Transitioning to a Circular Economy for Greener Electronic Systems
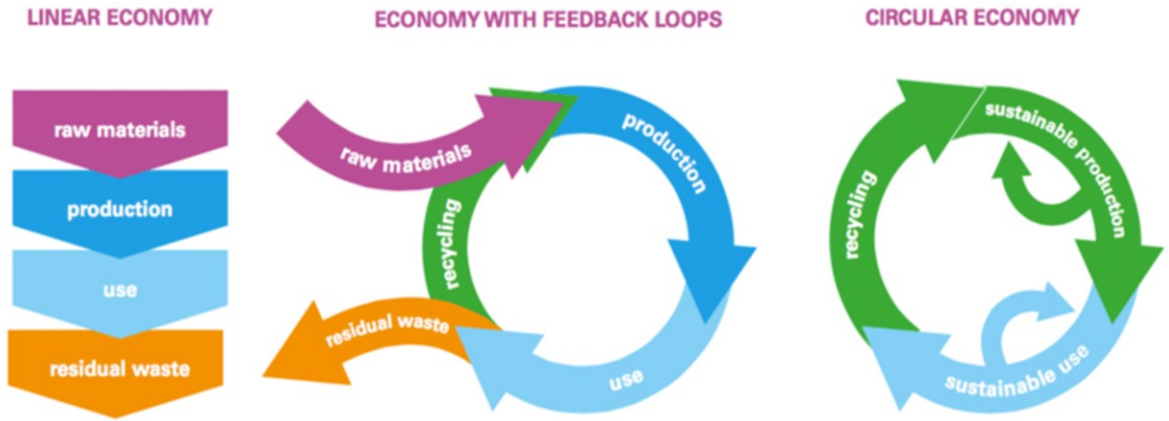
EECONE

2023-04-17 Antwerp

Good afternoon everyone,

Our world is facing numerous challenges such as climate change, depletion of natural resources, and waste generation.
To address these challenges, we need to shift from a linear economy to a circular economy.

THE TRANSITION FROM LINEAR TO CIRCULAR BUSINESS MODELS IN THE GENERAL ECONOMY

The linear economy is a take-make-dispose model, which means that we extract raw materials, produce goods, use them, and then dispose of them.

The circular economy, on the other hand, is an economic system that is restorative and regenerative by design. It aims to keep products, components, and materials at their highest value and utility at all times.

ELECTRONIC SYSTEMS ENVIRONMENT IMPACT

Source

Electronic systems are an integral part of our daily lives, and they have a significant impact on the environment.

The production of electronic systems requires a considerable amount of energy and resources, and they often end up in landfills or incinerators, contributing to pollution and waste generation.

TRANSITIONING TO A CIRCULAR ECONOMY FOR GREENER ELECTRONIC SYSTEMS

Design for longevity and reparability

Use recycled materials

Adopt a circular business model

Embrace digitalization

Educate consumers

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We collectively need to adopt the following strategies to transition towards a circular economy for electronic systems:

1. **Design for longevity and reparability:** Electronic systems should be designed to last longer, be repairable, and have replaceable components. This will reduce the amount of e-waste generated and extend the lifespan of products.

2. **Use recycled materials:** Electronic systems should be made using recycled materials wherever possible. This will reduce the environmental impact of raw material extraction and reduce the demand for virgin materials.

3. **Adopt a circular business model:** Companies should transition towards a circular business model, which involves the leasing or renting of products, take-back programs, and refurbishing and reselling of used products.

4. **Embrace digitalization:** Digital technologies can be used to improve the efficiency of supply chains, reduce waste, and optimize resource use.

5. **Educate consumers:** Consumers should be educated on the benefits of a circular economy and how they can contribute to it by repairing and maintaining their electronic systems, recycling, and participating in take-back programs.

DESIGN FOR LONGEVITY AND REPARABILITY

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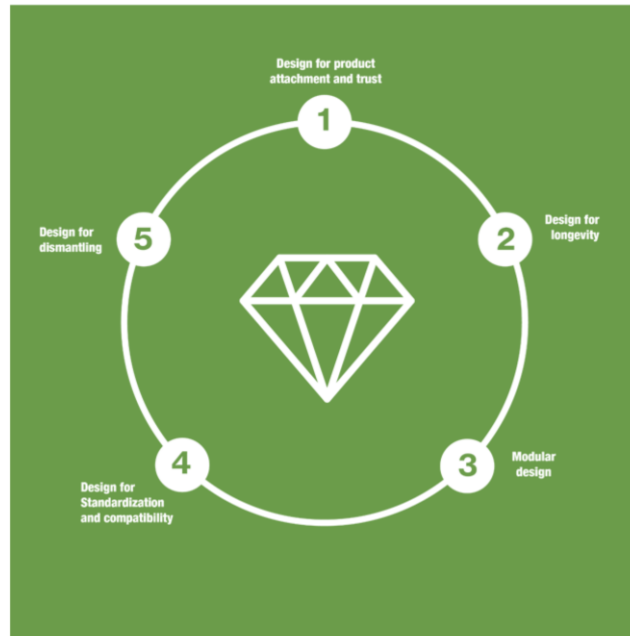
Designing electronic systems to last longer, be repairable, and have replaceable components is essential to promote a circular economy for electronic systems.

