

## How Sustainable Engineering is shaping the circular economy?

Sustainable Engineering Podcast Series

Transcript

### Nick Ismail

Hello everyone and welcome to the HCLTech Trends and Insights Podcast. Today we're beginning a series on sustainable engineering. The focus of the first episode in the series is on how industries are embracing a circular economy, and the role of sustainable product engineering in this environment. I'm delighted to be joined by Amit Patkar, Vice President of the Manufacturing Business at HCLTech, who's going to help us navigate this important topic. Amit, thank you so much for joining me today. How are you doing?

### Amit Patkar

Very good, Nick. Thanks a lot for having me here and happy to discuss on sustainability, which is at the core of several businesses as we go.

### Nick Ismail

Absolutely. So, let's get straight into it. The first question I had was around how are industries moving towards a circular economy, and what is catalyzing or accelerating that shift?

### Amit Patkar

Sure. So, to be frank, I think, several industries have already been into this circular economy in one way or another. So, it's just that it was not apparent, so clearly to us. And the other thing which happened in the meantime when industries developed is that getting the output or the throughput to be maximized became the priority and therefore the circularity of the of the entire process, which was supposed to be a much shorter life cycle, became more and more longer. And that's where we lost touch, sort of say with circular economy more. Recently, as you as you look at it, what I see is that, there is a lot of shift towards core things. Right? You say health, clean energy. I would rather call it more as a clean energy rather than just green energy. But usage of clean energy, usage of materials which are more, recycled as against, virgin materials in nature, reducing the company's exposure or even if it is to, let's say, a more volatile raw material prices increasing their resilience. Even things like using more and more alternative materials are localized materials. Which would that for then control the cost of shipments and cost of logistics, as well as the, the carbon, phthalate emissions, which are getting spent on, long distance logistics on certain materials. So all these are actually contributing sequentially. They are helping us catalyze the movement to more circularized industry, more circular manufacturing, and eventually more circular economy.

## Nick Ismail

And with a circular economy, collaboration is obviously crucial. So, can you go into a bit of detail about what role does collaboration between stakeholders like designers or manufacturers, as policymakers and consumers play in driving the adoption of circular economy practices?

## Amit Patkar

Oh, absolutely. I think, collaboration sits, right at the heart of, circular economy. And so the, the coalescence of circular economy is that, different parts of the, of the ecosystem, right? Maybe the manufacturer may be the designer or maybe the legislator or the policymaker. They have to work more cohesively. Because if you have, even one of those, spokes of the wheel, not rightly oriented, then the, the circularity itself, itself drops significantly. Take simple examples like, things like designing something where you put a mandated requirement on the quality of material, which is used for packaging or quality of material, which is used for surface protection, or that which is used for enabling, let's say, a bulk shipment. Or in these days, today, a lot of subassemblies will be grouped into a single package. These packages will be then grouped into a single palette or a single large container and so on. So, can there be a way where you can minimize the event of volume losses or minimize the event of a losses which occur in terms of, shipment, which are, these shipped because, because they are not packaged properly or they are not too oriented properly or they are not utilizing the space properly? Likewise, if you actually have, orientation towards the logistics transportation companies in terms of how they are actually going to orient the shipment, how they are going to maximize not just the profitability or the revenue share from them, but also minimizing the requirement of fossil fuel? So, minimizing the requirements of, a more nontraditional, energy mechanism and so on. So, the idea is system thinking actually comes at the at the core of it. But like, like every other thing, it's more easier said and done. If we do a poor job at designing systems, for example, if we are leaving out key elements, where we run the risk, we will be surprised by the system failure or strike. The economics, of course, of this doesn't add up, if you're doing it at a very low volume level. So, if you do it at a very high volume manufacturing, take, take appliances, for example, like take mobile phones, for example. If you maximize the standardization of product and you maximize the, the idea of having more and more standard products, packages shipped together, sent together and so on, that's where actually the core of system thinking comes in. Policymakers also have a, a very core role as, as you can imagine. What I've seen is that, traditionally, for example, in the European markets, you would always have electronic parts being sold with the C rating. Increasingly, in the, in the retail shops in the B2C world, you'll see that a lot of products actually show up in that energy class as well, which means how much is the energy they are going to consume in order to run the appliance which will not just impact the electricity of the energy bills of the consumer, but it will also impact the way the product is being consumed and the kind of throughput it is producing. Today, consumers are encouraged more and more to buy products which would have low energy rating or energy class of A or A++. People have already started moving away from energy class F and G, and this shift is happening not just at the core or dismantled in some assembly level products, which are your typical day to day usage products. I mean, you look at the toothbrush or a hair trimmer or a mobile phone or a washing machine, but it is happening even at the level of a turnkey product, like a full house or a residential building. People are actually consciously opting for the one which is more sustainable, more green in nature. And that's where the policymakers role comes in, because at the initiation, these products will not be competitive with those which are commoditized and produced at a large scale. So, how do you bridge that gap? How do you incentivize the production of such products, which are more greener in nature at the same time contain, create a, let's say a market and a more pull towards the product from the consumer. So that's where I would say more of a system thinking and more of a cohesive operation where all these parties like designers, manufacturers, policymakers, all of them work in tandem to make sure that that is a success from the circular economy

