



Business Transformation and the Circular Economy

**A CANDID LOOK AT
RISKS & REWARDS**



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A Candid Look at Risks and Rewards

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RESEARCH REPORT 1628-17-RR



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Introduction

Purpose and Methodology

Natural resource constraints and global environmental risks are challenging the traditional *linear economy*—where companies “take, make, waste.” Some companies are facing increasing pressure from customers and suppliers to adjust their business models based on *circular economy* concepts; that is, a way of doing business that aims to keep resources in use for as long as possible, and in which products and materials are recovered and regenerated at the end of their service life. For many companies, this adjustment signifies a daunting business model transformation, replete with risks and challenges.

However, an increasing number of companies—especially those with long-term strategies and ambitious sustainability targets—are also beginning to realize the opportunities new business models based on circular economy attributes can offer. The rapid advance of the sharing economy, where the core premise is to extract value (revenue, profit) from existing assets rather than produce new products, is one of several examples of these business models (see “Capturing the opportunity: business model transformation,” page 8, for a description of business frameworks that incorporate circular economy attributes).

This research report is intended as a resource for companies considering or already pursuing business initiatives that incorporate circular economy attributes. The research is founded on the recognition that companies have much to gain from managing resources efficiently and from developing business strategies based on this concept, but many of the challenges associated with the circular economy remain unexplored. The research takes a case study approach to shed light on these challenges and opportunities and to examine lessons learned and best practices from companies that are at various stages of transitioning their business models. This report features seven company case studies that were developed based on interviews with senior executives at each of these companies. The case studies provide an inside look into the real-world experiences of companies that have engaged their teams on circular economy projects and pilots, and they include candid details on companies’ challenges and successes.

The key findings section of this report distills insights and best practices gleaned from the case studies and provides a set of practical recommendations for companies to consider based on input from the interviews. The key findings section also includes results from a survey of over 50 senior executives who are members of The Conference Board Sustainability Councils and Chief EH&S Officers Council.

This report addresses the following key questions:

- What are the main drivers for pursuing business initiatives that incorporate circular economy attributes?
- How do companies develop the business case?
- What functions typically lead these initiatives?
- What are the primary benefits?
- What are the top enablers of success?
- What are the top risks and challenges?
- What are the main reasons for failure?

While the section that follows includes a brief background on the circular economy concept, it is important to note that this report is not intended as a comprehensive review of literature on this topic. It is also not intended to be a comprehensive source of circular economy initiatives (as there are many more examples from companies beyond those featured in this report).

The phrase “circular economy initiatives” is used throughout this report to refer to business initiatives, projects, and pilots that incorporate a variety of circular economy attributes.

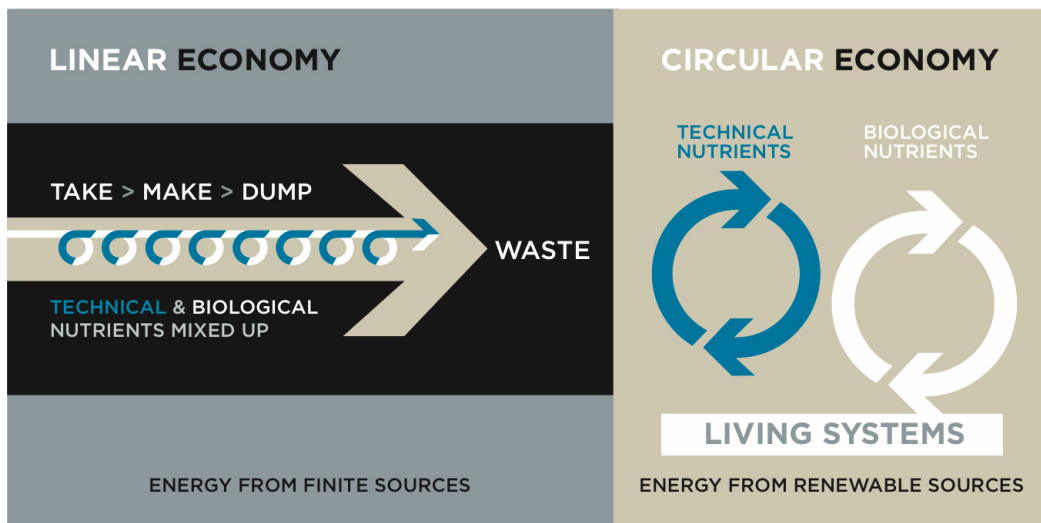
The Circular Economy

A Brief Background

Defining circular economy

Perhaps the best way to begin describing a circular economy is by describing what it intends to replace: the traditional linear economy. A linear economy is characterized by a “take-make-waste” model, in which raw materials are used to make products that ultimately end up in landfills and oceans or are otherwise wasted. A linear economy is inherently inefficient as it fails to maximize the value and utility of materials, products, and services. A circular economy, on the other hand, at its most simple level aims to decouple growth from the use of limited resources.

Figure 1
Linear Economy vs. Circular Economy



Source: [Ellen MacArthur Foundation](#)

The circular economy concept is not new, yet most business initiatives that incorporate circular economy attributes are at a very early stage. As others have pointed out, the development of the circular economy concept can be in part traced to author Kenneth Boulding's description of a "spaceman economy," one that functions by reproducing the initial limited stock of inputs and recycling waste.¹ This "spaceman economy" serves as a useful way of thinking about the circular economy concept, as it stresses the need for identifying solutions for subsisting with limited and finite resources. The Ellen MacArthur Foundation, one of the principal organizations working to advance the circular economy, notes that other more recent concepts associated with the circular economy include the functional service economy; "Cradle to Cradle®" design; biomimicry; industrial ecology; natural capitalism; and the blue economy systems approach.²

The Ellen MacArthur Foundation offers the following useful definition:

A circular economy is one that is restorative and regenerative by design and aims to keep products, components, and materials at their highest utility and value at all times, distinguishing between technical and biological cycles. This new economic model seeks to ultimately decouple global economic development from finite resource consumption. A circular economy addresses mounting resource-related challenges for business and economies, and could generate growth, create jobs, and reduce environmental impacts, including carbon emissions.³

How to effectively decouple growth from the use of limited resources is one of the biggest challenges companies face in tackling circular economy initiatives. Meeting this challenge often means revisiting established business models, and it can sometimes require a full business transformation.

Given the daunting challenges associated with business transformation, why would companies consider pursuing circular economy initiatives?

1 Vasileios Rizos, Arno Behrens, Terri Kafyeke, Martin Hirschnitz-Garbers, and Anastasia Ioannou, *The Circular Economy: Barriers and Opportunities for SMEs*, CEPS working document, September 2015, p. 1.

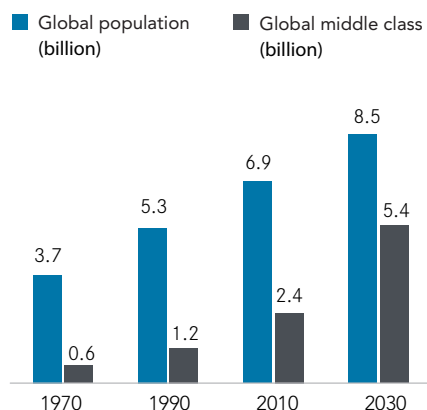
2 *Towards a Circular Economy: Business Rationale for an Accelerated Transition*, Ellen MacArthur Foundation, November 2015, p. 5.

3 *Towards a Circular Economy*, p. 2.

Business as usual cannot be sustained

While the concept of circular economy has been around for a number of years, it has recently taken on greater urgency with the recognition that the take-make-waste model is inherently inefficient and contrary to many companies' long-term sustainability strategies. The growth of the global middle class from 2 billion people in 2010 to 5 billion in 2030 will create a surge in consumption. From an environmental standpoint, the pace of global consumption will continue to stress limited natural resources: by one estimate, global natural resource use is expected to more than double between 2015 and 2050, increasing from 85 to 186 billion tons.⁴ Admittedly, estimates on future demand for natural resources vary widely (and can depend largely on drivers such as technological advancements, consumer preferences, government policies, and price effects⁵), but the potential impacts and risks of stressed and dwindling natural resources on businesses are well documented. For instance, reduced access to raw materials will likely exacerbate price volatility, ultimately increasing costs and disruptions in supply chains. If unprepared, companies that continue to rely heavily on limited natural resources could face significant cost increases (stemming from access to materials as well as regulation) and increased market share pressure from competitors that have transformed their business models to minimize reliance on these scarce resources.

Figure 2
Growth of global population and middle class



Source: **Global population:** United Nations, Department of Economic and Social Affairs, Population Division (2015).

Global middle class: *The Unprecedented Expansion of the Global Middle Class: An Update*, Brookings Institution, February 2017, p. 12.

4 *Resource Efficiency: Potential and Economic Implications*, International Resource Panel, March 2017, p. 286.

5 *The Future Availability of Natural Resources*, World Economic Forum, November 2014, p. 19.

Capturing the opportunity: business model transformation

Estimates show that only about 6 percent of global materials consumption is currently recycled into circular flows.⁶ This presents a tremendous opportunity for organizations that are able to extract value from reducing waste in the system. Besides the obvious ecosystem benefits, circular economy initiatives can be significant catalysts for economic growth. Analysis done for Europe, for example, estimates that ramping up investments in the circular economy could lead to savings of €600 billion for EU businesses and the creation of 580,000 jobs.⁷

Capturing these benefits requires businesses to be proactive about transitioning from a linear model to a circular model. A key part of this transition involves self-reflection and an honest evaluation of current business models. Company leaders need to ask themselves if their business model is at risk of becoming too costly, too inefficient, or irrelevant in the face of increasing sustainability challenges and changing customer/consumer demands. How dependent is the company on finite natural resources? How dependent are the company's suppliers? How much control does the company have over its raw materials? How much waste does the company generate throughout the product life cycle? Answers to some of these questions can help determine if the business model is at risk, and can jump-start conversations to transform risk into opportunity.

Answers to these questions can help companies identify how best to leverage their core capabilities to incorporate circular economy attributes in their business strategies. The ReSOLVE framework from the Ellen MacArthur Foundation offers a helpful overview of some of the primary business models that incorporate circular economy attributes:

Regenerate Shift to renewable energy and materials; reclaim, retain, and regenerate health of ecosystems; and return recovered biological resources to the biosphere.

Share Keep product loop speed low and maximize utilization of products by sharing them among users (peer-to-peer sharing of privately owned products or public sharing of a pool of products), reusing them throughout their technical lifetime (secondhand), and prolonging their life through maintenance, repair, and design for durability.

Optimize Increase performance/efficiency of a product; remove waste in production and the supply chain (from sourcing and logistics to production, use, and end-of-use collection); leverage big data, automation, remote sensing, and steering.

6 *Breakthrough Business Models: Exponentially More Social, Lean, Integrated and Circular*, Volans, September 2016, p. 27.

7 "Closing the Loop: An Ambitious EU Circular Economy Package," [European Commission](#).

Loop Keep components and materials in closed loops and prioritize inner loops. For finite materials, this means remanufacturing products or components and as a last resort recycling materials.

Virtualize Deliver utility virtually—books or music, online shopping, fleets of autonomous vehicles, and virtual offices.

Exchange Replace old materials with advanced nonrenewable materials; apply new technologies (e.g., 3-D printing and electric engines); choose new products and services (e.g., multi-modal transport).⁸

Recycling: Closed-loop vs. open-loop

While several business models that incorporate circular economy attributes go beyond the traditional notion of recycling (and a few do not involve recycling at all), recycling remains an important aspect of the circular economy and central to the idea of keeping material resources in use for as long as possible.

