Capital Equipment Coalition North America Insights Report

Digital Technologies for a Circular Transition

U.S. CHAMBER OF COMMERCE FOUNDATION

PACE
Platform for Accelerating the Circular Economy

INSIGHTS AND ACTION ON DIGITAL STRATEGIES

ABOUT THE CAPITAL EQUIPMENT COALITION

The U.S. Chamber of Commerce Foundation, in partnership with Philips and the Platform to Accelerate the Circular Economy (PACE), launched the Capital Equipment Coalition (CEC) North America in February 2021 to create a collaborative forum that works to reduce the environmental footprint of the capital equipment sector.

The U.S. Chamber Foundation convenes quarterly workshops with members of the Capital Equipment Coalition North America to discuss both individual and collaborative actions that members of the industry can take to move toward a more circular future. Each workshop focuses on 1 of the 10 calls to action in the Action Agenda created by PACE. The coalition's April meeting focused on call to action 9, Leveraging Digital Technologies for a Circular Transition. Other workshops in 2021 will focus on call to action 8, Enable Manufacturers to Increase Sourcing of Secondary Components (to allow for repair and refurbishing of capital equipment) and call to action 6, Collaborating Across Value Chain and Sectors to Strategically Plan Reuse Operations.

Interested in Joining the Capital Equipment Coalition?

The coalition is accepting additional capital equipment manufacturers and operators to join the effort. To learn more, please contact the U.S. Chamber Foundation's Sustainability and Circular Economy team at cccsustainability@uschamber.com.

Capital Equipment Coalition: Current Members

Philips | Microsoft | GE Digital | SAP | DLL

Leveraging Digital Strategies for a Circular Economy Transition

Digital technologies are critical enablers to move from a linear to a circular economy. In addition to being a call to action on their own, they are also essential for achieving several other calls to action. For example, using digital twin technology to manage assets remotely, building in remote sensors on capital equipment, and applying digital passport technologies for increased product traceability are all part of the digital transition. While the workshop discussion focused on a wide range of topics, they were all considered through the lens of how digital strategies can enable this transition.

Accelerating the Transition to a Circular Economy

62% OF U.S. BUSINESSES say moving toward the circular economy is part of their business strategy, and 16% have adopted the circular economic framework.[1]

51% OF SUPPLY CHAIN PROFESSIONALS expect their focus on "circular economy strategies" to increase over the next two years.[2]

70% OF SUPPLY CHAIN LEADERS are planning to invest in the circular economy in the next 18 months.[3]

1 ING. (2019). Opportunity and disruption: How circular thinking could change US business models - A Circular Economy Survey. Retrieved from https://www.ingwb.com/media/2692501/ing_us-circular-economy-survey-05-02-2019.pdf

2 Supply Chain Dive. (2020). 51% of supply chain pros expect to increase circular economy focus. Retrieved from https://www.supplychaindive.com/news/gartner-survey-supply-chain-circular-economy/585962/

3 Gartner. (2020). Gartner Survey Shows 70% of Supply Chain Leaders Plan to Invest in the Circular Economy. Retrieved from https://www.gartner.com/en/newsroom/press-releases/2020-02-26-gartner-survey-shows-70--of-supply-chain-leaders-plan

THEMES AND TRENDS IN CAPITAL EQUIPMENT AND CIRCULARITY

Shifting Mindsets

Transitioning to a circular economy has implications for how we think about capital equipment and how it is produced, managed, and repurposed at end of use. Used assets were once seen as being lower quality, but this is declining now. Regarding materials, customer perspectives are shifting away from seeing the use of virgin materials as the only option, and recycled materials are now being embraced. In addition to focusing on recycling materials, capital equipment manufacturers are increasingly thinking about how to reuse the components of a piece of equipment, with implications for tracking and reporting the components of equipment as well as the item as a whole.

Another area where expectations are evolving with the market landscape is the nature of customer relationships. In the linear model, the bulk of the relationship between a seller of capital equipment and the user of the product takes place prior to the sale, with a much lower level of engagement post-sale. As the capital equipment sector moves toward leasing models, pay-per-use, and virtualization rather than purchase, the nature of the relationship flips. Now, the pre-deal relationship is just setting the stage for a more engaged working relationship over the life of the agreement.

