that is aside from the other issues about how you actually recycle caustics of which there are many times and oftentimes many types within one product. So, technology has a huge role to play. You also got other topics again sticking with clothing, so for example, finishings used on clothing to make them more durable themselves might have chemicals that are not particularly helpful when it comes to recycling. I think you could certainly look at the RFID technology in terms of tracking products. For example, there is a shift in clothing towards e-textiles, that term includes many different things, but one idea is being talked about a lot is a simple RFID tag so that the manufacturer always knows where it is, can track it back, can supply information, can possibly even do repair diagnosis from the distance. The whole tracking of products is going to be crucial and that I can link to what I said earlier about the fact that circular manufacturers can only just sell stuff and get rid of it and it doesn't (??) me anymore and part of the process whereby they can own the products that they have produced in that deeper sense have the possibility ... to know who got them and for that you can use RFIDs and other forms of electronics. There are other things maybe more consumer focused, someone covered the idea of history tags so that the consumer actually has access to the history of products so products last longer when you find out about past users and that leads emotional engagement with and emotional attachment to products. The electronic side is potentially very influential.

The next aspect is the value capture, so let's take about the growth strategy. How should companies shape their growth strategy and growth ethos in the transition to the circular economy?

T: The main thing I think is growth in value but not necessarily in volume. So, in a circular economy the materials that they use in the course of their business will be less in volume terms but the value they are creating will be higher or certainly stable. I think also the companies will look at what is appropriate in terms of scale and where is the circular economy really going to come from - is it going to come from multinationals or from small companies? Are the small companies going to grow and become large companies or is small the most natural? Are they going to do that in a more sustainable, circular way or are they going to be if you like initiators, innovators but big companies take over those ideas once they have been tested by those small players. Personally, I think there needs to be some rethinking about whether huge companies can be circular companies and whether that model works. For example, in the UK which is a relatively small country, albeit a rich one, huge amounts of our recycling materials ends up being transported, using fossil fuels, to Belgium for recycling. A lot of things are done at scale and that can set again the need to restructure the economy to a more localised approach. That is partly necessary to stop greenwash. An example, a well-known international brand I saw recently said where quoted in an article were cited as now recycling all their clothes and the inference was that this huge multinational all their clothes are now recycled when in fact the reality is that a tiny proportion of the products are but that is what they have been talking about in the conference circuit so to a less-bright journalist this could be implying that this massive company is now far down to the roots of circularity. The company is actually it quite good at what it is trying to do but it is only 1% down the path towards circularity. Though how fast will it move? I am kind of tired of seeing examples of companies, who do do good things, but it is a tiny part of their business and you only have to go to the sustainable brands conference to see them there. They are the usual names but certain sustainability managers of those companies they go there, they got their little things they are doing, like this year we are working on a greener factory, next year it is going to be a new curbing (??) brought out but neither business has gone down that route they are basically out there to market their companies according to sustainable criteria so that is why I am sceptical about the idea that all the big companies will go circular. I think we will need to have much more growth from the grassroots and less huge globalised players.

We discussed a lot of different business model elements, do you feel something is missing?

T: I think we don't really understand business models and how they can best work. My colleague works in this area.

Can you think of one outstanding of a company that has implemented aspects of circularity?

T: Let me take another example from the car industry. That would be Riversimple. That is one company that is saying "we are providing a service, we are providing it for a certain price and that would give us the incentive to do the right thing, to maintain it, so that is one example. You think of Fairphone who are looking not just at the ethical issues but are making phone more modular, durable. I believe Google was looking at one Phonebloks but they dropped that one. So, Fairphone is the best example from that industry and there are other. There are quite a few companies that are looking at this; Philips is doing some work; H&M is doing some work... Then again how far they are gone. So, Philips for example will (??41:15) endlessly about pay-per-lux at Amsterdam airport but that is just one showcase that is the one thing showcased at conferences but what about the other millions of lightbulbs they still sell every year.

Can you pick one of these examples and tell me what you think the next steps for this company should be to become fully circular?

