

Managing lifecycle value

How digitalisation makes circularity
visible and manageable

**WHITE
PAPER**



Based on 50 examples from the Dutch manufacturing industry



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CIRCULAIRE MAAKINDUSTRIE

Executive summary

Where real value is created

The Dutch manufacturing industry is at a tipping point. Raw materials are becoming scarcer, margins are under pressure and supply chains are less predictable. At the same time, customers expect more: higher availability, less downtime and a longer service life. In this context, the focus is shifting from producing more to making better use of what is already there. This picture emerges from fifty practical examples in the Dutch manufacturing industry.

In practice, most value is not created during production, but afterwards. In the use phase. Machines run, parts wear out and service determines whether value is retained or lost. Yet this is precisely where companies still manage only to a limited extent. Many companies react to problems instead of preventing them. As a result, the greatest losses do not occur inside companies, but in the way products are used and maintained.

From reacting to managing

Companies that break this pattern do not start with circularity as a goal, but with a specific problem. Downtime, rising costs or parts that are unavailable. Starting from that problem, they bring data together, make use visible and gain control over what is happening. This changes the way they work: from reacting to managing, from replacing to retaining and from isolated optimisations to a coherent whole.

Digitalisation plays a key role in this, not as an end in itself, but as a means to create insight and enable better decisions. Circularity is not an end in itself here, but the result of better value-based management. Companies that start working in this way use nine concrete levers across making, using and reusing, supplemented by two connecting levers that enable management across the entire lifecycle.

Where to start creating value tomorrow

The strength lies not in one lever, but in the coherence between them. Companies rarely start with design and rarely end with reuse, but start where the pressure is. Often in use. Those who connect the steps begin to manage differently: not by department or process, but by the whole. That is where control, predictability and long-term earning potential emerge.

The greatest gain lies not in new technology or new products, but in making better use of what is already there. Circularity is not an additional task, but the result of better management of business value. Start with one product, one installation or one recurring problem. Make visible what is happening and manage accordingly.

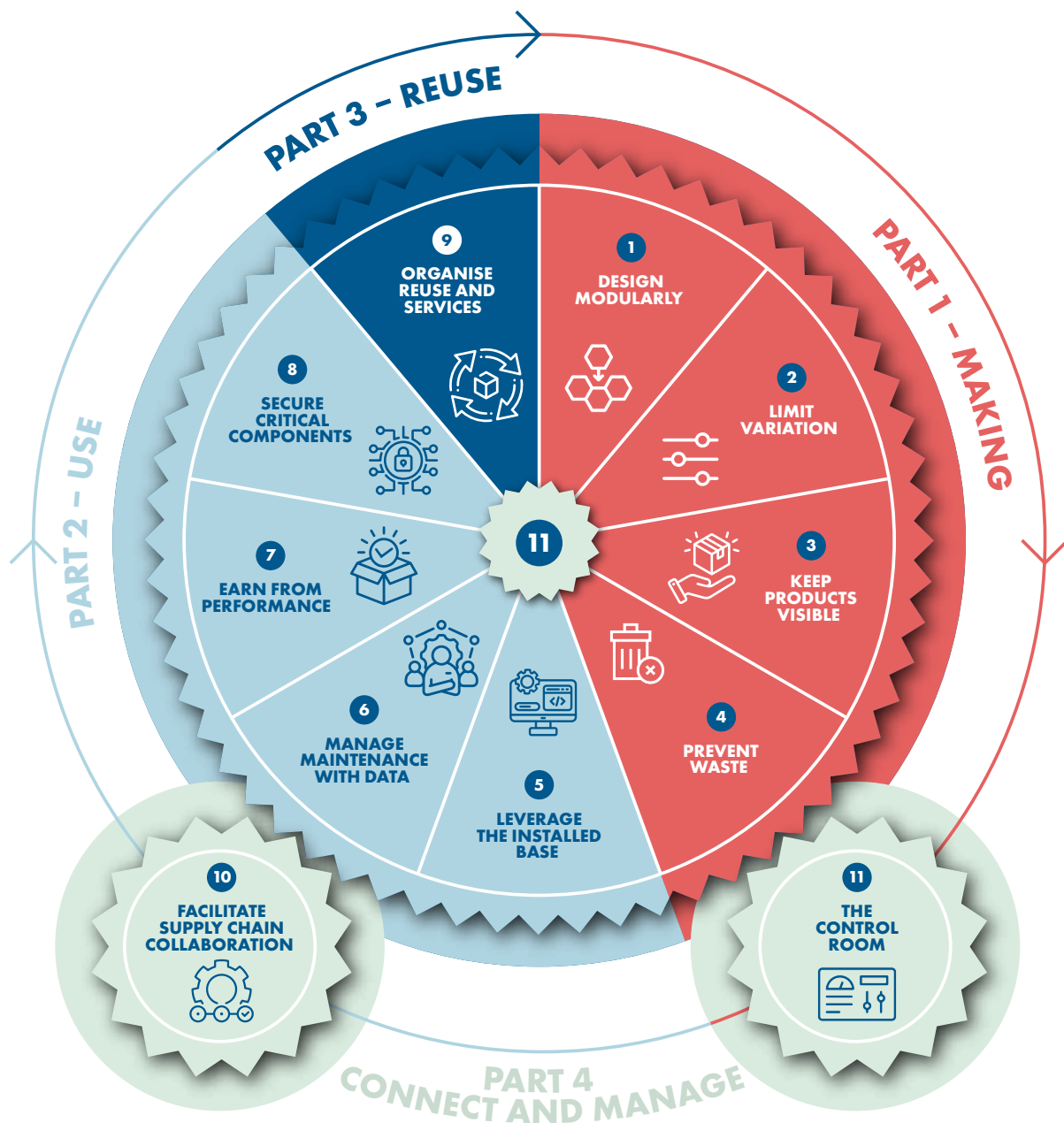
The value is already there. The question is whether you can see it and manage it.

