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How the circular economy can transform manufacturing

Enable and accelerate more sustainable global operations.

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Introduction

The circular economy, which is set to be the biggest revolution in the global economy in 250 years according to Accenture, is part of the ongoing narrative on industrial sustainability. Recent economic factors such as input cost rise and resource volatility have heavily influenced this shift towards a circular approach, but not all the reasons are reactive.

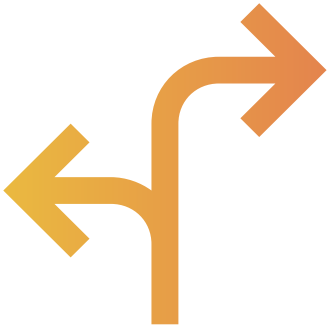
In a resource-constrained world, there is a noticeable trend of organisations opting into the circular economy model. For manufacturers, this shift involves a move away from the "take-make-dispose" process and a step towards increased responsibility over the total lifecycle of a product and its environmental impact. But to close the loop, manufacturers need to embrace change and learn to adapt their processes and products.

Manufacturers have immense potential to exploit the benefits of the circular economy. However, there's a lot of messaging around it, which may be baffling. You may already have waste management systems in place, but is this the same as being an active member of the circular economy? And, is the narrative on plastic and other materials recycling a worthwhile circular economy strategy helping the environment, or just a tactic forced on them by consumers?

This guide is written for manufacturers, distributors and wholesalers to help them unlock the opportunities available from the circular economy. The guide explains the current state of play and what is needed in the future and provides guidance on how to share the circular economy message with other leaders in your company.

A circular economy is where you design out waste and pollution by keeping products and materials in use for as long as possible and find ways to create new resources from what we discard.

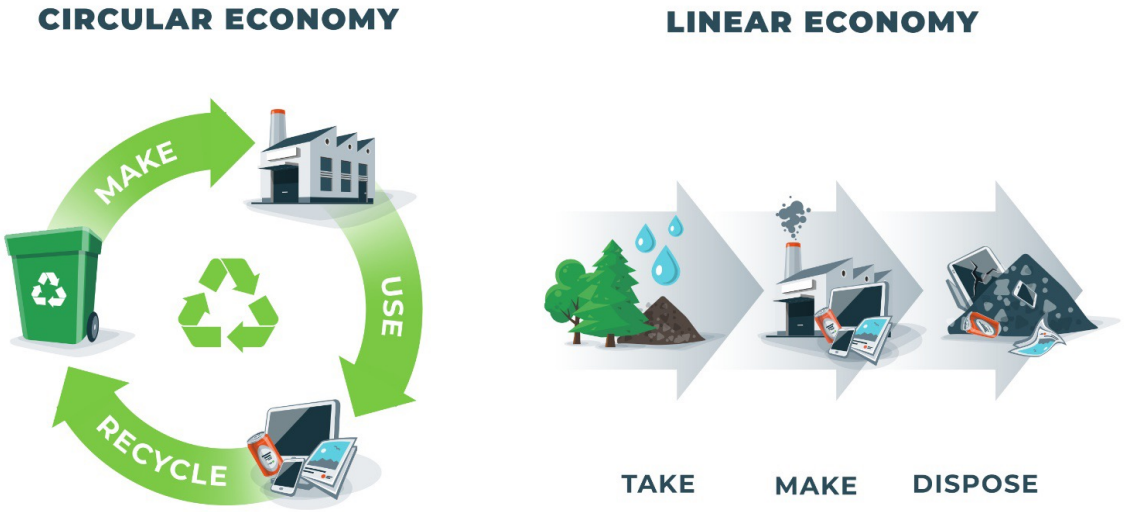
What is the circular economy?



A traditional linear economy is where you make, consume and throw away. Moving to a circular economy is all about creating a 'circle' where you design out waste and pollution by keeping products and materials in use for as long as possible and find ways to create new resources from what we discard.

The traditional linear economy creates waste through a model that flows as:
'Take, make, dispose of'.