Closed-loop recycling refers to recycling end-of-life products back into the same product, such as recycling aluminum cans back into new aluminum cans. Because a closed-loop process keeps the material in continuous use, it is often regarded as a preferred option. In contrast, **open-loop** recycling generally refers to use of recovered materials to make a different product. These recovered materials can also be used in **upcycling**, which refers to the conversion of waste materials into something of greater value and/or durability (e.g., recycling of an aluminum can into an airplane wing). Open-loop recycling could also result in **downcycling** (less preferable than upcycling), where the quality and functionality of the resource is diminished and/or capture of the material for further use is restricted (e.g., office paper recycling that shortens the fiber length so it is only suitable for lower market applications like tissue paper).

Source: Betsy Dorn and Becky MacWhirter, "Shifting the Focus from End-of-Life Recycling to Continuous Product Lifecycles," Call2Recycle, p. 4.

8 *Growth Within: A Circular Economy Vision for a Competitive Europe*, Ellen MacArthur Foundation, June 25, 2015, p. 25.

Examples of circular economy policies, legislation, and government initiatives around the world

At a global level, the circular economy concept represents an important element of the United Nations Sustainable Development Goals (SDGs). For instance, goal 12 of the SDGs refers to “responsible consumption and production” and includes several related targets. One such target calls for a substantial reduction of waste generation by 2030 through prevention, reduction, recycling, and reuse.^a

The emergence of national regulatory initiatives to promote the circular economy highlights the extent of the opportunities associated with this concept. Emerging regulatory activity in this space also highlights the need for businesses to engage with policy makers on this topic. Companies that sit on the sidelines may find themselves unprepared when forced to make changes to their business models, while companies that have been actively engaged in circular economy thinking will be at an advantage by getting ahead of regulation.

The following are some examples of circular economy policies around the world:

ASIA

Japan has had a version of its current Law for Promotion of Effective Utilization of Resources in place since 1991.^b Its regulatory efforts led to the creation of a number of circular economy indicators and associated targets, including measures of resource productivity and material recycle rate. Japan’s targets for 2020, for example, include increasing resource productivity to 460,000 yen of GDP per tonne of resources used (up from the 2015 target of 420,000 yen of GDP per tonne of resource used) and increasing the overall material recycle rate to 17 percent (up from the 2015 target of 14-15 percent).^c

China first introduced circular economy issues as a national development strategy in its 12th Five-Year Plan (2011-2015), and they remain a significant part of the current 13th Five-Year Plan (2016-2020). For example, one of the government’s targets is to increase the reuse of solid industrial waste as a share of total waste from 65 percent in 2015 to 73 percent in 2020 and 79 percent in 2025.^d To further promote the growth of circular economy initiatives, in 2013 the government founded the China Association of Circular Economy, a national, multi-industry organization. Among the organization’s numerous focus areas are issues related to industrial circular economy, agricultural circular economy, resource recycling, remanufacturing, and green consumption. In addition, as in the case of Japan, China’s statistics bureau has a number of indicators that are aggregated to create a circular-economy development index.

EUROPE

Germany introduced in 2012 the Circular Economy Act, which was created to “promote circular economy in order to conserve natural resources and to ensure the protection of human health and the environment in the generation and management of waste.”^e

The Scottish Government launched the country’s first Zero Waste Plan in 2010, supported by the Waste (Scotland) Regulations, which as of 2014 requires all businesses operating in Scotland to separate plastic, metal, glass, paper, and card for recycling. Scotland was also the first nation to join the Ellen McArthur Foundation’s CE100 circular economy group.^f

Denmark has also put a strong focus on waste reduction and recycling initiatives, launching the “Denmark without Waste” strategy in 2013. The strategy sets out a number of goals to increase recycling rates, including targets to double the amount of household waste recycled by 2022 and to collect 75 percent of all household electronic waste by 2018.^g

Holland laid out its circular economy vision in its 2016, “A Circular Economy in the Netherlands by 2050,” which includes an interim goal of a 50 percent reduction in the use of primary raw materials (from minerals, fossils, and metals) by 2030.^h

Finland, too, released in 2016 a road map for the country’s circular economy ambitions, which aim to make the country a leader in the circular economy by 2025.ⁱ

In addition to individual country initiatives, EU-wide circular economy policies are also gaining momentum. In December 2015, the European Commission adopted a Circular Economy Package to stimulate Europe’s transition toward a circular economy. The measures are intended to address issues beyond the end-of-life stage, including incentives for changing how products are actually produced and consumed. The Circular Economy Package consists of an EU Action Plan for the Circular Economy that establishes a number of actions and targets, including the development of standards for secondary raw materials and measures to promote reparability, durability, and recyclability of products. The Circular Economy Package includes legislative proposals on waste, which set targets for reduction of waste and establish measures for waste management and recycling. For example, the proposals set common EU targets for recycling 65 percent of municipal waste and 75 percent of packaging waste by 2030. The proposals also set measures to promote reuse and incentivize producers to put greener products on the market and support recovery and recycling schemes.^j

A number of legislative proposals have already been delivered under the EU Action Plan. A few examples include: proposed regulation to create a single market for fertilizers made from secondary raw materials (such as recovered nutrients); mandatory product design and marking requirements to make it easier and safer to dismantle, reuse, and recycle electronic displays (such as computer monitors and televisions); and a proposal to amend the directive restricting the use of hazardous substances in electrical and electronic equipment (“RoHS Directive”) that would enhance the ability and profitability of recycling waste electronic equipment.^k

UNITED STATES

The US Environmental Protection Agency (EPA) has adopted Sustainable Materials Management (SMM) as a regulatory framework for managing materials. Much like the circular economy concept, SMM is a systemic approach to using and reusing materials more productively over their entire life cycles.^l

The focus of the EPA's SMM Program revolves around four primary objectives:

- 1 Decrease the disposal rate, which includes source reduction, reuse, recycling, and prevention;
- 2 Reduce the environmental impacts of materials across their life cycle;
- 3 Increase socioeconomic benefits; and
- 4 Increase the capacity of state and local governments, communities, and key stakeholders to adopt and implement SMM policies, practices, and incentives.

The current focus of the SMM Program is on the built environment, sustainable food management, and sustainable packaging.^m

^a For more details, see: "[Goal 12: Ensure Sustainable Consumption and Production Patterns](#)," UN Sustainable Development Goals: 17 Goals to Transform Our World.

^b "Law for Promotion of Effective Utilization of Resources," [Global Environment Centre Foundation](#), November 2011.

^c "Indicators for a Circular Economy," European Academies Science Advisory Council, November 2016, p. 18.

^d "[The 13th Five-Year Plan](#)," US-China Economic and Security Review Commission, February 14, 2017, p. 10.

^e "Circular Economy Act," Federal Ministry for the Environment, Nature Conservation, [Building and Nuclear Safety](#), p. 4.

^f "[Five Countries Moving ahead of the Pack on Circular Economy Legislation](#)," Guardian, October 29, 2014.

^g "[Denmark without Waste](#)," The Danish Government, November 2013.

^h See: "[Government-wide Programme for a Circular Economy](#)," [Ministry of Infrastructure and the Environment](#), The Hague.

ⁱ See: "[Leading the Cycle—Finnish Road Map to a Circular Economy 2016–2025](#)," Sitra, 2016.

^j "Closing the Loop: Commission Adopts Ambitious New Circular Economy Package to Boost Competitiveness, Create Jobs and Generate Sustainable Growth," [European Commission](#) press release, December 2, 2015.

^k For more examples, see: "[Report on the Implementation of the Circular Economy Action Plan](#)," European Commission, January 26, 2017.

^l For details on the differences and similarities between the circular economy concept and Sustainable Materials Management, see Table 1 in "Maximizing the Benefits of Circular Economy and Sustainable Materials Management Models for Product-Packaging Systems," American Institute for Packaging and the Environment, September 19, 2016, p. 6.

^m "US EPA Sustainable Materials Management Program Strategic Plan for Fiscal Years 2017 – 2022," US Environmental Protection Agency, October 2015, p. 3.

Key Findings and Recommendations

The case studies featured in this report highlight examples of companies at various stages of transition toward business models that incorporate circular economy attributes. Given that circular economy initiatives are very much at a nascent stage, the case studies featured in this report are meant to shed light on many of the individual challenges, opportunities, and best practices that companies have encountered in their pilots of circular economy projects and their attempts to transition their business models. The following are the key findings, common themes, and most important lessons learned from these case studies:

Successful circular economy initiatives require high levels of collaboration with customers and suppliers and readiness to form strategic alliances across the value chain Close partnerships can yield strong new relationships with both new and existing partners and can result in an enhanced level of engagement throughout the value chain. The importance of strategic alliances is the most recurring theme across the case studies; notably, strategic alliances also feature prominently in *CEO Challenge 2017*. Among CEOs, two of the top three strategies for meeting the *Innovation and Digitization* challenge relate to collaboration (“engage in strategic alliances with customers, suppliers, and/or other business partners” is ranked number 1, and “establish a strong collaborative culture that encourages cooperation across functions and business units” is ranked number 3).⁹

Internal collaboration across functions is also crucial for success. Interface warns that attempting circular economy initiatives in a heavily siloed organization is a recipe for disaster. In the case of Dell, for example, the company’s closed-loop project expanded collaboration beyond the traditional engineering and marketing teams to also include the company’s services and supply chain teams. Having organizational leadership and buy-in from these four functional areas enabled Dell to overcome many of the operational challenges that would otherwise have killed the project.

As evidenced by many of the case studies, this need for strategic alliances is also one of the biggest challenges to success. As HP points out, the collaborative nature of circular economy initiatives means there is added importance in establishing partnerships based on transparency and trust. A lack of trust in partners is a big reason behind failed projects. Waste Management notes that when initiatives fail, either internally or with customers, it is usually because of breakdowns in communication that result in stakeholders not being aligned about the shared risks and the shared value of the initiatives. While business partnerships are crucial, an overreliance on partners introduces a significant set of challenges.

9 Charles Mitchell, Bart van Ark, and Rebecca L. Ray, [CEO Challenge 2017: Leading through Risk, Disruption, and Transformation](#), The Conference Board, January 2017, p. 20.

Circular economy initiatives, often triggered by pressure to meet changing customer needs, can ultimately help strengthen customer engagement Enhanced customer engagement is a key benefit of circular economy initiatives, particularly as companies become partners in their customers' efforts to meet evolving sustainability goals. Dell points to a notable increase in customer requests for proposals that factor in sustainability criteria, which can account for as much as 15 percent of a bid. A number of companies have had to revisit their business models amid changing customer dynamics. Waste Management, for example, was forced to shift its business model as more and more of its customers were setting zero waste-to-landfill goals, putting its core landfill business at risk. Today, the company partners with customers along the value chain to help manufacturers understand how design can affect the ability to capture products at their end of use. By going further up the value chain, Waste Management is now able to affect purchasing decisions and can partner with designers to engineer out some of the problems associated with waste, resulting in a heightened level of customer engagement.