“THE GREATEST VALUE LIES NOT IN WHAT YOU STILL HAVE TO MAKE, BUT IN WHAT YOU ALREADY HAVE.”

Managing value across the entire lifecycle.

11 levers to get more value from what is already there.

- 9 levers for making, using and reusing.
 - 2 connecting levers that bring everything together and make management possible.
- Together, they form a single whole for control, predictability and long-term value.



How it works

The first nine levers focus directly on making, using and reusing. The final two levers connect these steps and make integrated management across the entire lifecycle possible. Not linearly, but simultaneously. Companies start where the pressure is. Real value emerges when everything comes together. It is not about optimising each step separately, but about managing the whole. That is where control, predictability and long-term earning potential emerge.

Why this initiative?

Value is under pressure

The Dutch manufacturing industry is at a tipping point. Raw materials are becoming scarcer, margins are evaporating, supply chains are becoming more vulnerable and customers expect both certainty and sustainability. At the same time, digitalisation and automation offer new opportunities to produce more intelligently. Data, sensors and AI reveal where value is being lost and how it can be retained. The challenge is to harness that digital power for an economy that is not about more, but about smarter: using fewer materials and creating more value.

DACE

That is why DACE was launched: Digitalisation and Automation for a Circular Economy, an initiative of the Ministry of Economic Affairs and Climate Policy, Klikopmorgen.nl and BOOST. In policy and innovation programmes, there is often reference to the R-ladder and the Z-goals: Zero Harm, Zero Waste, Zero Emissions and Zero Loss. In day-to-day practice, entrepreneurs use different words: material reduction, refurbishment, predictive maintenance, security of supply and service contracts. Based on discussions with fifty companies, this white paper shows that these are not separate worlds. They are two languages for the same movement towards a resilient, digital and circular manufacturing industry.

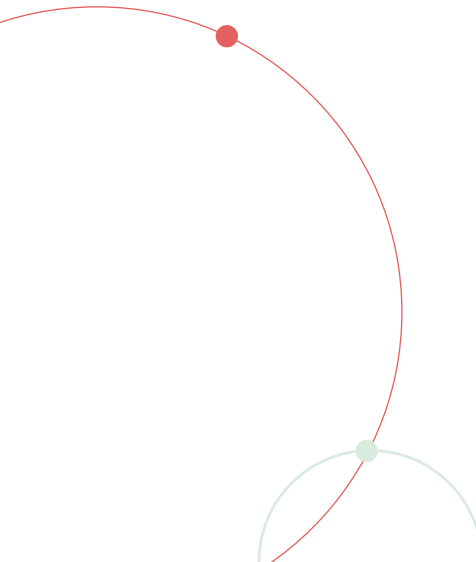
The value is already there

In this exploration, we look at circularity in the manufacturing industry across the full product lifecycle: from design to use and reuse. Not as separate steps, but as one coherent whole in which every phase offers opportunities to retain and create value. What stands out in practice is that this value is often already present, but not yet visible or organised. By looking differently at what is already there: products in use, parts in circulation and materials in the supply chain, space is created to better manage performance, availability and reuse.