## Nick Ismail

Absolutely. Would you say that consumers, out of everyone in the ecosystem are the fundamental drivers of the shift to a circular economy?

## Amit Patkar

Absolutely. Consumers. if consumers do not opt for a product which is more sustainable, the market itself will not exist. So, the good part, which I see again, I'm quoting the, the European example, because, because I'm seeing it a lot in terms of transformation over the last 10 to 15 years, is that there is a conscious effort to look at products which are more sustainable. Even if the product doesn't measure up, perhaps to the, to the traditionally used products or the products which are perhaps you have a, have a mental image of a certain thing, when you look at it, like a kitchen blender or Lipstick, oven in place, you will have a mental image of what this would look like and what this would perform and how this would do the control techniques. Even if the more sustainable version is, is

not exactly measuring up to exactly those controls, those particular panels, those particular settings, the idea is how do you actually enable the shift? And, today more and more people are more and more consumers are that see, you are actually opting for this option because they have understood the criticality not just lies in usage of that product itself, but the impact which the usage of this product will have in the next 10, 20, 50 years, 100 years to come. So that is a conscious shift which is taking place more and more. I mean, electric car, that is a very simple example, but this is happening in a lot more in a day-to-day life as well.

### **Nick Ismail**

So, moving into sustainable products engineering, how can this be applied to facilitate the transition to a circular economy and ensuring that products, design not only with longevity and recyclability in mind, which you mentioned earlier, but also with resource efficiency?

### **Amit Patkar**

Oh, absolutely. I think, what we call as, product engineering on new product introduction, not a new product design. This actually sits at the heart of, the full sustainable product genetic process. If you look at the products which are designed, traditionally, they would be designed with, with the concept, with the thought process of what we call as cradle to grave concept. Right. So, you would design a product, you would operate and run the product, and at some point in time you would retire the product because it's not operating at the same level of efficiency of performance as, as what it operated when it was originally designed and additionally purchased. The shift which is now rather taking place, is that instead of designing as a cradle to grave kind of product, we are increasingly looking at designing products which are more of a cradle to cradle kind of a product. This means that if you have an extended life, the end product, or if you have an afterlife or a second life for the same product, the impact which it has negatively on the environment is reduced much, much more drastically to the extent of 50, 60, 70%. This impact is actually reduced and managed. I can actually take, two simple examples, right? One example is that of a global company which does, lubrication systems, which does bearings, which does anti-friction devices, couplings, joints and so on. It supplies it. So it's a European company based out of Sweden which are Nordics. But supplies to the global markets. Really. a simple thing, which they did was if you look at the lubricants, they are actually operating in industrial environments, in automotive environments at a very, very high temperature and pressure. so the recyclability of these, these lubricants, it becomes a question because you have to occasionally replace them because they will run out of the efficiency, they will get oxidized, they will actually have carbon content, which is much higher, which doesn't encourage deduplication phenomenon in the process. What they did is they introduced an emulsifying agent, which would simply help reduce the amount of carbon content. Or secondly, down in the in the overall lubrication system, it can be easily trained out and you don't have to replace the entire lubricant. You can just replace perhaps one tenth or 1/20 of the lubricant, and then it will still perform at the same level of efficiency, which means that you actually end up paying slightly more per unit when you initially procure. But the longevity of this process requires the cost of the consumer, and it also impacts the amount of impact that it would have on the environment negatively. Another simple example would be, companies which are doing home furniture, for example, there is a lot of a lot of thrust on encouraging sequential usage, which means if you are trying to retire some of your home furniture, can there be a marketplace which is consciously created for such furniture, which is absolutely fine to reuse because it went out of space a bit, or it went out of the normal usage pattern for the consumer backyard. It. Can there be a second life for such kind of thing of let's say furniture, home furnishings or office equipment and so on? So, there is more and more thrust towards this particular way of designing where you can use and reuse it to reduce the impact on the environment. Other important point, other easy point, which we call it as a low hanging fruit, is that of packaging. So if you look at product and if you look at packaging, I showing forms about 3,040% of a product, when it is shipped by volume. And this is, this only adds maybe 1 or 2 functional elements. One is to protect the, the part which is sitting inside it. And second is to, to give a visual appeal, which is which is what positive nature. beyond that, the packaging is more or less, destroyed or, or thrown away within the first few hours of the product reaching the consumer. So, the idea is, if you can create a system where the packaging is made from more sustainable materials, or you can create a system where you can actually enable collection of the packaging so that it can be reused in its current form with very minor modifications. That's something which will encourage, the process of recyclability, the process of circularity in product engineering. In fact, at HCLTech, we do actually quite a few production solutions for this as well. And I can talk about it in a bit, things like design, right. And things like design for packaging. And so on.