Circular economy initiatives have a positive effect on brand and employee engagement and can be an asset to companies' talent management and recruitment strategies Interface, for example, finds that its internal brand value has benefited tremendously from the company's circular economy push, strongly reflected by the pride that employees have in working for the company. Companies also find that circular economy initiatives, and sustainability initiatives more broadly, have a positive effect on employee engagement and recruiting. This important relationship between sustainability and talent management is increasingly getting the attention of CEOs. For example, in this year's edition of *The Conference Board CEO Challenge*[®], leaders of US companies ranked "emphasize sustainability values and brand in talent recruiting" as their number 6 strategy for meeting the *Sustainability* challenge, significantly up from number 13 last year.¹⁰

Empowering or aligning with internal champions is key for initiatives to take off DuPont, for example, stresses the importance of having project leaders who are not only strong believers in the value of circular economy initiatives, but who are also capable of going through the process of getting internal support and buy-in. Kimberly-Clark notes that one of the biggest enablers of the company's success with circular economy initiatives has been the ability to identify and empower champions within the company's marketing organization. This strengthened collaboration between the marketing and sustainability teams accelerates the development of solutions that respond to customer needs. Companies also point to employees' passion and entrepreneurial drive as key enablers of success. For Waste Management, for example, success with circular economy projects is due largely to the entrepreneurial initiative of team members to explore alternative business models and new ways to manufacture products.

Strong support from the CEO has also been key to advancing circular economy projects at Philips and HP; at both companies, the CEOs regularly speak publicly about the importance of the circular economy to their companies' business strategies. As HP notes, this openness helps stakeholders understand how the circular economy fits with HP's vision for the future and the company's plans for achieving growth and demonstrating value to customers.

¹⁰ Mitchell et al., *CEO Challenge 2017*.

Circular economy initiatives thrive under a culture of experimentation and adaptability, where success also means knowing how to fail fast HP points to this culture of experimentation (evident in the company's "lighthouse projects") as a big reason for the success of many of its circular economy initiatives. When ideas work well, there is an incentive to help others learn from those ideas. And when ideas do not pan out, the company culture encourages learning from those setbacks and moving on quickly. "When you fail, fail fast" is a common theme across many of the case studies; at Philips, it is engrained in the company's philosophy. The importance of agility and adaptability also features strongly at Philips.

A culture that encourages innovation in the area of sustainability can also be a significant driver of revenue for companies. For example, recent research by The Conference Board found that, among a sample of companies that have launched branded portfolios of sustainable products and services, revenues from those portfolios grew at six times the rate of overall company revenues.¹¹

Commodity price pressures can threaten recycling models, reinforcing the importance of building robust and resilient business models As Interface points out, the current low price of oil erodes much of the price competitiveness of recycled materials, placing significant pressure on companies' ability to ramp up investments in recycling capacity and technology. Something as simple as a drop in the price of oil can have profound implications on the success of companies' circular economy initiatives. While the current low prices of virgin commodities may create complacency in many organizations, the long-term likelihood of future price spikes makes the importance of investing in business models that anticipate diminished resources stronger than ever.

Regulatory issues can present a significant challenge, highlighting the need for businesses to engage at the policy level Specifically, inconsistencies in regulations across geographic regions and borders can add significant complexity to circular economy initiatives. Without uniform regulations, something as simple as moving materials across borders can become very costly and can erode most of the economic value from business models that rely on product take-back systems. Several companies point to a need for addressing these regulatory issues at a policy level in order to prevent the unintended consequences of these regulations from stifling circular economy initiatives.

Companies need to improve awareness of the value of the circular economy, especially among customers and employees who may be resistant to change A number of companies acknowledge there is a mindset challenge around circular economy initiatives, in that not all customers and consumers readily embrace these new initiatives. Companies believe a big reason for this is a lack of awareness of the value of these initiatives, and the inherent difficulty of changing customers' preconceived notions and assumptions. The need for strong messaging and communication is partly why at DuPont the marketing teams play a central role in developing the company's circular economy projects.

11 *Driving Revenue through Sustainable Products and Services*, The Conference Board, June 2015, p. 6.

Without adequate communication, the process of business model transformation can also cause uneasiness among customers and employees. As Philips can attest, the company's gradual transition to product-as-a-service business models has generated some internal and external unease, partly caused by resistance to change. Convincing employees, especially those who have grown accustomed to a way of doing business for over 30 years, of the value of these new business models is no simple task. On the customer side, Philips finds that procurement engineers fear their job is on the line when they are increasingly asked to focus on service-level agreements rather than product specifications.

Some companies are making attempts to quantify and communicate the value of their circular economy initiatives as a way of reinforcing the business case. Philips, for example, recently introduced an externally reported metric indicating that circular economy revenue accounts for 8 percent of Philips' total revenue. The company's goal is to at least double this figure by 2020.

Customer education and marketing campaigns are also important given that circular economy initiatives are in their infancy. For instance, a key challenge to Interface's circular economy strategy is that the market is currently unable to distinguish between companies that only pay lip service to the circular economy and companies that have made significant investments in these initiatives. Customer education and effective marketing become crucial tools for combating this challenge and leveling the playing field. Indicators and metrics are helping to introduce a degree of rigor to this field, which is unfortunately quite prone to greenwash claims. Interface publishes a third-party certified metric showing the percentage of each product's weight that is actually recyclable into new products if it is returned to Interface, and in the case of HP, the company measures its material intensity and plans to introduce a material intensity goal in the near future.

Whom the sustainability team reports to can make a big difference in a company's ability to successfully launch circular economy initiatives. At Philips, where circular economy initiatives are integral to the company's innovation strategy, the sustainability function reports directly to the head of strategy and innovation. While the sustainability team spearheads the company's circular economy projects, there is close collaboration with the strategy and innovation teams to determine which projects to pursue.

At HP, the sustainability team is housed in supply chain operations, and the vice president of sustainability reports to the chief supply chain officer. For HP, having the sustainability team be part of operations makes it clear that the team has responsibility for both bringing products to market and for end-of-life issues. Having sustainability report high up in the organization can also help companies overcome issues associated with leadership buy-in, an important accomplishment given that "leadership buy-in" was the biggest challenge identified in our survey of Council members (see Chart 6).

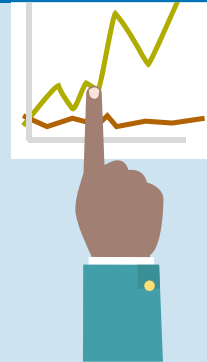
Council members also indicated that circular economy initiatives are primarily led by the operations team, with the sustainability team at a close second (see Chart 2). This survey result is consistent with the approach taken by many of the case study companies, though individual practices vary: at some companies the initiatives are led by the business units (with support from the sustainability office as needed), and at others the decision on specific projects to pursue is made by the corporate sustainability function.

10 RECOMMENDATIONS

FOR SUCCESS WITH CIRCULAR ECONOMY INITIATIVES



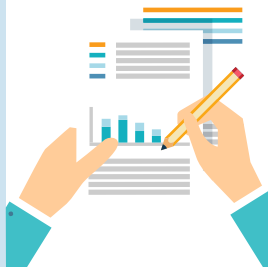
- 1. Establish strong partnerships.** Learn from and collaborate with other organizations along the value chain.



- 2. Find shared value.** Look beyond what economic or sustainability benefits these initiatives offer your organization.



- 2. Only work on projects that have a clear value proposition for your customers.** How do your customers use your products? What are their pain points?



- 4. Focus on the business model first.** Ensure the economics are rigorous at each stage of the value chain. Product design can follow.



- 5. If you sell a large-capital product, envision selling it as a service.** Not only will this practice bring you into the circular economy, but it could give you the jump on competitors.



- 5. Be prepared to commit to a significant investment in people, dollars, and pilots.** Ensure there is commitment for the investment, otherwise move on.



- 7. Focus on your organization, people, and mindset.** Identify and close any gaps in competencies.



- 8. Focus on simplicity rather than the size of the opportunity.** Make the initiative easy for customers to understand and salespeople to communicate.



- 9. Just start.** Find something small and build traction early to maximize your chances of keeping cross-functional groups together. Encourage experimentation.



- 10. When you fail, fail fast.** Recognize when it no longer makes sense to pursue a project, and move on to something else.

Insights from our survey of Council members

The Conference Board Councils are peer learning networks in which executives share best practices and problem-solve in a highly confidential and collaborative environment. Our councils of sustainability officers include:

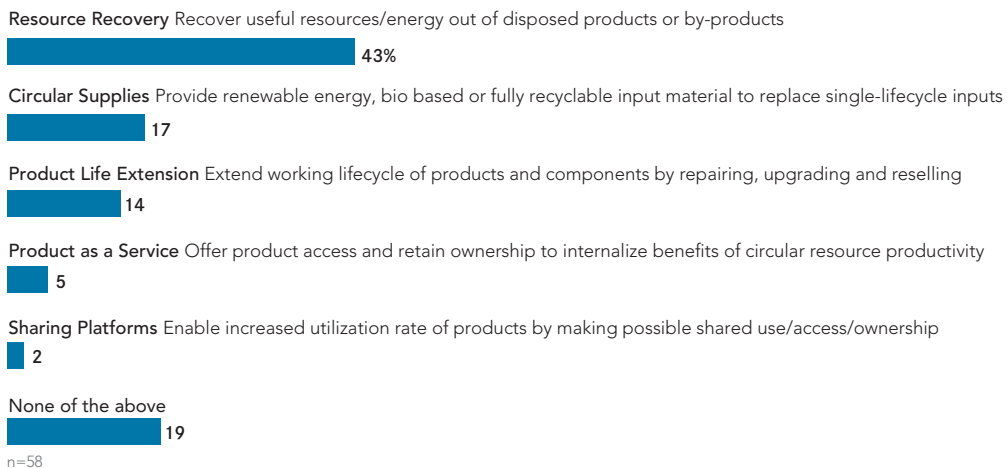
- Sustainability Council I – Strategy and Implementation
- Sustainability Council II – Innovation and Growth
- Chief EH&S Officers Council
- European Council on Corporate Responsibility and Sustainability

The following are results from a recent survey of members of these Councils:

Chart 1

Resource recovery is by far the most common type of circular economy initiative among surveyed companies.

What best describes the type of circular economy initiatives your company is working on?



Note: The descriptions of circular economy business models are based on: "Circular Advantage: Innovative Business Models and Technologies to Create Value in a World without Limits to Growth", Accenture, 2014, p.12.

Chart 2

Respondents point to operations and sustainability as the functions most often responsible for leading their companies' circular economy initiatives. The important role of operations is not surprising given the complex logistics associated with many business models that incorporate circular economy attributes.

What function is primarily responsible for leading your circular economy initiatives?

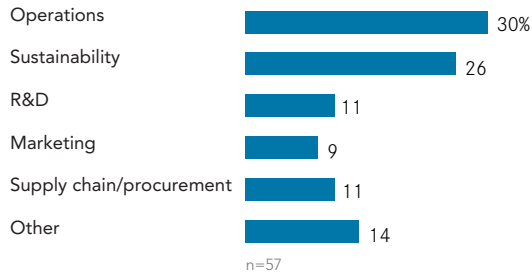


Chart 3

Respondents are evenly split between cost savings and new revenue streams as the primary benefits of circular economy initiatives.

What do you see as the primary benefit of circular economy initiatives for your company?