The implications of these shifts are not yet fully explored. For example, how can supplier relationships evolve and supply loops get restructured, and what would the implications be for negotiations and contracting? Another consideration is how these new contracting arrangements may change tracking methods and reporting data. These topics will be discussed further at future CEC workshops.

Value of Carbon Reductions and Avoidance

Another theme in the discussion of a circular economy for capital equipment is the implications for greenhouse gas (GHG) emissions, which can be significantly reduced through recycling, repair, refurbishment, and repurposing of equipment and the components that comprise it, together with new service models. Capital equipment can enable GHG reductions (e.g., the GHG savings resulting from a more energy efficient piece of equipment relative to its baseline) plus GHG emissions avoidance (e.g., the result of moving from a physical asset to a digital service, where GHG emissions that would have occurred are avoided).

The value of these carbon reductions and avoidance shows up in different ways across the system. In procurement decisions, companies may prefer to purchase components from a supplier with a lower carbon footprint, despite the cost being higher, if this can contribute to lower carbon footprint products. This would ultimately support higher profits as end users are also willing to pay a premium for low-carbon products.

The value of avoided carbon emissions from the adoption of a circular system may also be monetized as a carbon or materials credit for the manufacturer. Digitization (using telemedicine rather than having a patient go to a hospital); servitization (shifting to usage-based models that are more carbon and material efficient); and virtualization (shifting from on premise to virtual services) each provide the potential for ongoing emissions reductions or avoidance relative to baselines. However, carbon accounting methodologies do not yet include protocols for measuring these actions. The development of these methodologies should be prioritized as they can improve the business case for and accelerate the transition to the circular economy.

Circular Commitments

Several companies in the capital equipment value chain have public environmental commitments. For example, Microsoft has established Circular Centers to increase its reuse of servers and components up to 90% by 2025, while Philips has committed to generating 25% of sales from circular products, services, and solutions, closing the loop by offering a trade-in on all professional medical equipment and exercising responsible repurposing.

One unique aspect of digital strategies is that besides enabling equipment manufacturers to meet circularity goals, these strategies can also enable manufacturers' customers, or users of the equipment, to meet their circular goals, creating financial, environmental, and social benefits.

CHALLENGES THAT ARE INFORMING ACTION

Product Takeback and Intelligent Disposition

Takeback, the recovery of products from customers at the end of use, is an essential step in a functional circular economy, and some companies have even set goals for the number of products they commit to taking back. Yet, currently, recovering products at the end of use presents a significant challenge. Offering a financial incentive to customers can help grow the recovery rate, and credit for trade-ins can be beneficial to both get products back and maintain long-term relationships with customers. However, these programs have not yet driven recovery rates as high as companies are targeting.

Digital strategies have the potential to accelerate this progress. Digital asset tracking is one tool that can help address this challenge. Improving asset visibility and traceability makes it less likely that items will end up collecting dust in storerooms and closets and can improve the likelihood that components can be reused.

New business models aligned with the circular economy, such as leasing models and pay-per-use models where the seller retains ownership of the asset, also ensure that products are recovered when they can no longer be used. These models also align the economic incentives of the manufacturer and the customer for life-extending management, repair, and refurbishment, which have environmental and financial benefits too.

Perhaps, not surprisingly, the collection of data is essential to facilitating the flow of assets back to their manufacturers. One challenge companies face is a lack of detailed data on the life cycle of capital equipment assets, which can help inform predictive maintenance as well as when items should be taken back. This extends to a lack of transparency and coordination at end of use, where better data and visibility could ensure that value is maximized from the end-of-use disposition process (when equipment is scrapped for parts). Companies like Microsoft are implementing “intelligent disposition” systems that aim to make the best use of all component parts.

Further progress on this product takeback will require consideration of the following, for instance: What is commodity, and what is proprietary within the hardware? What are the implications for shared processes across companies versus keeping it in one company’s own closed loop? How else can digital strategies enable improved asset recovery?