The circular economy eliminates waste through a cyclical model:
'Make, use, recycle'.



Circular economy business models are likely to be more common in the future. By 2029, Gartner predicts the circular economy to be the only economy, replacing wasteful linear economies. The analyst claimed that this was due to consumer and shareholder preferences shifting towards sustainability.

"Organisations are under pressure to reduce the amount of waste they're producing – from consumers and governments alike," commented Steven Steutermann, Managing Vice President in Gartner's supply chain practice. "The solution to this challenge is a shift towards a circular, waste-free economy. The supply chain will play a key role in this process."

Benefits of the circular economy for manufacturers

According to the Ellen MacArthur Foundation, a charity that's working to accelerate the transition to a circular economy, the manufacturing industry could achieve from 10% to 15% cost savings on direct materials required for production by adopting circular economy strategies.

The circular economy can change the way manufacturers operate by 'designing out' waste in the design phase before a product is used.

The former director of sustainability at UK-based clothes and grocery retailer Marks and Spencer, Mike Barry, says in the circular economy documentary 'Closing the Loop', that there's still a lot of work to do:

> *"I think a lot of what people call circular today is just generally improved waste management. It's fundamentally thinking about producing something from the very beginning that can be circular, ensuring that the customer can see a real benefit from using it and having a practical interest in terms of reusing it and returning it to us. So, I think there's a challenge of genuinely satisfying customer needs. We cannot be satisfied until hundreds of thousands of companies, servicing hundreds of millions of customers, are doing circular".*

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So, how can manufacturers get out of a 'waste management' mindset and follow a 'circular economy' approach?

Instead of only thinking about the functionality and price of making products, manufacturers should think about the whole lifecycle of their products, maximising the usage of materials and cutting out waste.

Currently, many consumers still don't consider what happens to products after they've used them – it's assumed that at the point when it stops being useful, the product can be thrown out and replaced. Businesses design products to make manufacturing as easy as possible, which doesn't lead to sustainable use.

Discover new commercial opportunities

Refurbishment, remanufacturing and recycling

Refurbishing, remanufacturing and recycling can help manufacturers to compete at a lower price than their competitors without reducing quality. Industrial processing of used parts to bring them up to the same standard as new parts enable manufacturers to take advantage of cost savings.

Consider electronic equipment like smartphones and laptops. Manufacturers often offer refurbished equipment by simply collecting, fixing and installing new software in models for consumers that don't need or decide not to upgrade.

Global industrial brand management company Barloworld rebuilds and repairs Caterpillar industrial equipment in Russia and South Africa, providing their customers with remanufactured Caterpillar components. This service benefits the customer as Barloworld derives maximum value from their assets which mean profitability doesn't end with the life of a machine or component.

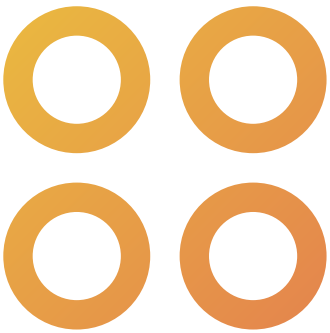
David Nienaber, Operations Manager at Barloworld, says, "Once the component arrives here, we disassemble it completely and inspect it. We determine what parts need to be replaced with new ones and which parts can be refurbished and reused. Parts then go through a process of cleaning, refurbishment and reassembly. After reassembly, the component will be tested and painted and then it's good to go back to the machine like new".

Nienaber continues; "Through remanufacturing, we can reduce the cost of doing business, because we can give customers components at a fraction of what it would cost to get a new one. When we remanufacture, it also reduces the load on raw materials, such as iron ore and steel, and what we can't reuse, we send it through for recycling. So, this is a process that replaces having to get new equipment every time something breaks, that's the essence of remanufacturing". Source: 'Closing the Loop'.

Rebuilding components can use 50-60% less energy and save up to 60% on the price of a new component.