T: Let me take the example of Marks & Spencers the high street retailer, we haven't done work for M&S particular although know their people quite well. One example of what they have done recently is that they have been labelling their t-shirts with a label that tells the consumer how many washes are possible before it may start to fade. (43:00) So, in my area of expertise we've talked a lot about lifespan labelling and the need to communicate to the consumers how long is it designed to last. So, some of M&S t-shirts say "this t-shirt is guaranteed not to fade within a certain number of washes". That is one example how they communicate how things are designed to last. They also within their strap lines within their advertisement also include ... there is a little phrase about durability where they again communicate it. They've done the big campaign "Shwopping" with Oxfam to promote reuse within the company. So, they have come a certain distance where do they go next with that? Again, I go back to the example with the conference circuit, it is very nice for the sustainability narrative to go on the circuit and say look at our 'shwopping' and was good and it still is good but it has reached a certain point whereby they have done something, they do handle this number of clothes but in the overall picture the vast number of M&S clothes are discarded, they are not collected by themselves. In Britain we discard over a million tonnes and about three-hundred-thousand tonnes of that ends up in landfill still. So, there is clearly still huge amount more that a company like M&S can do to ensure that the clothes they sell are a) used to the maximum of their ability so not discarded while they are still function and then collected and used, ideally not overseas but in the UK, epicycle fabrics where necessary and so on. So, basically it would take a huge amount for that company to be truly circular. I think it is possible, it is a questions of the pace of progress.

How do you think can these circular business models lead to sustainable consumption?

T: I stick with them [M&S] because one of the things they communicate these conferences is that they don't actually position themselves as a green or sustainable company and the reason for that is that once a company exposes itself in that way you only need to make one mistake in one area to get a lot of negative press. So, a company like M&S we will try and do the right thing whilst remaining profitable but we won't make sweeping claims about what we are doing because we know that would expose ourselves to unacceptable of bad media publicity. What we can do though, whilst not make so many product claims as a company I think in many ways we need to move towards industry-level standards, things like for example energy labels we've also got to move towards labels across the industry. So, electronic appliances, fridges, all fridges should have a lifespan label on them and that would mean that you wouldn't be exposed because everyone else also got it in the same standards as you are. But they also have a responsibility in terms of product information so the consumers as we know still don't discard off things in the appropriate way...

T: The business model can do that in a number of ways. The business model can work in a way that the consumer is incentivised to do the right thing. So, for example, disposal fees and the like or an incentive to return. One way where the company can, for a relatively small cost, recapture the value that is embedded in the products.

What do you think will the key differences be in the way business will be done in the circular economy from a user-consumer perspective?

T: Again, I think you have to differentiate by product type and by how much the consumer will notice it. For example, there will be areas where the change will take place and the consumer may not notice and the extend to what they will notice will only depend on price and the price of the product partly depends on governments and policies on factored prices and on the degree of competition in the market. For example, if you take something like floor coverings carpets, liners and the like. Whether or not a carpet is recycled or recyclable probably most consumers don't need to know about. So, you don't need to get the consumer on board but the consumer can still be forced to, required to, or chose to move in a direction quite quickly. So, they won't notice that. Clearly, if there is a big shift towards car sharing rather than private car ownership still less autonomous vehicles then they will notice that and obviously you need to get the consumer on board because the consumer is usually the voter and in democracies you have to get the voters on board. So, they will start noticing things like that. So, the circular model has to be sold to the consumer. Let me give you an example from the past, which is paper. In the 1970ies paper recycling, the consumer didn't want recycled paper because recycling had a reputation of poor quality. Now of course the recycled paper is just as good as ordinary paper but it wasn't then so we can develop a circular economy we have to do it in a way that the quality of products is maintained. In some cases, the products will be enhanced. For example, a company like Miele with their washing machines they are very very energy efficient but they are only energy efficient because they are durable and they are durable because they are recyclable. They are energy efficient because of law but they are durable because of market positioning and they are recyclable because to be durable they had to be designed for disassembly so that they would be repairable. So, all these things are coming kind of connected together. The consumer might not notice one or other of those other than the fact that high quality can't get away with in the areas you can't sell a durable product that is inefficient because then eventually you throw it away and get a more efficient one. So, if you make something that is energy efficient that is short lived then they'll soon start to question "why should I replace this?". It does depend on the type of product as to how much the consumer needs to know and how much you could actually sell circularity as a positively good thing. If circularity leads to repairability, you could take the mobile phone or the toaster, is two classic examples, you don't have to tell them "we are designing this to be circular" you can tell them "we are designing this so that you can replace the elements so that it lasts longer or you can replace the screen when it gets cracked". It is circular but you are not selling it to appeal to the consumer's environmental interests you are appealing to their self-interests, in other words it is repairable so you'll get a longer life out of it.

V: Anything that we haven’t covered that you would like to share?

T: Only this point, the distinction between closing the loop and slowing the loop. I think the debate on the circular economy and within companies is focused on closing the loop and if you look at the EMF's material then it is a lot about reuse but they say very little about intrinsic durability and making things last longer. I think they do that because there are potential conflicts with the business models that companies are still operating at the moment which are pile it high and sell it cheap. So, there are tensions there.