Managing lifecycle value

The economic perspective is central to this. In practice, circularity only becomes scalable when it contributes to companies' earning potential. Digitalisation makes this possible. By connecting data on raw materials, components and products, it becomes visible where value is created and where it is lost. This perspective is not a side issue, but the driving force behind change. Circularity follows naturally from this, because better management of value leads to less loss and better use of what is already there. In this way, circularity is not an additional task, but a logical part of managing for continuity, return and certainty.

**The greatest value
lies in what you
already have and
how you manage it.**



PART 1 MAKING

Design as the basis for future earning potential

What you define in the design phase determines what remains possible later. Design choices determine how a product can be used, maintained and reused. They also determine how dependent you are on materials, components and suppliers. This is where the basis is laid for supply security, lifespan and value over time. Digitalisation makes it possible to make those choices better. Products can be designed, tested and adapted in a modular way before they are built. Design is therefore no longer just about price and functionality, but about availability, predictability and retaining value across the entire lifecycle. Circularity arises here not as a goal, but as a consequence of design choices that retain value over time.



DESIGN MODULARLY

1

“Those who design for production have to solve problems later. Those who design for use can manage and retain value.”

Why design locks you in later

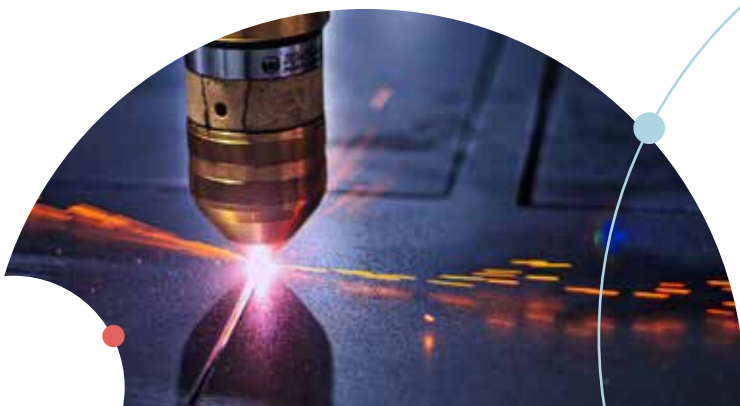
In many manufacturing companies, design is driven by manufacturability, cost and lead time. Logical, because that is where the pressure lies. But design choices determine what remains possible afterwards. Components are permanently integrated, connections are made permanent and products are built without taking maintenance, replacement or reuse into account. That seems efficient at the front end, but causes problems in use. Components are difficult to access, repairs take time and reuse is often not possible. Many problems that arise later are already locked into the design. Design also determines your security of supply. Anyone working with unique components or specific suppliers builds in dependency. As long as everything is available, that does not seem to be a problem. But as soon as something becomes scarce, risk arises immediately. Anything you cannot replace, exchange or remove leads to downtime. You see that companies are increasingly managing for use, maintenance and performance. Data is collected and service is organised, but this often gets stuck at the design stage. Components cannot be removed and product information is missing or fragmented. As a result, you cannot act on what you can see.

From designing for production to designing for availability

Companies that take this step design not only for production, but for use and availability. They make products modular, with components that can be removed, replaced and reused. This creates flexibility: what breaks can be replaced in a targeted way, and alternatives are available for scarce components. By working with standard components and interchangeable modules, dependency decreases. Security of supply shifts from dependency to choice. At the same time, product data and configurations provide insight into use and performance, and changes made over time remain visible. This allows you to better manage maintenance, upgrades and reuse, and to determine what is needed and when.

Where you can make a difference tomorrow

The impact is immediate. Maintenance becomes faster and cheaper, repairs become more targeted and reuse becomes practically feasible. At the same time, you gain more control over availability: less dependency on specific parts and suppliers, and more room for alternatives. Stock levels fall because fewer variants are needed. It does, however, require design, service and operations to work more closely together. Ask yourself: why does this part break, can it be removed, and is there an alternative? There is almost always immediate value to be gained there.