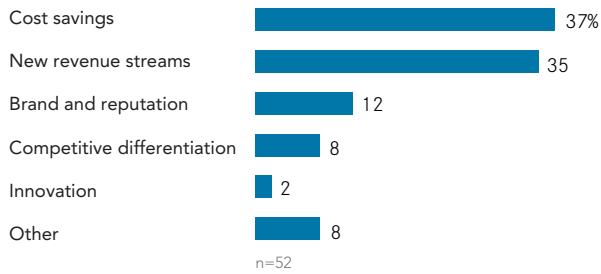
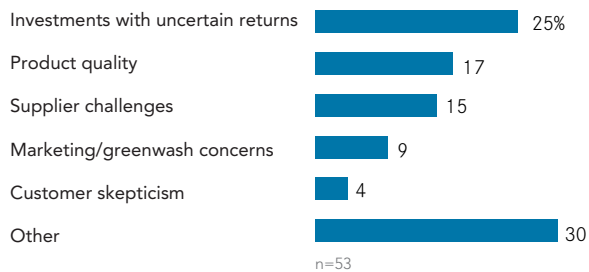


Chart 4

Respondents point to a fairly even spread of risks associated with their circular economy initiatives, though "investments with uncertain returns" rises to the top.

What is the primary risk associated with circular economy initiatives for your company?



Note: Within the "other" category, some of the main risks mentioned by respondents include hazardous materials, product contamination, and safety risks.

Chart 5

Almost half of respondents point to cost savings as the main driver of their circular economy initiatives. Notably, customer demand does not feature nearly as prominently as a driver of circular economy initiatives as it does among the case study companies.

What is the main driver for your circular economy initiatives?

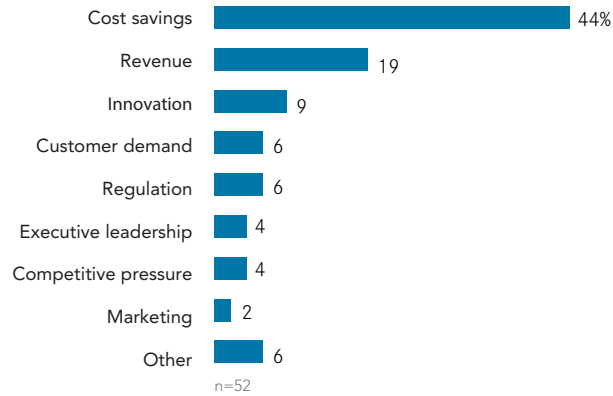


Chart 6

Business case and leadership buy-in is the top challenge respondents face in pursuit of their circular economy initiatives. As noted by several case study companies, strong executive support for circular economy initiatives is a key enabler of success.

What is the primary challenge you face in pursuing circular economy initiatives?

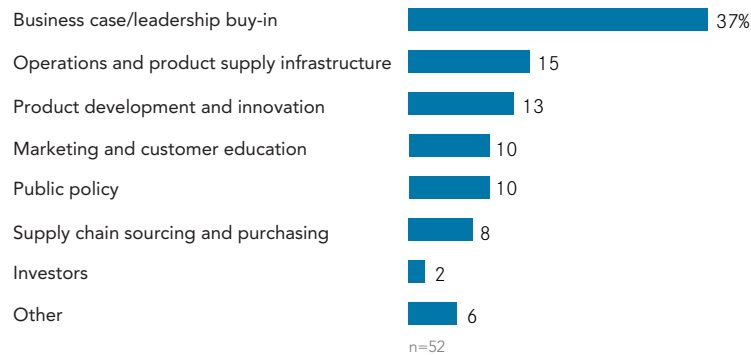


Chart 7

Compared to 3 years ago, my company (or my consumers) prefers to be offered services/functionalities that extend the life-time of a product/device, rather than having to purchase a new one.

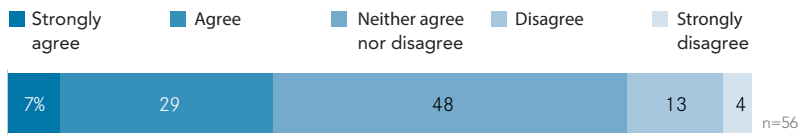


Chart 8

Compared to 3 years ago, my company is more likely to try to sell or return used products so they can be re-used/re-furbished for new usage.

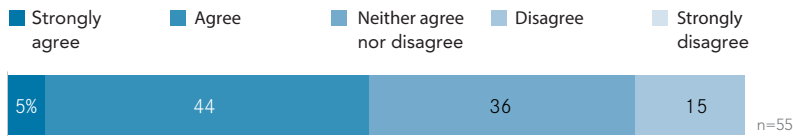
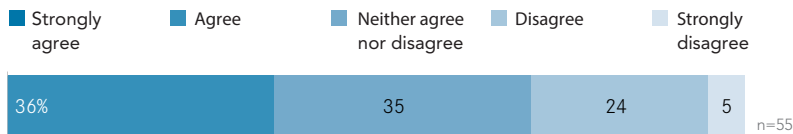


Chart 9

Compared to 3 years ago, my company is more likely to use a pay-per-use service of a product (instead of buying the product itself).



Source: Results from a 2017 survey of members of The Conference Board Sustainability Councils and Chief EH&S Officers Council.

Case Studies

Dell

DuPont

HP

Interface

Kimberly-Clark

Philips

Waste Management

Dell

Driving out waste from the system

Circular economy initiatives for Dell are currently focused on driving out waste from processes and products. To do so, the company has been working on two key circular economy initiatives: extending the life of products through reuse and refurbishment and closing the loop on materials with a focus on plastics and metals.

Dell Outlet is at the center of the company's product reuse and return initiatives. About 90 percent of the products customers return are refurbished and sold through the Dell Outlet store. These refurbished products are sold to customers at a slightly lower price than brand-new products, and they include the same warranty as new products. The remaining 10 percent of products that are damaged and unable to be refurbished are sent to recycling partners to recover the plastics and/or precious metals. Through Dell Outlet, the company processes about 800,000 refurbished units per year.

The second key initiative is the Dell Reconnect partnership with Goodwill Industries that was launched over a decade ago. The partnership establishes free electronics recycling collection points for consumers across 2,000 Goodwill locations in the United States. The initiative grew out of the recognition that there was a growing need for free and convenient options for recycling consumer electronics. At these collection points, Goodwill determines if any returned electronics can be resold; those that cannot be are collected, bundled, and sent to a Dell recycling partner. In 2014, Dell expanded this initiative to create a closed-loop recycled plastics program. The recycling partner returns the plastics back for mixing and molding to create new parts for new products. This closed-loop program began with one product (OptiPlex 3030 All-In-One) and has now expanded to over 90 cumulative product models that contain about 10-15 percent recovered plastic. Since the launch of the program, Dell has shipped more than 11 million pounds of closed-loop recycled plastics, which on average represents approximately 7 percent of total plastics shipped in Dell products annually.

Cross-functional collaboration

While most product initiatives for Dell involve collaboration between the engineering and marketing teams, the closed-loop initiative introduced a broader level of collaboration between the company's functional teams. In addition to the engineering and marketing teams, this initiative required close collaboration with the services group (which runs the Goodwill partnership) and the supply chain group (which owns the logistics of product take-back). These four functions met quarterly to review the economic health of the program and to ensure that the program would be able to scale efficiently. The close collaboration between these four functional groups, which was atypical for Dell, was one of the primary reasons for the success of the closed-loop project. For example, having the services team closely involved meant the project team was able to negotiate better pricing for the material recovery, which was key because it enabled the project team to offset the cost increases from the closed-loop materials. Without this level of collaboration, the increased material costs would have made the business case unfavorable. Having organizational leadership and buy-in from all four functional areas enabled the team to overcome many of the operational challenges that would otherwise have killed the project.

Today, because the project has been able to scale, the closed-loop plastics are slightly less expensive for Dell than other recycled plastics. Now the company is exploring opportunities to introduce similar closed-loop programs to recover precious metals from electronics. The same four functional teams continue to be involved in these discussions.

The close collaboration between these four functional groups, which was atypical for Dell, was one of the primary reasons for the success of the closed-loop project.

While Dell has found success in the closed-loop project, the company believes there is greater opportunity to be had in open-loop projects; that is, taking feedstock recycled material from other industries (such as water bottles) and converting those materials into plastics for use in PCs and enterprise products. For example, in 2015 Dell partnered with a supplier to recover scrap carbon fiber from another industry's manufacturing process. This carbon fiber, which was previously destined for landfills, is now used to create select models of the company's Latitude and Alienware notebooks. These open-loop initiatives can help broaden the potential source of materials beyond the plastics and metals that can be recovered from the electronics industry.

Open-loop initiatives can help broaden the potential source of materials beyond the plastics and metals that can be recovered from the electronics industry.

Competitive differentiation

Customer demand is one of the primary drivers of Dell's circular economy initiatives. Dell finds, for example, that sustainability criteria are increasingly making their way into RFPs from commercial and public sector customers. These criteria include questions such as whether products contain recycled content or whether the company has a service offering around product return and recycling. Dell recognizes that its circular economy initiatives provide an important edge on RFPs that measure sustainability performance, especially given that, in some cases, sustainability factors are weighted to account for as much as 15 percent of a bid.

Visionary leadership has been central to advancing the company's circular economy initiatives. For example, in 2013 Dell established a set of 2020 sustainability goals, including a goal to recover 2 billion pounds of electronics through product take-back initiatives, as well as a goal to ship over 50 million pounds of recovered material. These 2020 Legacy of Good sustainability commitments were established to send a clear signal to the market about the direction the company wanted to go.

Besides the competitive differentiation benefits and cost savings, the circular economy initiatives represent an important catalyst for future innovation at Dell. As more employees begin to learn and appreciate the value of the circular economy for the company, Dell believes these initiatives will open the door to new ways of thinking and will help drive innovation.

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Product quality and supplier challenges

The path to successfully implementing circular economy initiatives was not without its challenges. One of these initial challenges was the uncertainty factor. When the company first began the efforts, the closed-loop materials were not cost competitive with the existing materials. This cost difference generated uncertainty about the economic health and viability of the program. However, the project team was confident that by closely monitoring the program, the company could scale the initiative and get to cost parity or better (as they did).

Product quality issues have been another significant and unexpected challenge. Developing a closed-loop project meant facing the product take-back challenge of obtaining clean material at the end. This challenge required Dell to go through several trials to meet the necessary quality specs—a significant challenge given

Dell's commitment to having the quality specs of recovered material be on par with or better than the specs of virgin material. This focus on quality parity also has led to supplier challenges, as the need for quality materials makes it crucial to find suppliers that can provide the right quality of product. Another challenge with suppliers is that they can quickly lose interest in circular economy initiatives if projects become too complex.

The need for quality materials makes it crucial to find suppliers that can provide the right quality of product.

In addition to these challenges, Dell points to potential future risks to circular economy initiatives from the unintended consequences of emerging regulations. For example, the electronics industry could be affected by trans-boundary regulations intended to limit the ability to move products and materials across borders. Many of these regulations stem from a concern that environmental waste is being exported to less developed countries that may be unable to properly manage the waste. The challenge for Dell and other companies is that some of these rules might become so restrictive that they make it impossible to ship defective products to other countries for repair. The hope is that these issues can be addressed at a policy level in order to prevent the unintended consequences of environmental regulations from stifling circular economy initiatives.

Recommendations for success

Have a clear understanding of the circular economy business models.

Implementing these business models will likely require new collaborations across different functions in your business.

Determine where you as a company want to go with the circular economy.

Do you want circular economy initiatives to focus on tackling short-term projects, such as addressing RFPs, or supporting long-term strategies, such as a 2020 vision?

Find one good project and get started. Find something small to get started on, because if you don't build traction early it can be difficult to keep cross-functional groups together. It is important to get the early successes so that you can build on these for bigger projects.