Here are some key design principles that can be followed:

1. **Design for product attachment and trust:**
   Customers are more likely to trust and attach to a product that is easy to use, with a positive user experience, well-made and lasts a long time.

2. **Design for longevity:**
   Electronic systems should be designed to withstand wear and tear over time. This can be achieved by using high-quality materials and components, as well as designing products to meet or exceed industry durability standards.

3. **Modular design:**
   Electronic systems should be designed to have modular components that can be easily replaced if they fail or become obsolete. This approach allows for easier repair and upgrades, reducing the amount of e-waste generated.

4. **Design for standardization and compatibility:**
   Electronic systems should be designed to have standardized interfaces, such as connectors and ports, to facilitate interoperability and compatibility with other products. This allows for easier repair and upgrades, reducing the need for new products.

5. **Design for dismantling:**
   Electronic systems should be designed to facilitate disassembly at end-of-life, making it easier to separate and recover valuable materials for reuse or recycling. Minimize use of adhesives and fasteners, as they can make repair and disassembly more difficult. Instead, alternative methods such as snap-fits or self-locking mechanisms should be used.

By following these design principles, electronic systems can be designed to last longer, be repairable, and have replaceable components. This approach will reduce the environmental impact of electronic systems by extending their lifespan, reducing e-waste, and promoting a circular economy.

USE RECYCLED MATERIALS
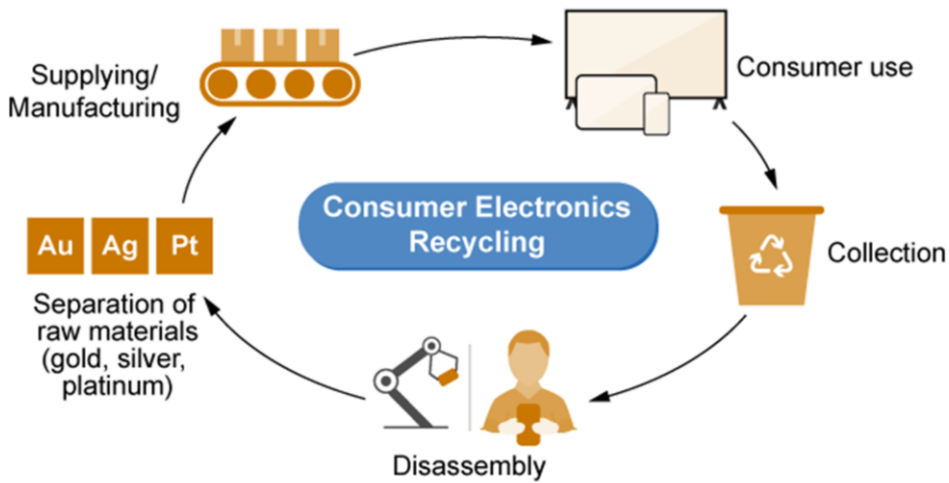
By using recycled materials, manufacturers can reduce the demand for virgin materials and minimize the environmental impact of electronic systems.
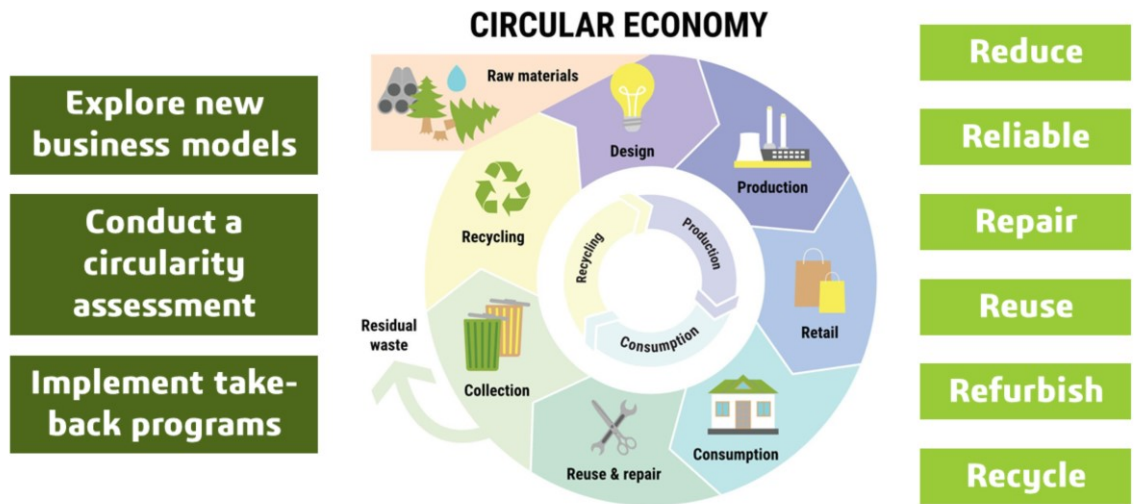Recycled materials are derived from products that have reached the end of their useful life, and they can be reused to produce new products, reducing waste and conserving resources.