Recycling

It's cost-efficient for manufacturers to recycle product components, ensuring that they reuse these in new products instead of using raw materials. The circular economy approach means manufacturers are finding smart ways to create products that are durable and subsequently recyclable while retaining profitability.



Who is embracing circularity?

BMW

BMW looks to combine waste prevention and high-quality recycling in one unified concept, working on solutions to make the processing of vehicle spare parts more resource-friendly. It's also devising guidelines for the recycling of materials that are no longer usable. This ensures optimal reusability – or for disposal, according to the method that is least damaging to the environment.

Daimler

Daimler, the owner of Mercedes Benz, addresses the circular economy in its production processes from the outset. Daimler analyses the entire product lifecycle and submits vehicles to an environmental balancing process depicting material flows and the carbon dioxide footprint from raw material extraction, usage, and recycling.

AstraZeneca

Pharmaceutical company AstraZeneca works with external specialists to take a holistic approach to address waste. It looks for waste in its end state and evaluates how it got there. It assesses initiatives that address waste produced in distinct ways – production, on-site with employees and disposal. AstraZeneca prioritises waste prevention and works to change its processes to reduce the volume of waste it generates.

Craemer

Telford UK-based Craemer, a leading refuse bin manufacturer, demonstrated internal circularity when it minced up the plastic from a Manchester council's wheelie bins and reused it to create newly-designed bins, giving their product an extra 10-15 years of life.

Carradice

Rather than using the internal circular model, Blackburn UK -based luxury bag manufacturer, Carradice, became circular almost by accident when it repurposed a stash of old lorry tarpaulins destined for landfill and turned them into bags. Within 18 months, 'Upso cycling bags' launched, with a new customer base. Canvas costs for the regular range were increasing so it was a logical, money-savvy business decision, and this small enterprise had the agility to convert the opportunity.

Aquapak

Birmingham UK-based Aquapak is tackling some of the challenges of circularity head-on by taking an innovative approach to the complicated issue of plastic recycling. The company uses a polymer called polyvinyl alcohol (PVOH) which, unlike most plastics, goes straight down the drain and biodegrades safely. The company takes PVOH and turns it into a processable pellet called Hydropol, which can be used to make all manner of things recyclable, especially packaging, as part of a circular business model.

How can manufacturers design products with the circular economy in mind?

Nick Oettinger is the managing director and founder of the Furniture Recycling Group, founded in 2012. They work with leading hotel chains and retailers, recycling more than 1.5 million mattresses since its launch.

Initially focusing on recycling, the company strove to take a problematic waste stream out of the landfill and recycle it into its parts. Now the business also focuses on circular economy principles as it looks to reuse rather than waste the material used in mattresses. In essence, this is a challenging task as currently, mattresses are made from low-grade materials that can be split into up to 19 different material types such as steel, foam, cotton, or polyester.

From a circular economy perspective, a process of proper deconstruction makes sense, because the environmental benefits and the materials that can be salvaged have financial value.

Oettinger says, "Inside mattresses are things called shoddy, mixed and blended fibres. And you can't quite tell what goes into them – this is where we were getting frustrated. We needed a circular economy way of thinking from them. If you don't know what a product like mixed fibres has in terms of components, how do you stand the chance of recycling it?"

Oettinger continued, "We started banging on the doors of manufacturers and the mattress supply chain to ask, what's the stuff in these mattresses? And they couldn't tell us."

"So, something that we're working very hard with manufacturers and retailers on is identifying the materials that are being put into mattresses so that we can make the best use of them when they come to the end of their useful life as a mattress."

Oettinger says, "Manufacturers need to think about product lifecycles and design products to take account of circular economy principles. In particular, it is essential to design products that have value at the end of their useful life in terms of a commodity."