DuPont

Performance materials

Given DuPont's diverse businesses, the company's circular economy initiatives are led by DuPont's individual businesses and pursued based on specific interest from customers, brand owners, and other value chain partners. This diversity has resulted in a variety of circular economy pilots throughout the businesses.

DuPont's performance materials business is home to several examples of these initiatives. Circular economy initiatives in the area of performance polymers, for instance, focus on source and waste reduction, waste recovery, recyclability of existing polymer streams, and reducing dependence on oil (through the development of bio-polymers). And while initiatives focused on reducing waste, reducing cost, and bringing in new revenue have been around for several years—what has changed for DuPont is that the circular economy concept is helping the company think more holistically across the entire value chain. For example, waste reduction initiatives now involve thinking about business models all the way from the design phase to product recovery, involving the entire value chain and collaborating with it. As such, collaboration is now a key theme across many of DuPont's circular economy initiatives.

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Pilots and partnerships

DuPont's recent partnership with BiologiQ—a company focused on producing products from renewable resources—resulted in the development of a film that blends polyethylene with bio waste, such as potato waste. DuPont provided the solution to improve the compatibility between these materials. The initial pilot received significant internal support as it aligned well with DuPont's corporate sustainability goals, and the success of this pilot encouraged DuPont to think about additional opportunities to utilize waste streams. These films are commercially used and show excellent performance, comparable to films made only with polyethylene.

In Brazil, a circular economy partnership between a Brazilian association of suppliers of agrochemicals, of which DuPont is a member; DuPont Performance Materials; the Brazilian government; and a local converter helped tackle an important public health issue. The association had identified a potentially serious public health issue stemming

from people's widespread reuse of empty chemical bottles for carrying drinking water. The project partners developed a system to incentivize customers (typically farmers) to return empty bottles before they could be used as potentially toxic water containers. The bottles were then reprocessed using DuPont's modifier solutions to create the raw material for new nonfood-related products, such as pipes.

In another example, DuPont has worked closely with industry organizations, brand owners, and customers to identify ways to make packaging material lightweight while improving its performance. For instance, DuPont has developed solutions for meat packaging that can help customers save as much as 80 percent of the packaging weight as well as double the shelf life of the product, reducing in-store food waste by half. While the lightweight packaging can be more challenging to recycle (due to the polymers used), it contains significantly less material than traditional packaging.

Customer sustainability goals drive innovation

DuPont's circular economy initiatives have been largely driven by market and customer demand and value chain collaboration. Projects focused on packaging recycling, renewable materials, and material downgauging (using thinner materials) have been primarily launched as a result of value chain partners seeking solutions to their sustainability challenges and help with meeting their sustainability goals. For example, brand owners and suppliers of brands are increasingly establishing goals around packaging reduction or greater usage of recycled or renewable materials in products and packaging. And while DuPont has been working on downgauging packaging structures for about 25 years, this recent sustainability push by customers has triggered DuPont's innovation in the area of circular economy. There is now increased traction for DuPont's circular economy initiatives as a result of customers' sustainability goals. DuPont sees greater customer demand for material innovation as an important opportunity to tap into the company's history in product innovation.

Initiatives are owned by the businesses

Many of DuPont's circular economy projects are first proposed to management as opportunities for future growth, with an acknowledgment that even if the projects do not yield immediate results, they will likely be important in the long term. DuPont's strategy is to embed sustainability as much as possible into the businesses and allow individual businesses the independence to pursue opportunities as they see fit. The result is that circular economy projects are primarily owned by DuPont's businesses, with the corporate team providing support and linkages between the businesses as needed.

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In Europe, for example, DuPont's circular economy initiatives are primarily owned by the European sustainability group, which has both a technical leader (from R&D) and a marketing leader. The sustainability group works with the marketing and the technical teams to identify projects to focus on, typically through an impact analysis process. For instance, DuPont's meat packaging project was selected due to the significant environmental impact associated with meat production. Through its impact analysis, the company found that even small improvements in the packaging material could result in significant reductions in overall environmental impact (producing 1 kilogram of meat creates up to 200 times the CO₂ emissions of producing the packaging material for that kilogram of meat).

The company finds that a key enabler of the success of circular economy initiatives comes down to having project leaders who believe strongly in the project and who can go through the process of getting internal support. Having people with the right leadership mentality who can put the pieces together has been critical to the success of several of DuPont's circular economy projects.

The challenges of collaboration and consumer education

A big challenge of shifting toward circular economy initiatives (and thinking more holistically across the entire value chain) is having to line up multiple interests. Circular economy initiatives require collaborating with multiple partners, all of whom need to see value from the initiatives. These projects often require collaboration on the materials end and the sourcing side, and with the original equipment manufacturers designing the final product; they also require close collaboration on the logistics of product take-back, disassembly, and reuse. The introduction of multiple partners can make circular initiatives very challenging, which makes it crucial to be able to assess partners' tolerance for varying levels of value: Do all partners have the same tolerance for not making as much money along the way? Open communication between partners is important, but it can often take a significant amount of time to achieve the level of trust and transparency needed to make these initiatives succeed. This reliance on third parties can unfortunately also represent a big risk.

Customer acceptance represents another significant circular economy challenge for DuPont. For example, for the company's Performance Materials business, the challenge is communicating the benefits of certain packaging materials to the consumer and getting wider acceptance from people to use recycled material. Consumer education is crucial to the success of these initiatives, which is why marketing plays an important role in several of DuPont's projects. The meat packaging project illustrates this consumer education challenge, as many consumers find it counterintuitive that less packaging can actually improve food protection. Consumers prefer the look of the traditional thick packaging, which uses up to 10 times more material and has a shorter shelf life compared to the lightweight packaging.

Price pressures represent yet another challenge, especially for DuPont's renewable polymers business. The current economics make it difficult to develop renewable polymers that can compete on price with nonrenewable established polymers. Because of the price difference, renewable polymers are currently only successful in the marketplace if they perform significantly better than traditional polymers. The implication is simple: A sure way to kill a circular economy project is by developing a product that is not cost competitive and fails to deliver clear value to the customer.

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Recommendations for success

Be realistic. It is important to ask the questions: Does the project make sense? Is it realistic? Is there a problem that is solved? Slow down and be realistic with what you want to achieve, and worry less about the size of the opportunity. It is also important to be able to recognize when it no longer makes sense to pursue a project.

Ensure there is open and honest communication. To be successful, companies need to be able and willing to work with and share information with partners. Projects are often unnecessarily delayed because there is too much mystery surrounding the project and people are afraid to share information. Open and honest communication makes projects move faster.

Only work on projects that have a clear value proposition. The end customer should not lose money with a circular economy solution. The circular economy solution should have the same performance and same price, or higher performance and same or lower price as the alternative. If there is no financial benefit for your customer, chances are the initiative is not going to work.

Know that these initiatives will likely require significant investment. Circular economy solutions are unlikely to be found off-the-shelf, meaning that investments in people, dollars, and pilots will be required. Ensure you are committed to the investment, otherwise kill the project quickly and move on. Similarly, know your partners' tolerance levels for ROI hurdles.

Collaborate along the value chain in order to obtain buy-in from all of the partners involved.

ORGANIZATION PROFILE

HP

Ink as a service

Circular economy initiatives at HP are focused on identifying ways to decouple materials and resource consumption from revenue growth and customer value. The ultimate goal for HP is to be able to continue to grow revenue and demonstrate value to customers without having to depend on extracting more materials from the planet—to find ways to keep materials in use at the highest state of value for the longest possible time. In pursuit of this, the company focuses circular economy initiatives on areas such as design for serviceability, repairability, and modularity. In addition, as IT plays an important role as an enabler of the circular economy, HP's IT solutions (such as connected devices and the internet of things) also help underpin other companies' circular economy initiatives.

One example of HP's circular economy success stories illustrates its shift from selling a product to selling a service. Through HP's Instant Ink service, consumers' internet-connected printers recognize when ink cartridges are low and automatically ship new cartridges to consumers, preempting the all-too-often frustration of running out of ink at inconvenient times. The new cartridges include return envelopes, which enables HP to close the loop by incorporating plastics from returned cartridges into the manufacturing of new cartridges. In addition to the plastics from returned cartridges, about 1 million water bottles per day are recycled into these new ink cartridges. For HP, the Instant Ink service offers an opportunity to address customer pain points and design waste out of the system. Notably, Instant Ink is marketed as an easier and more affordable option for consumers (customers can save up to 50 percent compared to purchasing ink from traditional outlets), and not as a circular economy or sustainability initiative. The service introduces sustainability benefits without pushing them as such to consumers.

Instant Ink has resulted in some significant waste reduction benefits. The initiative's direct-to-consumer model has helped HP eliminate about 67 percent of materials used per printed page (primarily by eliminating the overpackaging retailers need for marketing and theft-prevention reasons). And since the costs of shipping cartridges to customers are now internalized, the product-as-a-service model incentivizes HP to maximize the amount of ink included in each cartridge, which also means Instant Ink cartridges need to be replaced less frequently.

The Instant Ink program has yielded some clear business benefits for HP, as the service has about 2 million subscribers and an extremely high customer retention rate. It also provides an example of a circular economy initiative that has been successful globally and at scale.

The product-as-a-service model works well for HP in the B2B space as well. This model enables HP customers to use products without purchasing them outright, which is attractive for customers as it allows them to shift significant capital expenses to operational expenses. The model represents an important business for HP as the company currently has about \$12 billion in leased assets.

Extending the life of products

Other examples of how HP participates in the circular economy include initiatives aimed at product life extension and design for repairability. HP's commercial 3-D printing offering, for example, has the potential to make it easier for other companies to produce spare parts and therefore extend the life of their products. A partnership between HP and BMW offers a working example of this potential: through this partnership, HP prints real application car parts for use in a BMW production model in Germany. For HP, the link between 3-D printing and the circular economy is about the ability to make production-ready parts on demand and locally, which can help extend the life of products and encourage design for repairability. The company sees its role as an enabler of this disruptive technology which could potentially relocalize manufacturing.

The link between 3-D printing and the circular economy is about the ability to produce production-ready parts on demand and locally, which can help extend the life of products and encourage design for repairability.

In the consumer space, HP partners with iFixit to have HP's technical manuals translated into easy to understand online guides that are made freely available to the public. The aim of the partnership is to further promote the repairability and prolong the life of HP products.

Material intensity

As part of HP's goal to keep materials in use at the highest state of value for the longest possible time, the company measures its materials use intensity (tonnes of metal, plastics, and other materials per net revenue) for select products and plans to introduce a material intensity goal in the near future. Tracking these data helps HP understand how it can keep materials in use for as long as possible and ultimately reduce material intensity per revenue dollar.

Through good control of the return loop and material streams, HP has been able to achieve high yield on retrieved plastic from ink cartridges: 70-80 percent of the plastic from the collected cartridges can be used in production. Overall, the company's initiatives around material recovery prevent about 10 million kilograms of plastic from ending up in landfills each year.

Megatrends drive circular initiatives

An element of HP's vision of the future is a move away from transactions and toward relationships. This vision, together with a convergence of megatrends—such as big data analytics and the internet of things—have been some of the primary drivers behind HP's circular economy initiatives.

Other factors driving HP's circular economy projects include data transparency; supply chain transparency; regulatory trends; and greater interest from customers about how and where products are made. Circular economy initiatives also provide a way for HP to reduce supply chain risks. For example, if a product is certified as free of conflict minerals, the product does not have to go through a new certification process when it is brought back for reuse.