**WHAT YOU DESIGN
WELL, YOU CAN MANAGE
AND RETAIN. WHAT YOU
LOCK IN PLACE, YOU
HAVE TO REPLACE.**

BEST PRACTICE

GEA Food Solutions extends service life with service, design and data

(WEERT, LIMBURG)

From use to value creation

GEA Food Solutions Weert develops and builds vertical packaging machines and lollipop machines for the global food industry. The machines are designed for high speeds, reliability and a long service life, and run in production at customers for up to twenty-five years. Circularity therefore lies mainly in the use phase. Service, spare parts, tooling and modifications are a structural part of value creation. Machines continue to adapt to new product developments, different packaging and changing production requirements.

A realistic approach to end of life

At the same time, there is a realistic view of the concept of 'end of life'. Due to high hygiene requirements and rapid technological development, full take-back and rebuilding is often not logical. In some cases, end of life also really means end of life, particularly for machines located outside Europe. The real strength lies in learning from use. Through service questions and wear patterns, it becomes visible what is happening in the field. GEA uses that knowledge to make new machines more robust, more accessible and more adaptable.

Connecting data and design

Data is becoming increasingly important in this. Not as a goal in itself, but to make maintenance more predictable and prevent downtime. Planned maintenance is always more efficient than ad hoc intervention. The same balance is sought in design: not necessarily building lighter, but modular, accessible and focused on a long service life. In this way, the value of machines is preserved over time.



LIMIT VARIATION

2

“Every variant you add costs you money.”

Why variation costs you money without you realising it

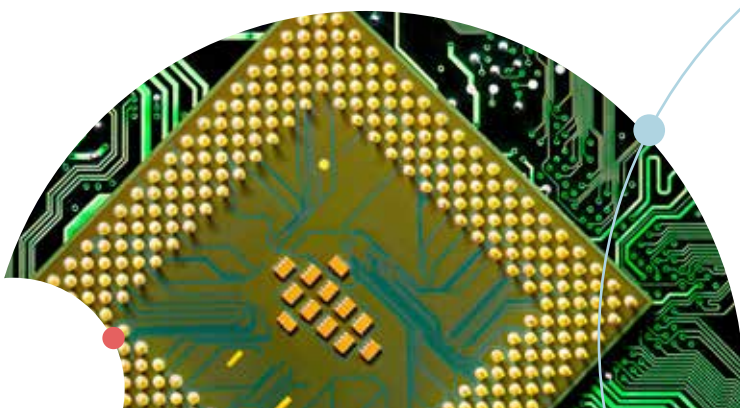
In many manufacturing companies, variation grows step by step. Customer requests, exceptions, new versions and minor adjustments accumulate into a wide range of variants, parts and configurations. This may seem flexible and customer-focused, but in practice it brings complexity. Stock levels rise, errors increase, knowledge becomes fragmented, dependence on specific suppliers grows, and with every adjustment, profit margins evaporate further. Minor differences in parts and modules make maintenance more difficult, reuse harder and scaling up almost impossible. What seems like customisation today becomes complexity tomorrow. A great deal of variation seems necessary, until you see how much it costs. Every additional variant requires stock, knowledge and coordination, and this is reflected in costs, errors and delays.

From customisation to manageable simplicity

Companies that take this step take a critical look at their variation. Not everything that is possible is necessary. They introduce structure by working with standard components, modules and fixed configurations. Customisation remains possible, but is built from a limited number of building blocks. This creates clarity. Components become interchangeable, processes become repeatable and errors decrease. What was once complex becomes manageable. Much customisation adds no customer value, but creates internal complexity. This changes the way of working. Digitalisation helps to organise this. Product data, configurations and coding make it possible to manage variants and steer choices. This allows you to remain flexible without losing control.

Where you can create simplicity tomorrow

The impact is immediate. Less variation means less stock, fewer errors and less dependence on specific suppliers. Maintenance becomes simpler because parts are recognisable and interchangeable. Reuse and refurbishment become easier because components are not unique. At the same time, scale is created. Solutions can be applied more often and improvements implemented more quickly. Circularity follows naturally: less waste, better use of parts and more opportunities for reuse. It does, however, require companies to dare to make choices and not to keep trying to solve everything for everyone. Start tomorrow with a single product line: place all variants and components used side by side and see which differences are truly necessary. Often, it turns out that a large proportion adds little value but costs a great deal. Companies that do this quickly see where standardisation immediately creates room and control.