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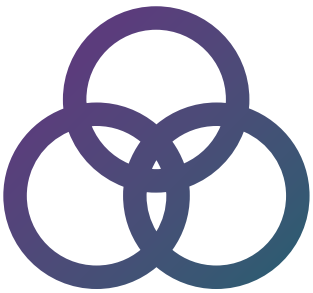
Different circular economy business models



Leasing

Leasing is a contractual arrangement that calls for the user of an asset to pay its owner for its use. Often, we talk about property, buildings, and vehicles in this sense, but industrial equipment is also leased. The tyre company Michelin, for example, offers durable tyres that are rentable. Leasing agreements require manufacturers to maintain responsibility for sustainable products after they are sold, but also when they come back in.

Services based on performance

This business model retains ownership of a product and provides a service based on its performance outputs, such as data on availability, maintainability, efficiency, and reliability (which the Internet of Things (IoT) could measure). An example could be a washing machine – instead of the customer needing to own the washing machine, they would pay for the benefits that come from using it (i.e., the act of washing clothes).

Incentivised return

A business offers an incentive (usually financial) for the return of used products, such as electrical or electronic equipment. These products could then be refurbished and re-sold.

Asset management

Maximise the life of products and minimise the need for new purchases by tracking your assets, allowing you to decide what can be reused, repaired, or redeployed. You could reuse your assets as part of an asset-sharing platform, where you contact other firms to share assets you can't justify the expense of buying.

Collaborative consumption

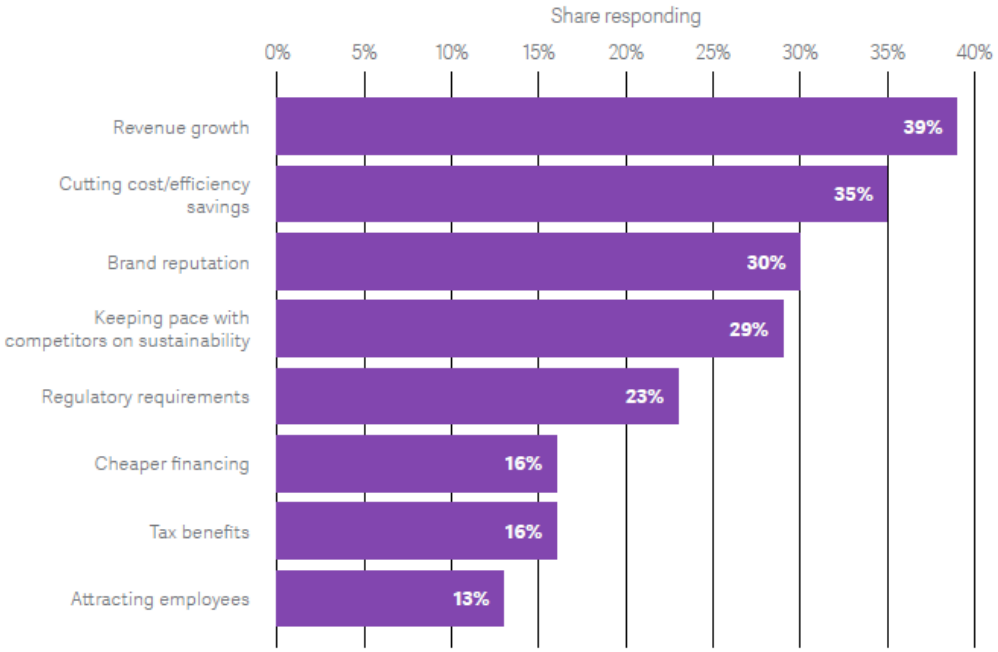
The rental or sharing of products between members of the public or businesses, often through peer-to-peer networks, is a way to reduce waste. One example is car-sharing services available for people who don't need to spend money on a car.

How the circular economy contributes to business growth and sustainability

Other than the benefits to the environment, other factors that drive the adoption of circular economy practices include the ability to increase revenues and reduce costs. Other catalysts are more energy-efficient practices and advances in productivity, efficiency and resilience. There is also the brand credibility element, where manufacturers feel that being greener improves their brand image.