Some key strategies for using recycled materials in electronic systems include:

1. **Develop closed-loop supply chains:** Manufacturers can establish closed-loop supply chains to promote the use of recycled materials in their products. This involves collecting end-of-life products, disassembling them, and using the recovered materials to produce new products. This can help to reduce waste and minimize the use of virgin materials.
2. **Engage with suppliers**: Manufacturers should work closely with their suppliers to identify sources of recycled materials and ensure that they meet the required quality and technical specifications. This can involve developing a robust supplier qualification process and establishing clear guidelines for the use of recycled materials.

By adopting these strategies, manufacturers can promote the use of recycled materials in electronic systems, reduce the environmental impact of raw material extraction, and move towards a more sustainable and circular economy.

ADOPT A CIRCULAR BUSINESS MODEL

CIRCULAR ECONOMY

Explore new business models

Conduct a circularity assessment

Implement take-back programs

Raw materials · Design · Production · Retail · Consumption · Reuse & repair · Collection · Residual waste · Recycling

Recycling · Production · Consumption

Reduce · Reliable · Repair · Reuse · Refurbish · Recycle

Source

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Transitioning towards a circular business model requires a strategic approach that involves several steps:

1. **Explore new business models:** Companies should explore new business models that align with circular principles, such as product-as-a-service models. This includes leasing or renting products to customers instead of selling them outright.

2. **Conduct a circularity assessment:** Companies should assess their existing business model and identify opportunities for circularity. This includes assessing product design, supply chain operations, and end-of-life processes.

3. **Implement take-back programs:** Companies should implement take-back programs that allow customers to return used products at the end of their life. This can include refurbishing and reselling used products or recycling them for the recovery of valuable materials.

By following these strategies, companies can transition towards a circular business model that incorporates principles such as leasing or renting products, take-back programs, and refurbishing and reselling used products.

There are several digital technologies that can be used to improve the efficiency of supply chains, reduce waste, and optimize resource use in the context of a circular economy for electronic systems:

1. **Big data analytics:** Big data analytics can be used to analyze data from various sources, such as supply chain operations, customer behavior, and environmental factors. This allows companies to make more informed decisions about resource allocation, product design, and waste reduction.
2. **Artificial intelligence (AI):** AI can be used to optimize production processes, reduce waste, and improve the efficiency of logistics operations. For example, AI algorithms can be used to predict demand, optimize inventory levels, and route products more efficiently.
3. **Digital twins:** Digital twins are virtual replicas of physical products or processes. They can be used to simulate different scenarios and optimize resource use. For example, a digital twin of a production line can be used to simulate different production scenarios and identify areas for improvement.

By leveraging these digital technologies, companies can improve the efficiency of supply chains, reduce waste, and optimize resource use, which are all essential elements of a circular economy for electronic systems.

Let's see now how Dassault Systèmes' Virtual Twin Experiences can help build more sustainable products.

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Educating consumers on the benefits of a circular economy and how they can contribute to it is crucial to promoting sustainable consumption practices. Here are some key strategies that can be used to educate consumers on the benefits of a circular economy and how they can contribute to it:

1. **Develop educational campaigns:** Companies, governments, and non-profit organizations can develop educational campaigns to raise awareness of the benefits of a circular economy and the actions consumers can take to support it. This can include social media campaigns, educational videos, and public events.
2. **Highlight the environmental benefits:** Consumers should be informed about the environmental benefits of circular practices such as repairing and maintaining electronic systems, recycling, and participating in take-back programs. This includes reducing waste, conserving natural resources, and reducing greenhouse gas emissions.
3. **Provide incentives:** Companies can provide incentives to encourage consumers to participate in circular practices. This includes discounts on repair services, trade-in programs, or rewards for recycling.
4. **Make circular practices more accessible:** Companies can make it easier for consumers to participate in circular practices by offering convenient options such as take-back programs, repair services, or refurbishment programs.

By using these strategies, consumers can be educated on the benefits of a circular economy and how they can contribute to it by repairing and maintaining their electronic systems, recycling, and participating in take-back programs.

TRANSITIONING TO A CIRCULAR ECONOMY FOR GREENER ELECTRONIC SYSTEMS

Greener electronics sustainability will come from the practice of **designing**, **producing**, **using**, and **disposing** of electronic devices in a **sustainable** and **environmentally** responsible way.

By adopting strategies such as **designing** for **longevity** and **reparability**, using **recycled materials**, adopting a **circular business model**, embracing **digitalization**, and **educating** consumers, we can create a more **sustainable** and **resilient** future.

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DASSAULT SYSTEMES

Transitioning towards a circular economy for electronic systems is essential to address the environmental challenges we face.

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In conclusion, I would like to point out how the EECONE project relates to Dassault Systèmes values.

The two values on the top are clearly directed to the EECONE project itself, and the fact that what we intend to is to challenge the status quo and show the dream is possible

The two values at the bottom are meant for us, as citizens of the world and consumers. We need, as a community; to learn from the past to navigate the future in order to reach our sustainability goals

Thank you for your attention.