Leadership and a culture of experimentation

HP highlights that a key reason for the company's success with circular economy initiatives has to do with where sustainability fits in the organization. HP's sustainability team is housed in supply chain operations, and the company's vice president of sustainability reports to the chief supply chain officer. For HP, having sustainability be part of operations makes it very clear that the sustainability team has responsibility both for bringing products to market and for end-of-life issues. For these reasons, the team works closely with product design and manufacturing.

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HP's culture of experimentation is another important enabler of the success of the company's circular economy initiatives. The company has a culture that encourages people to experiment and pursue new ideas. HP refers to these experimental initiatives as "lighthouse projects." When ideas work well, there is an incentive to help others learn from those ideas. And when ideas don't work, the culture encourages learning from those setbacks.

Yet another enabler of success is having a CEO and board of directors who understand the circular economy concept, who can connect it to business value, and who can convey this value to investors (for an example, see the video "HP Board of Directors Discusses Sustainability" (<https://youtu.be/DU9x0OgflaY>)). Because HP's CEO is comfortable discussing circular economy and sustainability topics at some of the company's biggest investor events, stakeholders understand how the circular economy fits with HP's vision for the future and the company's plans for achieving growth and demonstrating value to customers.

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A need for policy reform and procurement incentives

Regulatory issues present some challenges to HP's circular economy ambitions, and these issues can make it difficult to develop circular business models that work within the current regulatory environment. For example, there are regulatory issues in Europe around refurbishment, the categorization of waste (hazardous vs. nonhazardous), and the ability to transport waste materials such as spare parts across borders that can significantly add costs to the company's circular economy projects. Simply moving materials across borders, for example, can be very costly.

While emerging regulation in Europe is focused on specifying product design for longevity or reparability, HP suggests that a better approach might be to shift policies to encourage the purchase of products as a service. This approach could ultimately be more effective for changing the incentives for product design. In this case, the challenge is persuading consumers and small businesses that purchasing a service is preferable to owning a product. In other words, persuading consumers that they don't need to own a printer, they just need printing.

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In addition to regulatory issues, commodity prices are another significant roadblock to circular economy initiatives. Recycled resins are not very attractive when the price of virgin resins is as low as it is currently.

Transparency and close partnerships

The collaborative nature of circular economy initiatives means there is added importance in establishing partnerships based on transparency and trust. HP points to a lack of trust in partners as a big reason behind failed projects. An example of this comes from a project HP was pursuing with a consortium of hospitals to determine the viability of sourcing discarded polypropylene surgical wrap as raw material for HP ink cartridges. It was a promising opportunity as the quality and consistency of the material that could be recovered were good. After an eight-month process, however, it became clear that a new technical step had to be introduced into the logistics loop since the plastic wrap was a fabric, and typical recycling solutions are primarily intended for rigid materials. The addition of this extra step would normally not have been an obstacle, but the cost became an impediment when the project's recycling partner increased the cost beyond what was economical. As a result, the economics did not work out and the project never

took off. This experience introduced an important learning for HP: For circular economy projects to succeed, it is helpful to have transparency, an upfront understanding of the costs, and relationships with partners that share the same goals and values.

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Recommendations for success

If you sell a product, envision selling that product as a service. This is not only for circular economy reasons, but also because competitors and others are likely already thinking about doing this. This is becoming especially common for large capital items.

Just start. There is no need to think too hard about it all from an end-to-end process. For HP, one of the key advantages is that employees are allowed to experiment and allowed to fail.

When you fail, make sure you fail fast. If you fail at something, move on and do something else. You have to be able to say to yourself: "This is not working; let's work it in a different way."

Identify customer pain points. Understand how your customer uses your products and what their pain points are. Can you address those pain points by shifting to a product as a service model?

You need passionate people. Circular economy projects don't take off when people just think of them as a job. At HP, implementing circular economy initiatives is a small fraction of people's jobs, but they love it and they find it exciting. These initiatives give people a sense of purpose and a calling.

Interface

Moving forward with less 'backing': ReEntry®

Circular economy initiatives at modular carpet maker Interface are focused on finding ways to reduce the environmental impacts of the company's raw materials. The company's initiatives revolve around two key questions: What are the impacts of our raw materials? Can we reduce those impacts if we find a way to get our materials back? These questions form the foundation of Interface's ambitious 2020 goal of obtaining all of the company's raw materials from rapidly renewable bio-based materials or recycled waste streams. Interface is currently 60 percent of the way toward meeting this target.

Interface can point to August 31, 1994, as the beginning of the company's sustainability journey, though initially most of the company's initiatives focused primarily on waste reduction and dematerialization (one of the company's first successful sustainability projects involved removing 1 ounce of plastic from the carpet backing and saving \$1 million). Interface's first foray into circular economy initiatives came in the late 90s with the introduction of recycled material into the company's carpet backing. While the initial version of this process was heavy in chemical and water usage, the process evolved in the early 2000s primarily through the use of others' waste material. In 2005, the company made a key investment in technology that enabled Interface to grind production scrap and use its own recovered materials in new products. This new process, branded as ReEntry, was the result of innovations in technologies and a new approach to business.

Visionary leadership

The main driver behind Interface's circular economy initiatives has unquestionably been visionary leadership. For Ray Anderson, founder and then CEO of Interface, the strong belief in sustainability as a way of doing business was founded in ethics, but he also believed sustainability would eventually become a competitive advantage for Interface and a better way to do business. Much of Interface's early sustainability work was inspired by circular economy conversations that took place between Anderson and his outside environmental advisors. Anderson posed a question to his advisors: "How would nature design a company and what would that look like?" The answer to this question—that nature functions in closed loops and does not waste—became the driving force behind Interface's embrace of the circular economy concept. As these informal conversations evolved, Interface assembled an "Eco Dream Team" that served as a sustainability advisory team for the company. The team met periodically with Anderson to discuss how to transform the company to become a proof of concept for the circular economy that other companies could later follow.

The main driver behind Interface's circular economy initiatives has unquestionably been visionary leadership.

Board and supplier commitment

Anderson eventually had to sell his strong vision for sustainability and circularity to the company's board, to Wall Street, and to suppliers—no simple task given the significant investments in technology that this vision required. In fact, engaging the company's yarn suppliers was a vital part of Interface's circular economy journey since most of the life cycle impacts of the company's products were from virgin nylon and yarn production. As early as 1997, Interface began engaging with suppliers on recycled content yarn, and soon the company had suppliers competing against each other to win business based on recycled content. Whichever company produced the latest incremental breakthrough in increasing recycled content would get Interface's new styles for the year made on their yarn. For Interface, setting up a "race to the top" on recycling innovation has been a key strategy with suppliers.

With yarn suppliers on board, Interface's next challenge was investing in recycling technology for its carpet backing (Interface makes its own carpet backing but does not make its own yarn). A milestone in the company's sustainability history was obtaining board approval for the capital investments that were needed, as this approval locked in the company's strategy for the long term and kick-started real investments in circular economy initiatives. With board sign-off, major investments in recycling technology for turning old backing and production waste into new backing were able to commence around 2003. These breakthroughs in supplier engagement and recycling technology have had a significant effect, as Interface now has standard products in the Americas reaching 88-89 percent total recycled content.

Interface's sustainability work, including circular economy initiatives, was initially managed by the company's R&D team (after all, Anderson's background was in R&D). As the company's sustainability initiatives became more embedded in the business, other functions (including marketing, supply chain, and innovation) began to take on greater responsibility for implementing circular economy initiatives. These initiatives are now primarily owned by the product take-back team within Interface's innovation and supply chain functions.

A milestone in the company's sustainability history was obtaining board approval for the capital investments that were needed, as this approval locked-in the company's strategy for the long-term and kick-started real investments in circular economy initiatives.

Environmental, economic, and social benefits

Interface points to its reduced environmental impact as the biggest benefit of the company's focus on the circular economy. The company's focus on increasing the use of recycled materials has had a significant impact on reducing carbon emissions, especially given that a large share of Interface's carbon footprint comes from the sourcing of raw materials. Interface has reduced the carbon footprint of its products by over 60 percent since the company began its sustainability journey in 1994.

In the past, the cost savings associated with recycled materials have also been an important benefit, as a reliance on recycled materials helped Interface smooth out the price shocks from oil and gas and enabled the company to maintain flat product prices when competitors had to increase their prices. This benefit is less significant today as the low price of oil has eroded much of the price competitiveness of recycled materials.

Interface also finds that employee engagement and internal brand have benefited tremendously from the company's circular economy push. This is reflected by the pride that employees have in working for the company.

Interface points to its reduced environmental impact as the biggest benefit of the company's focus on the circular economy.

Managing costs while driving demand

Investing in expanding the company's circular economy initiatives is a question of when, not if. Economic analyses help Interface understand how quickly to move on certain initiatives and determine how fast the company can scale and incorporate more recycled content into its products. Before being able to scale, Interface is working on determining what it will take to recover additional material. The plan is to first focus on the company's capacity to use additional material and the demand for products, and later focus on scaling the supply side to recover more material. The challenge for Interface is twofold: Being able to keep the useful recycled material as close to cost neutral as possible, and ensuring customers understand how the company's products differ from alternatives.

The threat of greenwash

A key challenge Interface faces is that currently the market is unable to distinguish real attempts at circularity from greenwash. Interface finds this especially challenging when companies that only pay lip service to the circular economy get equal credit in the marketplace as companies that have made significant investments in these initiatives. To combat this challenge, transparency, customer education, and effective marketing become crucial tools. This challenge is partly due to the fact that circular economy metrics are in their infancy, and the absence of standard indicators and good transparency allow for a lot of fudging when reporting on circular economy initiatives. The lack of standard indicators is no longer a significant issue in other areas

of sustainability reporting that have established standards, such as in greenhouse gas reporting. To encourage transparency and the use of verifiable indicators, Interface publishes a third-party certified metric showing the percentage of each product's weight that is actually recyclable into new products if it is returned to Interface (currently 58-60 percent; the remainder must be downcycled). This product-level transparency supplements Interface's business-wide metrics that report the total usage of recycled or biobased materials and the volume of materials returned to the company.

A key challenge Interface faces is that currently the market is unable to distinguish real attempts at circularity from greenwash.

Partnerships matter

Attempting circular economy initiatives in a heavily siloed organization is a recipe for disaster because these initiatives inherently cut across many parts of a company and its supply chain. If there are silos in the organization, the economics of a circular economy initiative can quickly break down.

Collaboration is crucial, but an overreliance on partners can also bring its own set of challenges. The biggest circular economy setbacks for Interface have been due to partners going out of business, especially local recycling partners. Interface finds that helping its partners succeed can largely determine the company's own success in the circular economy. This close level of collaboration has been key to the success of Interface's Net-Works project, which was launched in 2012 in partnership with the Zoological Society of London. The Net-Works project empowers people in coastal communities in the developing world to collect and sell discarded nylon fishing nets. The nets are sold into a global supply chain and recycled into yarn to make carpet tile. The project offers a good example of the importance of collaboration in the absence of an internal skill set or a labor force, as the project is heavily dependent on local partners. Since 2012, Net-Works has collected 125 metric tons of discarded plastic fishing nets to be recycled into carpet tile.

Recommendations for success

Establish strong partnerships. Circular economy initiatives magnify the interdependencies of complicated supply chains and their many moving parts. To succeed in circular economy initiatives, it is important to have really good partners at multiple levels.

Ensure the economics are rigorous at each stage of the supply chain. The economic health of the system needs to be maintained at all times.