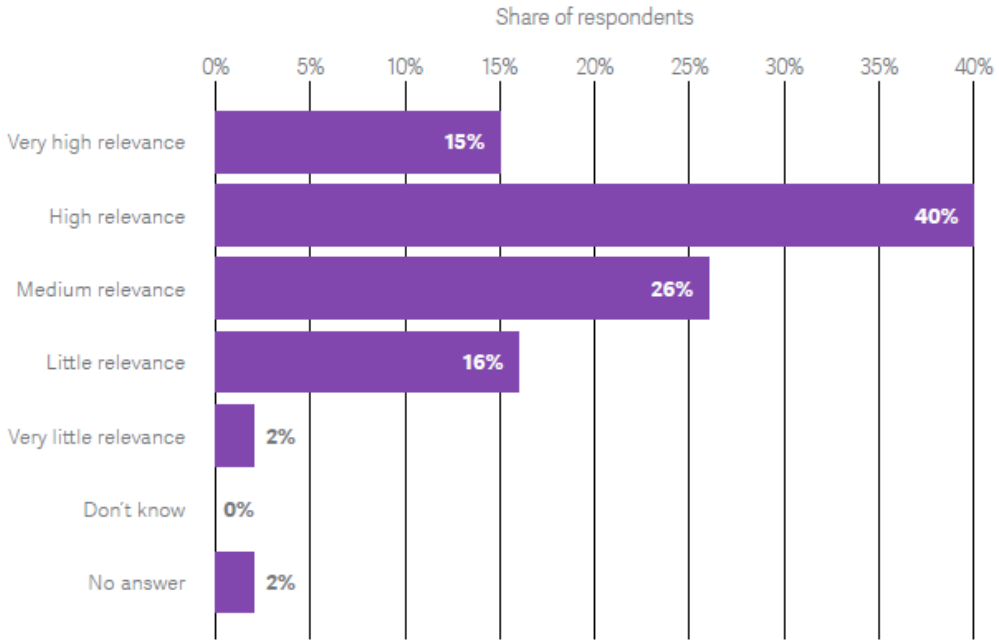
Most important factors for corporate sustainability among finance executives in the United States as of 2018.

The below research by Statista contains figures from the Chartered Institute of Logistics and Transport. 55% of respondents who worked in logistics for at least two years felt that sustainability has a high or very relevant external influence on their company.



Source: Statista

How do you rate the relevance of sustainability as an external influence for your company?



Source: Statista

Mitigate the risk of resource shortages

By reducing the materials needed for production, manufacturers can reduce exposure to rising and volatile resource prices – such as costs related to fossil fuels and metals. Businesses can gain new efficiencies by driving down waste in the manufacturing supply chain and customer sites. There are also significant cost savings to be made from adopting more environmentally friendly practices, which is why global manufacturers are willing to pay the change price.

Using ERP as the heart of a circular economy model

An Enterprise Resource Management (ERP) system has several tools within the manufacturing and distribution areas of the software that supports circularity and can help manufacturers improve their circularity implementation.

Below are some examples of the capabilities in an ERP that support a circular system:

Bill of Materials (BOM), and engineering change control

By ensuring the accuracy of the BOM, waste is reduced, and replenishment is aimed at Just-In-Time (JIT), which reduces unnecessary loads on the system.

Manufacturers looking to incorporate recycled material in their production process without compromising the final product should be continually checking their BOM. An ERP ensures you have full control of the quantity, quality and cost of the materials, and control of the hierarchy of the resources, items and parts that comprise your product. Information from the BOM can help companies trace and report on the percentage of recycled materials that make up the final product sold to customers.

At the design level, engineering change control allows you to plan and check the items that constitute a product during the development phase and how best to incorporate pre-used parts, or what recycled material can be used in a recipe.

If an ingredient or component is found to be defective i.e., the recycled material impacts product quality, a capability like a 'where-used' search can be used to identify all the parts or products that might be affected and quickly mitigate any risk or further waste.

