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Outlook Point of View | Sustainability

Using digital tech to spin the circular economy

By Peter Lacy

In the digitally powered circular economy, business models focus on renewal, sharing and service. And the shortest path to sustainable, profitable growth isn't a straight line.

From hailing a cab to healing the sick, digital disruptions are transforming virtually every aspect of modern life, rattling formerly stable industries and offering new, profitable growth opportunities. There's little wonder, then, that digital solutions will play a major role in bringing the concepts supporting the circular economy, with its focus on sustainable growth, into the mainstream.

Businesses have traditionally exploited resources in a linear way, extracting raw materials to manufacture products for customers worldwide who then use and ultimately discard them. Today, however, critical nonrenewable inputs like metals, minerals and energy supplies are increasingly scarce, while the regenerative capacity of forests, land and oceans is under mounting pressure. As a result, these conventional straight-line business models can expose firms to unacceptable levels of risk, including wild price volatility.

Consequently, leading companies have begun to adopt new, more circular approaches to using resources. These approaches focus on reuse and repair, on upgrades and refurbishments, on capacity sharing and renewability. We have identified more than 100 companies that are guided by circular economy principles, and they range from massive global enterprises to feisty, fast-moving startups.

Five primary circular business models have proven successful and scalable.

- 1. Circular Supply Chain.** Provide renewable energy, and bio-based or fully recyclable materials in place of traditional inputs to enable regenerative use of the same resources again and again
- 2. Recovery and Recycling.** Recover useful resources or energy from disposed products or byproducts, effectively turning waste disposal

costs into resource management revenues for any business

- 3. Product Life Extension.** Extend the working life of products and components by repairing, upgrading or reselling them to transition from product to lifecycle revenue generation
- 4. Sharing platform.** Enable, for a transaction fee or access to a similar device, increased product utilization by making it possible for consumers and/or companies to co-use and exchange goods on a central service
- 5. Product as a service.** Offer product access rather than ownership to let customers pay for performance only, and integrate incentives to make products that last and can be effectively upgraded and serviced

Digital technologies provide remote visibility and asset control, making them perfect enablers for three of the five circular economy business models: product as a service, sharing platform and product life extension. By enabling "dematerialization" (e.g., replacing physical newsprint with virtual online content or physical stores with direct-to-consumer retail) and changing how people interact with physical and virtual assets, digital technologies can transform value chains so that they no longer need additional physical resources to grow.

Five key digital technologies enable the circular economy.

Why cheap, ubiquitous mobile access rules

The unique ability of mobile technology to be everywhere at increasingly affordable prices makes it an ideal enabler of the circular economy.

How can businesses use existing physical assets, rather than increasing resource consumption, to provide services? This is a particularly important question in urban areas, where congestion is an issue.

Enter MyWays, a mobile app and delivery service piloted by logistics giant DHL. Instead of increasing the size of its delivery fleet, DHL uses MyWays to match supply with demand, using third parties who are already on the road. A customer adds a parcel to MyWays digitally, using a tracking number and specifying the delivery address and his willingness to pay. A third party finds the job through the app, picks up the parcel at a DHL service point and delivers it. During the process, deliverer and customer

communicate via the app. Once the parcel is delivered, the deliverer earns digital points redeemable in cash.

Another way mobile technology supports the circular economy is by simplifying and improving the user experience by making remote interactions possible across customers, suppliers and goods themselves. Mobile apps combined with other digital technologies like machine-to-machine (M2M) connectivity and big data analytics can enable remote control, predictive maintenance, mobile payments and automated monitoring.

For instance, telecommunications player Verizon recently introduced a mobile share service in which a smartphone can scan a QR code that remotely unlocks and accesses a product. The service, launched initially for cars, can offer mobile access to anything from gardening tools to commercial storage, boats and computers.

The rise of the machines

Two circular business models—the sharing platform and product as a service—will benefit from M2M connectivity, thus allowing organizations to substitute M2M asset management for costly, labor-intensive field service. That's because the M2M approach lets manufacturers, energy producers and a host of other businesses manage their products remotely. It also reduces the risks associated with selling offerings that come with a performance guarantee, supporting the product as a service business model. Experience suggests that M2M connectivity can cut overall service and maintenance costs by as much as 30 percent.