Focus on expensive materials first. The inherent value of the material that is being recovered matters a lot. The most valuable material in a mixed waste stream determines whether or not it will be recovered. For instance, nylon recycling is attractive because it is an expensive engineering plastic.

Kimberly-Clark

Making use of hard-to-recycle products: RightCycle®

Kimberly-Clark's circular economy initiatives began about six years ago, when the company started thinking about product take-back ideas and initiatives to help avoid landfill waste, and in particular ideas for what to do with disposable material that was relatively clean at the end of its life.

The company's disposable and hard-to-recycle products were increasingly at odds with the sustainability goals of many of its customers, who expressed a need for products that did not conflict with their zero waste-to-landfill goals. In 2011, Kimberly-Clark launched the RightCycle initiative with the aim of converting hard-to-recycle products—such as nitrile gloves and single-use apparel—into useful new items, enabling the company to be part of the solution rather than the problem for customers that were pursuing waste reduction goals. Kimberly-Clark works with customers across more than 200 sites around the world and has grown from recycling just under two tons of material in 2011 to 130 tons in 2016.

Through partnerships with recyclers and reprocessors, the RightCycle program creates new products from customers' used materials. For example, disposable garments are dismantled to separate the non-polypropylene components, allowing the polypropylene to be densified and used in plastic processing facilities. The end product is a compound that is blended into polymers to make new items such as plastic shelving and storage bins. By leveraging internal logistics, Kimberly-Clark gained valuable insights into making the program more cost effective and transparent for the customers.

Kimberly-Clark has also pursued a number of other circular economy initiatives and pilots, including a previous partnership in New Zealand between the Huggies brand and a local business to identify solutions for composting used diapers. The partnership was able to establish a reverse logistics model for a diaper collection service. In another example, the Kimberly-Clark Professional business has begun incorporating agricultural byproducts in some product lines. For instance, the company's GreenHarvest towel and bathroom tissue products contain up to 20 percent wheat straw fiber, an alternative material to tree fiber and a solution to growing agricultural waste. Not all of Kimberly-Clark's initiatives and pilots have been able to successfully scale, but the key is being able to fail fast and learn quickly from those setbacks.

One driver for Kimberly-Clark's circular economy initiatives has been customers' sustainability goals.

Finding innovative sources of value

An important driver for the company's circular initiatives has been a strong internal interest in finding new ways to insert materials that have been traditionally seen as having zero or low value into value chains. These initiatives are inspired by the question: "What else are we not looking at that could be a source of value, both socially/environmentally and financially?" The company's customers care about waste issues, and the challenge for Kimberly-Clark is finding innovative ways to serve this customer need more directly by examining the company's products and packaging more critically and identifying ways to redesign components and material usage to improve efficiencies.

For Kimberly-Clark, circular economy initiatives are not just about avoiding landfill waste, but also about taking materials that were presumed to have no value and finding ways to insert them into value chains.

Many of the company's internal conversations revolve around finding the right balance between competitive advantage and the need for collaboration with peers, competitors, and the industry to advance overall opportunities for the circular economy. There is a recognition that, while the economics of circular economy initiatives are important to the business, the broader sustainability component may be best addressed through precompetitive initiatives.

Empowering sustainability champions

The biggest enabler of the success of Kimberly-Clark's circular economy initiatives has been the company's ability to identify and empower champions within a brand's marketing organization. In the case of the RightCycle program, Kimberly-Clark's marketing team knew there was strong customer interest in a waste reduction solution, but the challenge was the lack of sufficient knowledge within the marketing organization to respond to the customer need. In this particular case, Kimberly-Clark's sustainability team filled the knowledge gap to help implement the customer solution. When there is demonstrated interest from customers for a sustainability solution, as in the case of RightCycle, Kimberly-Clark's sustainability team partners with the company's sales and marketing organization to develop a targeted program. These partnerships work especially well because the sustainability team has visibility into the company's high-level strategy and the granularity of operations and manufacturing logistics. By having this granular view—knowing the characteristics of the materials and having insight into transactions, negotiating terms, and operations—the company's sustainability team is equipped to partner with sales and marketing to provide realistic and practical solutions. Circular economy initiatives at Kimberly-Clark are owned by the brand and are worked on in close partnership with the sustainability team.

The biggest enabler of the success of Kimberly-Clark's circular economy initiatives has been the company's ability to identify and empower champions within a brand's marketing organization.

The internal sell for circular economy initiatives is not much of a challenge when the customer value proposition is clear. For example, once the customer opportunity around the RightCycle project became clear, the business was all about how quickly the project could be brought to customers. However, projects that require technical innovation can be more challenging due to real or perceived regulatory hurdles and because of challenges from contaminants. In most cases, Kimberly-Clark finds that resistance to initiatives is less internal and more often driven by external hurdles.

The case for circular economy initiatives is also strong when faced with potential risk management issues, such as risks associated with extended producer responsibility that are beginning to emerge in some markets. As Kimberly-Clark grows its business in emerging markets, the company is seeing the likelihood of these risks increase, especially in places where waste infrastructure is not well established.

Topline value

Kimberly-Clark is still learning what the biggest value drivers are from its circular economy pilots, but a few initial benefits are already clear. For example, the company has found that circular economy initiatives have brought important benefits related to brand and reputation value, particularly in communities where the company has taken a public leadership role in promoting recycling initiatives, such as a partnership in Costa Rica to spearhead a recycling day. Beyond reputational value, circular economy initiatives have also been a competitive differentiator and have contributed to topline value. For instance, Kimberly-Clark can point to customer accounts that have been won specifically because of the company's RightCycle project. In addition, circular economy initiatives have helped improve the diversity of inputs in the company's supply chain (in the form of innovative materials) as well as extend the life of the value chain.

Kimberly-Clark can point to customer accounts that have been won specifically because of the company's RightCycle project.

A shift in mindset

For Kimberly-Clark, the biggest challenges associated with circular economy initiatives revolve around handling raw materials, contamination of products after use, and reverse logistics (product take-back). Regulations, particularly for biological and hazardous waste, and the volatility of commodity prices can also add layers of complexity, making it very difficult for circular economy initiatives to be profitable. Not being able to recover sufficient value can quickly lead to failed initiatives, and something as simple as a drop in the price of oil can have profound implications on the success of an initiative. Consequently, being able to capture the value of circular economy initiatives depends largely on ensuring logistics costs do not outweigh the value of outputs.

To tackle these challenges, Kimberly-Clark is beginning to shift its mindset around product and package design to fully consider how these materials can be designed with disposal in mind. This shift represents a big opportunity for the company, but also a daunting task as it requires determining the appropriate raw materials needed to improve product recyclability and figuring out the reverse logistics so that the economics of circular initiatives work out. The key is being aware of the assumptions that are made when developing these initiatives and being able to tap into existing supply chains and reverse streams that can save significant cost compared to creating entirely new logistics systems.

The key is being aware of the assumptions that are made when developing these initiatives, and being able to tap into existing supply chains and reverse streams that can save significant cost compared to creating an entirely new logistics system.

Recommendations for success

Find shared value. It is important to look beyond what these initiatives mean for your organization—either from a sustainability standpoint or in terms of economics—and focus on attempting to find shared value. Shared value only works if you are willing to recognize that these challenges can't be solved alone. It is crucial to be able to work with peers, potentially even competitors, and outside organizations. These initiatives can't be done in isolation.

Focus on simplicity. Circular initiatives need to be easy for customers to understand and easy for salespeople to communicate. The business models and messaging should be clean, clear, transparent, and done in a responsible way.

Philips

Light as a service

Philips views circular economy initiatives as an opportunity to generate topline revenue and save costs by finding ways to change the way the company provides services to customers; finding opportunities to cut out waste from underutilized products and hardware; and finding ways to utilize products multiple times. For Philips, the biggest focus of circular economy initiatives hinges on the notion of switching from selling products to selling services.

For example, “light as a service” is one of Philips’ primary circular economy initiatives. This business represents a shift away from selling a product (light fixtures) to providing a service (lighting solutions). The company sees this as a response to a clear customer need. On the one hand, it is about financial considerations—customers find it easier to have operational rather than capital expenditures. It also helps Philips stay on top of the latest customer needs and learn about customer usage patterns. And it allows Philips to extend replacement cycles to longer periods. While the focus is currently on warehousing applications, the company plans to expand this service to other applications such as office and retail.

For Philips, the biggest focus of circular economy initiatives hinges on the notion of switching from selling products to selling services.

Similar models are being implemented in the company’s health care businesses, where Philips has established performance contracts with hospital chains. The company has about 50 long-term partnerships with hospitals. Instead of selling equipment to hospitals, Philips has cooperation agreements to sell services, which include technology leases, consulting services, and maintenance services, among others. By retaining ownership and management of equipment, for example, Philips can help drive customer behavior to better resource efficiency. For the company, this shift represents a move away from a traditional role of manufacturer to more of a knowledge-based partnership. Philips’ experience and ability to foresee upcoming technological advancements in the industry are well suited to this type of partnership.

A close link with innovation and strategy

The company's decision to embark on circular economy initiatives goes back to around 2012, when Philips was rethinking its strategy and establishing its corporate vision of "striving to make the world healthier and more sustainable through innovation." Inspired by this vision, the company set a corporate goal to improve the lives of 3 billion people by 2025, which kick-started an aggressive business transformation program. During this period there was a realization that what has helped Philips stay in business for 125 years—through several periods of business disruption—has been the company's ability to adapt to changing needs. An awareness that business disruption is likely to continue to occur has helped Philips think more radically about new business opportunities and better prepare for business transformation. For instance, Philips believes that if the company wants to be around for at least another 125 years, it will have to shift the way resources are used, given that current levels of consumption will not be sustainable on a planet expected to have 9 billion people by 2050. For Philips, the key to achieving this shift in resource consumption lies in the ability to decouple the economic development of societies from the use of material resources.

There was a realization that what has helped Philips stay in business for 125 years—through several period of business disruption—has been the company's ability to adapt to changing needs.

That circular economy initiatives at Philips are integral to the company's innovation strategy is very much by design, as the company's sustainability function reports directly to Philips' head of strategy and innovation. While the sustainability team spearheads the company's circular economy projects, it closely collaborates with the strategy and innovation teams to determine which projects to pursue. When Philips first began exploring circular economy projects, the sustainability and strategy teams worked together to select a sample product out of each of Philips' main business sectors to analyze the opportunity for Philips and identify good candidates for circular economy initiatives. Since the analysis yielded a significant net opportunity for Philips, the company's CEO, Frans van Houten, gave his support for launching circular economy initiatives as a formal program for Philips, complete with staffing. CEO support has been key to advancing these initiatives at Philips, as Van Houten regularly speaks publicly about the importance of the circular economy to Philips' business strategy.

Opportunities for revenue growth and cost savings

The main benefits of the circular economy for Philips fall into four evolving categories:

Topline growth For example, refurbished products allow the company to expand to markets that would not traditionally purchase the latest and newest technologies.

Cost savings The company's partnership deals, for example with hospitals, allow Philips to deliver service without the need for frequent replacement of machines.

Reduced risk While there are no immediate risks related to raw material availability and price fluctuations, Philips recognizes that these could be significant risks in the future. As such, Philips—along with other companies involved in the circular economy—is striving to become less dependent on raw material prices.

Reputation and trust building with stakeholders, in particular through the company's initiatives to improve the affordability of health care. For example, by shifting to a partnership model with hospitals, Philips aims to help lower the costs of the health care system as a whole.