Data on Capital Equipment: Tracking and Sharing

The shift from linear to circular business models for capital equipment has enormous implications for what capital equipment data is needed, how it is captured, and how, where, and when it is shared. In this shift, there are echoes of the challenges faced in the digitization of medical records and the measurement and reporting of environmental, social, and governance metrics across supply chains. These challenges include the need for standardization of metrics and reporting frameworks, interoperability across systems and data formats, and protocols to protect confidential data where relevant.

Currently, there is no private sector-coordinated system for capturing capital equipment data, which hinders the comparability and compatibility of data from different sources. To address this, a private sector-led common framework and data format are needed to guide the collection and reporting of data on capital equipment throughout its life cycle. Moreover, these standards must be adopted by all companies across the supply chain, from upstream suppliers to customers and companies managing disposition.

Managing capital equipment as circular assets also changes the unit of tracking from the asset to a more granular level, such as components and even materials. Since these have not been tracked previously, some may not even have a unique identifier such as a barcode, requiring the creation of new ways to identify and document each relevant element of an asset.

One idea that has emerged to help with these challenges is to develop an industry standard “digital bill of materials (BOM)” or “passport” that travels with an asset through the full value chain, continuously being updated in a way that still protects proprietary information.

Measuring Circularity and Its Benefits

As circularity becomes increasingly adopted as a shared vision and in individual commitments, the inevitable question emerges: How can the private sector measure circularity? There are a range of metrics and measurement methodologies for assessing circularity and its social and environmental implications. But what is not yet clear is the degree to which these methodologies can be applied directly to the capital equipment sector, or if there will need to be a process of adaptation.

There are three specific measurement needs that have been articulated through the Capital Equipment Coalition that are seen as essential areas of measurement and metrics:

- **Product**: Measurement of the degree to which a product, its components, and materials are optimized for circular management, along with the environmental impact of the hardware, from the origin of materials to the manufacturing of components and finished goods to repair, refurbishment, and recycling.
- **Product-as-a-Service:** Measurement that captures the difference in the environmental impact and to whom it accrues as a result of product-as-a-service models, for example, usage-based contracts rather than ownership of assets, remote service, upgrades, and predictive maintenance.
- **Cloud:** Measurement that captures the difference in the environmental impact and to whom it accrues when the services provided by capital equipment are delivered digitally, for instance, through the cloud, rather than through the use of physical assets on-site.

Having these measurement methodologies defined will enable capital equipment companies to better demonstrate the environmental benefits of the shifts in business practices, and they have the potential to create economic value for manufacturers and their customers.

The Potential Power of Circularity

THE WORLD IS CURRENTLY ONLY 8.6% CIRCULAR. Of all the minerals, fossil fuels, metals, and biomass that enter the economy each year, just 8.6% are cycled back.[4]

Using resources for the longest time possible could **CUT SOME NATIONS' EMISSIONS BY UP TO 70%**, increase their workforces by 4%, and greatly lessen waste.[5]

The circular economy has the power to **SHRINK GLOBAL GHG EMISSIONS BY 39%** and cut virgin resource use by 28%.[6]

4 Circle Economy. (2020). Our world is now only 8.6% circular. Retrieved from https://www.circle-economy.com/news/our-world-is-now-only-8-6-circular

5 Stahel, W.R. (2016). The circular economy. *Nature*, 531, pages 435–438.

6 Circle Economy. (2021). The Circularity Gap Report 2021. Retrieved from https://www.circularity-gap.world/

Other Considerations for the Transition to a Circular Model for Capital Equipment

Discussion among the Capital Equipment Coalition members during the workshop raised additional considerations, which will be further contemplated in future workshops and conversations.

- How can capital equipment manufacturers stay informed and engaged in the social and economic impact on workers and communities in the supply chain to ensure that there is a fair transition?
- Could aligning the measurement and reporting of the capital equipment industry with the United Nations Sustainable Development Goals lead to more widespread adoption for both?
- How can new business models, takeback programs, and tracking and measurement systems balance the need for transparency with the importance of protecting proprietary information?
- What are the implications of new business models, such as leasing and pay-per-use models, for accounting?
- How do we measure both reductions (e.g., the GHG savings resulting from a more energy efficient piece of equipment relative to its baseline) and avoidance (e.g., the result of moving from a physical asset to a digital service, where GHG emissions that would have occurred are avoided)? We need ways to talk about and measure both.