### **Nick Ismail**

That's great. Thanks, Amit. And before we get onto some HCLTech, solutions, let's talk about the economic implications of transitioning to a circular economy. How can businesses capture, value and drive growth while adopting these models? And what exactly are the economic implications?

## Amit Patkar

So, I would say, as it is apparent, most of the companies which are selling the particular category are a particular type of product in the market, there is a conscious inhibition that will my product might be more expensive and therefore I'd be out of the market because of competition. A lot of these product products, for example, they would compete for a single dollar or single euro or even sub euro kind of, kind of segments if it's a B2C and if it's not, if it's an FMCG product, for example. So day to day use product, for example. The core idea and what sticks out the thought process of it is how the how the new demand for business services enabled by the policymakers, which we spoke earlier, can there be let's say, cherry on the cake? Can there be a, can there be an incentive to, in fact, look at the possibilities of making such products, which are designed in a more localized manner and a more sustainable manner, which means the materials used for these products are more sustainable. Also, the supply chain and the distribution system is more modeling. How do how do we incentivize these products? A lot of the the thrust initially happened. If you see in the in the consumer economy on organic or what it's called in Germany as bio products. And the idea was that these products will always be at a premium of 25, 30, 40% as compared to the more more traditional, more commoditized and more mass produced products. But if you, if you go to these products, the benefit would be that it would give you a more healthier lifestyle. The same applies for any other products which are more engineered products in nature. It could be electronic goods, could be automotives, could be more of machinery and so on. So how do we encourage the adoption to make sure that there are more consumers who are looking for this? One is, of course, to try to see if there is an incidence reduction in place, which is promoted by the policy makers. There is a demand for, let's say, collection and reverse logistics companies that support and use products being reintroduced in the system. This is what I talked about in the second Lives that could be product free marketeers and sales platforms that facilitate longer use of high utilization products. So typically, you design products which are not designed to fail, but they are designed to be more reliable in nature, which means that life span is much, much more number. And last but not the least, the aftermarket element right parts and components manufacturing. But the product refurbishment offering specialized knowledge, specialized services. These are actually encouraged in such a way that data platforms are more actively used to determine what is the possibility of failure. How can you localize to service for failure, thereby reducing the carbon footprint in terms of shipment of a, of a component to service a particular conceivable, and so on. I think the way we will move eventually is that as the green products start becoming more and more mainstream, the volume of green products, which is today, I would say if you look at the total Pi, the traditional products, or let's say sort of say the non-green products would occupy about 60 to 70% where green products by about 25-30%. The idea would be when this titlts the other way, when 70, 80% are greener products, prices will automatically start coming down and the price will automatically start getting benchmarked to a certain level, which is then more palatable to consumers.

## Nick Ismail

Thank you, Amit. And now looking towards HCLTech, how can companies like us transform discrete linear processes, facilities and supply chains to be more encompassing of circular economy capabilities and operations, which will lead to things like improved material and resource use? How can it be done with limited or no capital investments?