Currently, for Philips the most tangible benefits of the circular economy are related to revenue growth and cost savings. In 2016, for instance, Philips released an externally reported metric that indicates circular economy revenue accounts for 8 percent of Philips' total revenue. The company's goal is to at least double this figure by 2020.

Circular economy revenue accounts for 8 percent of Philips' total revenue, and the company's goal is to at least double this figure by 2020.

The internet of things, digitization, and IT infrastructure are some of the company's biggest enablers of success in the circular economy. Since circular economy initiatives are very knowledge intensive, it is crucial to have the right IT infrastructure to be able to scale initiatives, so Philips works closely with IT partners to improve access to real-time information and its ability to manage leased assets.

The internet of things, digitization, and IT infrastructure are some of the company's biggest enablers of success in the circular economy.

The progress Philips is making on circular economy initiatives is being picked up by the company's stakeholders. For example, Philips finds that investors are increasingly asking questions about the company's sustainability and circular economy activities. Large institutional investors are paying increasing attention to these activities as they are looking at enablers of long-term profitability. For instance, a large Dutch pension fund is interested in understanding ways to measure circularity, which is an area Philips has been actively involved in. The company's circular economy initiatives have also helped it achieve recognition as a leader in the Dow Jones Sustainability Index.

The risk of uncertainty

Philips recognizes there are risks inherent in changing the way the company operates its business, especially given Philips is still in the process of its strategy transformation. The company sees long-term uncertainty as one of the biggest risks. For example, Philips has partnership deals that span 10-15 years, and there is a risk that the technologies these partnerships are based on may not be relevant in 10 years. What will be the latest technology in 10 years? How much of the equipment will be reusable after 10 years? Ultimately, the risk lies in the residual value calculation of the equipment. Since technology tends to depreciate rapidly, equipment that was slated to last for 10 years may have to be replaced after only five years. To hedge against this risk, Philips approaches circular economy initiatives with agility, testing concepts with pilots and making improvements as needed.

A mindset challenge

A big challenge for Philips has been changing the mindset among middle management to embrace the company's shift in business strategy. The challenge is addressing employees' resistance to change and the mindset that shifting to a service model will cannibalize sales. It is especially difficult to convince employees of this new model when for 30 years they have been used to pushing boxes rather than services. To tackle this challenge, Philips is aligning the organizational model to create a better understanding and awareness of the company's circular economy initiatives among employees and to ensure that the benefits of these initiatives are clear to all employees. In addition, to facilitate the change in business model, Philips is working on recruitment initiatives that emphasize candidates' experience in the service industry.

A big challenge for Philips has been changing the mindset among middle management to embrace the company's shift in business strategy.

While the mindset challenge is primarily an internal issue, it can also represent a challenge with customers. For example, as discussions with procurement engineers transition from focusing on product specifications to focusing on service-level agreements, people can get uneasy as they begin to think their job is on the line. In these cases, the challenge becomes very personal. To mitigate these issues, Philips notes the importance of having a dialogue at the C-suite level to ensure that employees on the customer side are also aligned with the shift in business model.

Another important challenge for Philips is realigning the organization to be able to get clear visibility on the assets that are being managed. In the past, Philips was primarily concerned with how many units the company was shipping, but a shift toward a circular economy model means the focus is now increasingly on managing a fleet of assets that are in constant interaction with the users of those assets. As a result of this business model transformation, the type of information the company generates and shares is vastly different from what it was.

Agility matters

While Philips has made good progress in pursuing circular economy initiatives, the company initially thought that the business transition would be much quicker than it has been. A significant setback has been a misjudgment on the speed of the change, and several circular economy pilots have looked good on paper but never taken off. However, the company's philosophy is to fail fast and learn from those mistakes, and to acknowledge that one size does not fit all. A key advantage for Philips has been the company's agile approach to circular economy initiatives, which has allowed teams to quickly learn from projects that have failed.

Recommendations for success

Understand the value proposition for the customer. Value propositions that manage to minimize risk for the customer are most likely to be successful. Circular economy initiatives have to start with the customer and with a focus on the value drivers, and not be bogged down by looking into material flows and closed loops. Companies need to ask themselves: What is on the mind of the customer and what is the customer willing to pay money for?

A circular economy transformation requires changing the business model first. Philips initially tried to change products while maintaining the same business model, but this strategy did not work out. Companies need to ensure their marketing and finance teams are clearly on board, and also ensure their business models enable them to have control over the physical assets. The business model should go first as doing so will trigger and align the incentives; the design should follow.

Focus on your organization, people, and mindset. It is important to identify any gaps in competencies and figure out how to close those gaps. In the case of Philips, the company is working on closing capability gaps related to service selling, data management, and modular design.

Waste Management

Transforming the business

Realizing in the 2000s that landfill volumes were dropping, and strongly sensing that market pressures were pushing customers to embrace different waste strategies, Waste Management paused to try to understand the future impact of these trends on the business. Were these just short-term trends? What was the risk of inaction? Waste Management leadership recognized that failure to quickly adapt to changing customer needs could put the company at risk of becoming irrelevant. This realization became the catalyst for a shift in mindset—participating in the circular economy (or “cradle to cradle” thinking, as it was referred to at the time) was crucial for Waste Management to remain relevant to customers and their evolving needs. Today, the traditional landfill business accounts for only a small portion of the company’s revenue.

Participating in the circular economy was crucial for Waste Management to remain relevant to customers and their evolving needs.

Customer demand is the primary driver for Waste Management’s circular economy initiatives. The company finds that customers have been increasingly asking for solutions to better manage byproducts, in part driven by costs and risks associated with disposal of those byproducts, as well as pressure from downstream customers seeking waste solutions. Regulations are also pressuring some customers to find alternative ways to manage their materials, as some of these materials are now being banned from landfills. With the emergence of Waste Management’s environmental solutions, these pressures have all come together to create greater demand for circular economy solutions from the company.

Moving up the value chain

Circular economy initiatives at Waste Management began around 2001, with a focus during this early period on ways to reduce, reuse, or eliminate materials, particularly by looking at byproducts and waste materials from large customers. For example, one of Waste Management's early initiatives involved working with US automotive companies to capture waste materials, such as scrap metal, and return them back to the production loop by finding new uses for the material—a traditional closed-loop initiative.

Today, these initiatives have evolved to move Waste Management further up the value chain, collaborating with product designers and manufacturers to learn how their work affects the ability to capture products at their end of use. The company works closely with designers to identify materials that either have a lower environmental impact or greater value, and can therefore be used in closed-loop initiatives. By going further up the value chain, Waste Management influences purchasing decisions and works side by side with designers to identify their specific problems associated with waste and engineer them out. The company's circular economy focus has widened to look not only at capturing and returning waste materials to the production loop, but also identifying ways to produce items that are ultimately more recoverable.

Circular economy initiatives are housed within Waste Management's Sustainability Services (WMSS) organization, which over the last decade has grown from a team of 10 people to about 400. Waste Management quantifies the value of its circular economy initiatives through the value that the WMSS team brings to the overall company, as well as the value that WMSS drives for customers. There is direct value from the revenues generated by the organization and the environmental improvements associated with these initiatives, and there is also significant value from getting to know customers better and helping eliminate their waste streams. Waste Management finds that on average the company's sustainability solutions generate \$10 million-\$14 million per year in savings for customers.

By going further up the value chain, Waste Management influences purchasing decisions and works side by side with designers to identify their specific problems associated with waste and engineer them out.

The importance of culture

Team culture has been the biggest enabler of circular economy success for Waste Management; in particular, having a culture of solutions-minded and systems-thinking entrepreneurs within the WMSS team, which has its own profit and loss statement and is a true division within the company. The company's recruitment focuses on finding people who can look at material streams as opportunities and sources of value and can embrace a lean and crafty solutions mindset when working with customers. The belief and desire of team members to change business models or alter the way things are manufactured have been key to the success of the company's circular economy initiatives. Being part of the separate organization of WMSS frees team members to collaborate with outside partners to deliver pure customer engagement and solutions, while leveraging the broader resources available from being part of the larger Waste Management team.

Building resilience and sharing risk

One of the biggest risks associated with circular economy initiatives is not approaching these initiatives with a true understanding of the economic returns. Waste Management points to the importance of shared dialogue with partners to build robust businesses around these initiatives. When Waste Management first embarked on transforming its business model, the company moved fast and invested about \$600 million in technologies to replace its landfill business. These investments looked good when oil cost \$80 per barrel but were not viable at \$40 per barrel. The company realized it was trying to move too fast too soon without fully considering a strategy that was robust enough to be resilient through economic cycles. An effective circular economy strategy requires building resilience at the back end and being able to share the risks among multiple partners.

Waste Management finds that a key challenge to pursuing circular economy initiatives lies in having to build a strong business case around these initiatives when the value is difficult to quantify. Brand and marketing budgets, for example, are not scrutinized as much as sustainability budgets, yet brand and marketing value can be just as hard to quantify as value from sustainability initiatives. If sustainability and circular economy initiatives are considered as part of the business framework, the costs can be shared across the business. By sharing the sustainability budget with another function, such as marketing, circular economy initiatives can be more resilient during economic downturns.

Another challenge for Waste Management stems from inconsistencies in regulations, and in particular from regional variations in recycling programs and landfill bans. There are unintended consequences from having to deal with multiple regulatory structures, which can result in sometimes having to landfill waste instead of pursuing alternatives.

Infrastructure gaps impede Waste Management's circular economy efforts. Depending on the location of partners, it can be challenging to design efficient reverse logistics systems, key to the reuse of products and materials necessary in a circular economy. Reverse logistics can be a major impediment in remote locations, as cost increases with distance. This is less of a problem for large manufacturers that have the material volume to make the economics work, but for smaller organizations it can be very difficult to pursue these initiatives individually. The reverse logistics challenges are quite possibly the biggest roadblock to fully capturing value from circular economy initiatives.

The reverse logistics challenges are quite possibly the biggest roadblock to fully capturing value from circular economy initiatives.

Waste Management finds that the primary reason for failed circular economy initiatives comes down to a lack of communication. It is crucial to have all the necessary stakeholders communicating and in agreement with the business plan and strategy. When initiatives fail, either internally or with customers, it is usually because of a breakdown in communication because stakeholders are not aligned on the shared risks and the shared value of the initiatives.

Recommendations for success

Reach out for opportunities to collaborate. Seek ways to learn and collaborate with other organizations throughout the supply chain. Don't go about these initiatives on your own.

Adopt circular economy initiatives as a business framework. It is important to shift the way value is placed on materials and waste streams, but to do so within a business framework. Many companies think of the circular economy as a buzzword for recycling, when really it needs to be treated as part of the business strategy.

About the Author

Thomas Singer is a principal researcher in corporate leadership at The Conference Board. His research focuses on corporate social responsibility and sustainability issues. Singer is the author of numerous publications, including *The Seven Pillars of Sustainability Leadership*, *Driving Revenue Growth through Sustainable Products and Services*, and the comprehensive corporate sustainability benchmarking report *Sustainability Practices*. Prior to joining The Conference Board, Singer worked with Blu Skye Sustainability Consulting and SustainAbility, helping clients embed sustainability into their core business. Over his career, he has supported engagements with industry leaders across sectors, focusing on strategy development, opportunity assessment, competitive analysis, and stakeholder engagement. He began his career as a management consultant with Kaiser Associates, advising clients on white space opportunities, competitive analysis, and benchmarking. Singer is a graduate of Tufts University.

The author would like to thank the companies featured in this report for their valuable input on this research. Additionally, he would like to thank the individuals who dedicated time to sharing their insights.

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