Material Requirements Planning (MRP) or kitting

No manufacturers want to hold stock that is not going to be used soon and that can be avoided by using MRP and the kitting functionality. MRP and kitting, ensure what is needed for the production process by placing orders for the right items and quantities, to be delivered and available in stock just in time before production starts. MRP also provides you with accurate Just-in-time base material replenishment.

Inventory management

Excess stock is one waste companies can avoid, but if the stock has an expiry date, or is temperature sensitive, you want to make sure the items are used in time or don't get ruined. An inventory management system that logs and tracks these criteria, through accurate stock control and integration with IoT and sensors, provides the assurance that items are stored in the required conditions and consumed before expiring.

Co-products and by-products

Managing co-products and by-products results in less waste, better machine utilisation and allows greater opportunity to reuse materials in the production process. Businesses can also generate extra revenue by creating demand for by-products that are not used, into products that can be sold to other organisations that can use them.

Supply Chain Management (SCM)

If you have a web platform that enables online transactions with suppliers, you can improve your collaboration with them in many different areas. For example, if design or production teams change a BOM to include recycled material, the change of requirements is easily passed on to suppliers, and the new orders are delivered to include updated requirements. With an automated Request for Quote capability, you can easily invite existing and new suppliers to include reused or recycled items in their tenders.

Sales and purchase returns

Most companies think of sales returns as something to avoid as they indicate customer dissatisfaction, but in the circular economy efficient and easy-to-process sales returns will allow customers to return products that have been finished with and that can be recycled. Likewise, it should be straightforward to return products to suppliers for recycling and processing.

Disassembly

Having a straightforward ERP function to disassemble a product that has been returned into its component parts ready for re-manufacture can greatly reduce the overhead of the manufacturing process.

Transforming your business for the circular economy

Such is the increasing profile of the circular economy that last year the European Commission (EC) launched a circular economy action plan to embed the principles into manufacturing. As a result, the EC's Sustainable Product Policy Framework proposal, part of the European Green Deal, will empower consumers and encourage manufacturers to deliver on circularity. It claims that the EU's 2050 climate targets cannot be achieved without fully transitioning.

Achieving a circular economy is possible, but it comes with a list of challenges, the first being awareness. Unlike many other sectors, manufacturers cannot ignore resource scarcity. Some are already acting, appreciating that raw material is critical to producing goods. To make the most of the circular economy, manufacturers can take steps to transition to a circular economy as detailed below.

1. Create a solid business case for a circular economy

Reducing your organisation's carbon footprint is a worthy goal. However, if you want your circular economy implementation to be seen as a priority, you'll have to show the board some solid numbers. Just like any type of organisational change, enthusiastic buy-in will make all the difference in getting everyone else on board. Your business case is the first step in achieving this.

2. Starting small

The key to success here is to embed manageable chunks of change into your organisation's routine. For example, start with setting up a refurbishment programme to repair and resell second-hand products. Once you've trained your staff, successfully launched the programme and are starting to get good feedback from customers, move on to the next phase.

No action is too small. Even if your first step is as simple as making all your packaging recyclable, it's a solid start and a contributing factor to the circular economy.

3. Keep everyone in the loop

Implementing a circular economy is a transformation that will affect every single department of your organisation, so make sure everyone's on the same page and ready to work with you. The perfect circular economy implementation team will vary from organisation to organisation, but your basic list of internal stakeholders should include:

Supply chain and logistics: If you're moving to a buy-return-service-send model, you'll need to make sure your supply chain is geared to this before making the switch.

Procurement: How you source your materials and parts may need to change if you're looking for less wasteful alternatives.

Sales and marketing: You're moving away from the assumption that after a certain period, a product will become obsolete and your customers will need to buy a new one. This may not fit with your current sales cycle or campaign strategy, so you'll need to allow time to adjust.

Manufacturing/shop floor: How you process orders will change when you implement a circular economy. Your factory floor will need to figure out how they can make this switch while fulfilling demand on schedule.

Finance: A circular economy changes how and when the company generates income.