## Amit Patkar

Absolutely. I think that's a million dollar question, which is, which is hovering for most of the manufacturers out there in the world. The good thing from a tech perspective, is that we are not just doing this to cater to a particular market or to service a particular demand which exists at this point in time. Sustainability or circularity in its own, in, in its own creation has been a core part of the ethos at HCLTech. We have seen that, not just product sustainability, but enterprise sustainability sits at the very core of our HCLTech has been created as a corporation. There are several, dimensions to this. We actually work very, very actively, not just on the on the product side of sustainability, but even on the on the side which looks after the environment, which looks after governance, which looks after the ESG principles. Coming back to a topic of sustained product engineering as such, there are frameworks that are system thinking which are actually created by HCLTech, to give you a few simple examples. If you look at, sustainability on the product side or the design side, we have a simple product which is called as DFX, which stands for Design for excellence. It sits in its more standardized DFM pro product, which actually aids the design for manufacturability of a particular component. What it does it, it simply sits together with your CAD system, with your design system. So, whenever an engineering designer is actually designing product and whenever he makes a choice for a particular component, which would be somewhat less sustainable as compared to the recommended component, that would be in that provided to him, that he should perhaps consider using something which is different in nature, which is differently constructed, differently composed. At the same time, if he uses an engineering process, if you look at the manufacturing process like shipping as against milling, there would be different kinds of energy consumptions which happen in each of these processes. If you

look at, let's say the fill it radius on the relief area given to a particular block component, or a sheet metal component, which is banned in, in a let's or a pending. Let's see if you can create something which is three millimeters instead of 3.5mm on four millimeters instead of 4.5mm, that it would be a much, much more, not just economy of scale, but even energy consumption, the kind of machines which are used by the suppliers and so on, which can be more palatable towards the sustainable part. So DFM Pro actually caters to this market. It prevents also a design going to a manufacturing shop, them trying to produce the design. At 50% of the production, you realize that, okay, there is a challenge because A - my current machines do not support the production of this particular finish or B - I have to invest into sending it out to another machine shop in order to get that particular element. So, if it is functionally a necessity, that's absolutely perfect, it allows you to overwrite such a recommendation. But if it is not a functional necessity, it's only, let's say, standard practice which is being followed, but if you, if you move away from that practice, it could make it more sustainable. HCLTech actually provides products and technologies which can cater to this. The other product from HCLTech would be something which caters to the carbon footprint of the customers, which comes more into the manufacturing side, the services side of thing. Tools, products like the Net Zero inflation operation product that actually provides an overview of an aggregated system level carbon consumption. What is the kind of footprint which you created? What is the kind of emissions which you are actually having as an impact? And how can you then create an action plan to cater to this, both at this systemic level as well as the granular level, so that you can track the effect of these actions or the effect of these actions, and then eventually transform it into a more sustainable enterprise, more sustainable manufacturing site.

### **Nick Ismail**

That's great, Amit. Thank you so much for running us through all those terrific insights. Just as a round up of the discussion, you mentioned that several industries have been actively participating in the circular economy, but that wasn't initially apparent. There is now a shift to clean energy and clean tech with the use of more recyclable, alternative and local materials. Collaboration is at the heart of the circular economy, and different parts of the ecosystem have to work together more cohesively. If one aspect doesn't work, the circularity collapses. Consumers are fundamental in driving the shift to a circular economy, and the question is, how do you enable that shift? The traditional model of cradle to grave is being retired, and designers are now encouraged to focus on developing products that can be reused from, or in a cradle-to-cradle model, or with an extended light packaging as a low hanging fruit. The aftermarket is a significant element of the circular economy and data platforms are important here. As green products become more mainstream, the prices will come down and be more palatable for consumers. And just finally, circularity and sustainability sits at the core of HCLTech, and we have created frameworks to drive sustainable product engineering. Amit, thank you so much for your excellent insights. We really appreciate having you on the podcast.

### **Amit Patkar**

Thank you very much, Nick. It was a pleasure talking to you.

### **Nick Ismail**

That's great. And thank you to the audience for tuning in. Also, please make sure to listen to the next episode in the Sustainable Engineering Podcast series. Will provide a link in the description below. Once live. Goodbye.