SKF, a leading maker of bearings, lubricants and other maintenance products, is using this technology to optimize the performance of equipment, postponing replacement and minimizing downtime

while still ensuring the best service for customers. It is integrating wireless technology into “intelligent bearings” so they can communicate their operating condition, which should ultimately lead to lower costs, higher reliability and more machine uptime.

Accenture and General Electric analyzed the Industrial Internet's potential in a 2014 study that linked equipment, products, factories and supply chains using M2M solutions allied with big data analytics to drive efficiency and productivity. Ninety percent of the companies surveyed across eight industries said this combination of technologies was either their top priority or among their top three. It was estimated that these improvements could increase global GDP by as much as \$10 trillion to \$15 trillion over the next two decades.

Dematerializing in the cloud

Traditional travel agents, music stores and newspapers all share a common challenge: something we call dematerialization. The term describes the process of replacing a physical thing—the brick-and-mortar travel agency, music CDs or newsprint, for example—with a digital alternative. During the past few decades, dematerialization has put a variety of industries in intensive care, and cloud computing, along with mobile and social technologies, has played a key role in this disruption.

The cloud lets consumers shop or use services from anywhere at any time. Customers love it because it saves them time and money by making it possible to shop from home. Companies prefer it because they can more easily update content, and their capital and operating costs are lower than with traditional IT. What's more, dematerialized assets don't involve physical stock and

thus have a better environmental profile. Research suggests that digital products, such as music and movies, are much less resource-intensive than the same content sold on CDs and DVDs—the carbon emissions from digital music are between 40 percent and 80 percent lower, for example.

Cloud computing also makes it easier to offer the customized products that customers want—instead of a CD, they get specific songs or playlists. This drives resource savings. For instance, a media company realized that by publishing one of its newsletters online instead of printing it, it could save nearly 135 tons of paper a year, along with 3.7 million liters of water, almost 270 barrels of oil and more than 550,000 kilowatt-hours of electricity. Putting the newsletter online would also reduce the amount of industrial waste the company generates by almost 14,000 kilograms.

Sharing the social revolution

Social media's value has grown far beyond its original purpose of helping people stay in touch. The technology is evolving into a fundamentally new approach to sharing. It helps companies gauge customer sentiment quickly and cost-effectively by piggybacking on existing networks like Facebook. These new sharing platforms help firms build trust among consumers; they also enable users to make their own transactions and logistics arrangements without involving third parties. In fact, most online marketplaces for used goods—think eBay—could not operate without this ability.

Firms can rely on sharing platforms to identify and connect with interested

user communities and gather ideas to strengthen the value propositions of their products. Social technologies also enable consumers to provide feedback, providing companies with a way to measure their ongoing competitive performance and offering an early warning system for problems that could affect customer experience.

One circular economy player connects people who need a car for short periods with vehicle owners who don't use their cars all the time. It provides insurance as part of the deal, and users and car owners can review each other via Facebook, making it possible to identify anyone who fails to meet community standards.

By the numbers: Applying big data analytics

Companies in the circular economy rely on product use, not sales, to generate revenues, and they grow their businesses by identifying and capitalizing on latent demand.

Accomplishing the latter can require major number-crunching horsepower, the kind that big data analytics offers. Circular business models that benefit from this capability include the circular supply chain, the sharing platform and product as a service. Manufacturers can use advanced analytics to gain insights into product use patterns and customer requirements, enabling them to bundle physical products with attractive add-on services. Creating models that predict consumer behavior based on historical data

can allow firms to optimize product maintenance schedules, reducing cost, labor and resource requirements.

One firm combines big data analytics with LEDs, networking and software to reduce customer lighting-related energy use by up to 90 percent. The approach analyzes the behavior and requirements of building occupants, providing optimal service and extending lighting lifecycles by activating systems only when required. Traditional analytics could handle most buildings, but airports and other large public facilities with multiple users require the increased quantitative power offered by big data analytics.

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The growth of the circular economy depends heavily on disruptive digital innovations, which is why many pioneering players either already have strong high-tech roots or are creating an ecosystem of partners with key technology capabilities. For others, competing with these fast-moving attackers can expose stress lines in formerly cohesive business models, compelling leaders to reassess their value propositions and explore new, more roundabout ways to create value and what we call Circular Advantage. ■

About the author

Peter Lacy is the Shanghai-based managing director in Accenture Strategy and leads Accenture's work globally on Circular Economy.