IT: Will there need to be any software purchases or infrastructure changes? Getting your IT experts involved at an early stage will help prevent issues further down the line.

Engineering/product design: So much of a successful circular economy is in how your products are designed. Your engineers or product design team are your number one ally here.

4. Ensure your supply chain can manage a circular system

As a manufacturer, you may focus on your logistics activity such as 'parts and raw materials in, complete products out'. However, if you want to incorporate remanufacturing, leasing, asset management and incentivised return into your business model, this means that your products will move back through the supply chain for reuse or repair.

If everything runs smoothly for your customers, they'll keep coming back; if things are lost, damaged, or delayed, it will be harder to persuade them to return and you may lose them to competitors.

This means a reliable, watertight supply chain should be a top priority when implementing a circular economy. Before you launch any new services, answering the below key questions should be a good guide:

1. What movement of goods will these new services require?
2. Do I have enough driver capacity to deliver the service as promised?
3. Will demand these services increase over time, and how do should I plan to match that?
4. What sort of training do our drivers and supply chain operators need to receive to get used to new ways of working?

5. Do your current systems embrace a circular economy model?

Attempting to implement a circular economy with a legacy IT structure will not give you the results you want. It, therefore, may be a good idea to conduct a thorough review of your current IT systems.

Your workforce will need to make fundamental changes to how they work when you implement a circular economy. Consider an ERP system that can deal with the demand that implementing a new host of services would generate and provide the level of functionality you would need for a circular economy to be feasible.

6. Share the changes you are making with external stakeholders

A circular economy model generates extra revenue and can help you reduce costs. However, another advantage is that it attracts environmentally conscious consumers.

More and more companies are adopting recyclable plastic packaging for online deliveries. However, the circular economy has not moved into the mass adoption phase yet. So, if you choose to implement a circular economy, you are ahead of the curve. It's a major selling point for you, so make it central to the public perception of who you are and what you do as an organisation.

Conclusion

It's important to remember, that reducing our harmful environmental impact doesn't necessarily mean a loss of profits, but rather a restructuring of our business vision and goals to incorporate the principles of a circular economy.

For manufacturers, a move to the circular economy should include research into understanding flexible remanufacturing or how reverse logistics can be harnessed to increase productivity and active disassembly for efficient material recovery.

The need for investment in a circular economy requires prioritising long-term goals. Overcoming knowledge and cost barriers can open the doors for manufacturing, to achieve a more innovative and sustainable future - one that is developed to suit the future low-carbon, low-waste economy.

About Inixion

At Inixion, we don't just implement ERP systems, we deliver success.

Founded in 2006, Inixion is a trusted Sage ERP partner with a 100% implementation success rate and a reputation for delivering long-term value. We specialise in Sage X3 for manufacturers and distributors across the UK and USA, and Sage Intacct for professional and business services companies in the UK.

What sets us apart? Many of our consultants have worked in the industries we serve. That means we bring real-world understanding to every project, combining deep product expertise with genuine business insight.

Above all, we believe in building mutual value. Our approach is collaborative, transparent, and outcomes-driven. Whether you're scaling, streamlining, or modernising, we're with you every step of the way.

Zero failed projects. Proven results. Trusted by industry.

Speak to our team today: enquiries@inixion.com

Support resources

2-hour free demo and briefing

Our free demo and briefing will highlight the key functionality available in Sage X3 and demonstrate the areas relevant to your organisation.

Book your demo here.

Distribution without disruption guide

Our guide is written for distributors looking to find ways to build resilience into their operations and for those who want to better control inventory across their supply chain.

Download your guide here.

Reimagining Manufacturing guide

Discover the opportunities available for the manufacturing industry to grow, adapt and evolve to address the changing needs of its customers and discover how to build a digital manufacturing operation.

Download your guide here.

ERP selection checklist

Our comprehensive ERP selection checklist highlights three critical categories and has been created to help guide you in selecting the right ERP system with the right functionality to give you a head start during your ERP selection due diligence.

Access your checklist here.

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