PRODUCTS

The environmental potential of a product can only be understood through a deep understanding of the customer's perspective and consistent product lifecycle management

How do the products a company makes affect its environmental footprint?

Product design, working conditions, the type of raw materials used, resource consumption during production and use, recycling and reuse - products have a massive impact on the social and environmental footprint of manufacturing companies. Reducing that footprint requires the consideration of sustainability to be anchored in every aspect of the value chain and organizational structure.

The organizational aspect focuses in particular on a specific mindset and the skills and competencies required for consistent 'Design for Sustainability'. The technical aspect focuses on innovations that are necessary to develop new technologies, change manufacturing processes and enable the use of more environmentally friendly materials. Digitalization, automation and the use of artificial intelligence, on the other hand, help to improve the efficiency of production and achieve a long product life.

When looking at a product, however, it is crucial to realize that its assessed sustainability is never solely in the hands of the manufacturing company: it's also significantly influenced by customer use. So, taking a wider view of the entire product life cycle, as well as gaining a deeper understanding of usage scenarios, forms the basis for the development of truly sustainable products.

How does one adopt a sustainable mindset when carrying out product development?

Taking an environmental view of products requires a radical broadening of perspective. It involves examining interdependencies and relationships between the product and its social, natural and technological environment, as well as its influence on different aspects of sustainability, the context in which it is used by the customer and its life cycle. The product development process is a crucial building block in this respect.

The classic 'Design for Manufacturing' approach must therefore be supplemented in several respects: because 'Design for Sustainability' focuses not just on efficient and resource-saving manufacturing but also on the entire life cycle of the product, from the extraction of the raw materials to how the product is eventually recycled as part of a sustainable circular economy.

In short, adopting a sustainable mindset means thinking about products holistically, across systems, and consistently taking the customer's perspective into account. For many products, their environmental footprint is determined not only by how they are produced but also by how they are used and recycled. Which is why manufacturers must exert their influence as early as possible - at the product development stage - and consider the entire product life cycle from a sustainability perspective.

Why are sustainable products a matter of customer perspective?

The environmental potential of a product can only be understood through a deep understanding of the customer's perspective and consistent product lifecycle management. How do customers use the product? To what extent are sustainability features a differentiating factor? How do sustainable products influence customer satisfaction and loyalty to the product? Which features and characteristics are crucial, which are not? How does the importance of certain functionality change in the context of general trends?

Products are always part of complex preference structures and application scenarios. So, sustainability and understanding one's customer go hand in hand. Only then can it be seen, for example, that users of a certain make of car are more likely to accept speed limiters because they appreciate their inherent sustainability benefits, even if the manufacturer's primary motive is to reduce the risk of accidents.

At the same time, taking an environmental perspective opens up the potential for embedding products and systems in higher-level systems. This can give rise to new approaches when it comes to designing integrated mobility solutions, building decentralized energy systems or reducing the wastage of resource, for example, through harmonized hardware, software and process interfaces.

But aligning product strategy with sustainability goals isn't just a driver of positive corporate development. Taking an environmental perspective invariably reveals how digitization and sustainability can reinforce each other: for example, when networked and smart products interact in an integrated IoT landscape, to optimize the customer experience and improve the environmental footprint of the overall system.

Which path leads to sustainable product innovations?

Aligning product development with sustainability criteria opens up new scope for innovation. In order to exploit these in a systematic way, environmental thinking must also be systematically anchored. One example is via open innovation formats such as 'Sustainathons', events modelled on hackathons. Here, employees can compete against each other in an informal setting, the aim being to devise new, more sustainable ways of developing product.

Seeking innovative collaborations outside of existing industry and competitive structures is another promising approach. The decisive factor here is to bring together experts in the company and the value chain, on an interdisciplinary basis, the goal being to come up with radically new scenarios that are 'outside the box'. Core competencies can therefore be combined in new ways to create forward-looking solutions.

Industry 4.0 approaches play an important role here: the use of digital twins, deeply embedded sensor technology and artificial intelligence can significantly increase the longevity of classic hardware products. These can then be continuously monitored, analyzed in known usage scenarios and continuously optimized via ongoing interaction with customers, processes that – happily - often give rise to entirely new business models.

How does the circular economy inspire more sustainable product design?

The central tenets of the circular economy are the extension of product use, the minimisation of waste and loss of resources, and the use of regenerative or recycled raw materials. In order to meet these objectives, the core requirements of the circular economy, (e.g. longer product life and separability of materials), must already have been taken into account in the product design phase.

Taking a wider perspective on a product's life cycle and ensuring the consistent alignment of products with customer requirements, and their usage scenarios, increases both customer satisfaction and the manufacturer's inherent competitiveness.

For example, unnecessary product features can be eliminated through requirement engineering. Manufacturing processes such as 3D printing (additive manufacturing) can also be used to develop and produce resource-saving designs using integrative components and lightweight structures designed in accordance with load paths.