THOSE WHO LIMIT VARIATION GAIN CONTROL. THOSE WHO KEEP EVERYTHING UNIQUE LOSE CONTROL.

BEST PRACTICE

TechNikkels connects machine building, automation and data

(HOLTEN, OVERIJSEL)

From machine to system

TechNikkels develops and builds machines for product handling and packaging solutions, where the real value lies not only in the machine that is delivered, but in how that machine continues to perform in practice. Machines often run for years at customers and must remain reliable, flexible and adaptable in an environment that is constantly changing. This requires a different way of looking: not only at technology, but at the whole of control, software, data and service across the full lifecycle.

Automation and digitalisation as a foundation

Automation plays a central role in this. Together with technology partners, the company ensures that machines not only move, but also 'understand' what they are doing. Control, drive technology and software form the foundation on which further development is built. As a result, processes can be made more stable, adapted more quickly and better supported remotely. Digitalisation does not arise from dashboards afterwards, but from the machine itself, as an integral part of the process. In practice, this combination of machine building and digitalisation directly contributes to circularity and raw material use. Through better insight into use, performance and wear, machines can remain in operation for longer and be adapted or upgraded in a more targeted way. Parts are not replaced because they have to be, but because data shows that it is necessary. This shifts the focus from replacement to improvement and continuously creates new value from the installed base.

Standardisation and continuous improvement

TechNikkels' strategy is aimed at structurally strengthening this development. Investments are being made in standardisation and modular design, so that machines remain easier to adapt and maintain. Service is becoming increasingly important in this context: not as a side issue, but as an integral part of the proposition. By monitoring machines and customer projects more closely, continuity and efficiency can be safeguarded and changes in practice can be responded to more quickly. At the same time, innovation is given a clear place within the company. New technology should not stand alone, but be directly applicable in machines and for customers. This creates a learning system in which design, use and improvement are continuously connected. Digitalisation, automation and circularity come together in this as one logical whole. For TechNikkels, digitalisation is a way to make machines perform better, maintain their value for longer and structurally support customers. In this way, a machine fleet is built step by step that not only works today, but also continues to deliver value tomorrow and the day after.



KEEP PRODUCTS VISIBLE

3

“What you cannot track, you lose.”

Why the unknown means loss

In many companies, information about products and parts disappears as soon as they leave the premises or enter the next stage in the supply chain. It is unclear where something is located, what condition it is in and what its history is. This makes it difficult to carry out targeted maintenance, reuse parts or recover value from what has already been produced. Many parts disappear from view and, with them, from your revenue model. In several companies, the realisation only comes when parts are needed again but can no longer be found or traced. What you cannot track, you lose, and what you have lost, you have to buy again.

From isolated records to complete visibility

In these companies, products, parts and materials remain identifiable and traceable throughout their entire lifecycle. They record where something is located, how it has been used and what condition it is in. This can start with simple identification and registration, but grows into a system in which information is linked to the physical product. The result is a continuous picture rather than isolated snapshots. What was once a black box becomes visible. This changes the way of working. Maintenance becomes more targeted, reuse becomes possible and decisions are better informed. Digitalisation makes this practically feasible. Unique identification, registrations and links between systems ensure that data is not lost, but moves with the product. In practice, this grows into a digital product passport (DPP), in which information on use, maintenance and modifications is recorded over time. Not only as a requirement, but as a way to maintain control over the condition and residual value of products and components.

Where you can find value tomorrow

The value lies in making better use of what is already there. Maintenance becomes more efficient because the condition of a part is known; reuse becomes possible because parts are identifiable and reliable; and residual value can be realised because it is clear what is still usable. At the same time, dependence on new parts decreases and operations become more predictable. Circularity follows directly: materials remain in use for longer and lose their value less quickly. Building this information foundation requires discipline in recording and using data and in connecting systems. Start with a single product or component. Give it a unique identifier and record where it is, what happens to it and what condition it is in. This information is often already partly available, but not yet linked. Make sure this takes place in a structured and automated way in internal processes. Companies that start doing this quickly gain control over their own products and discover how much value remains in them.



WHAT YOU CANNOT TRACK, YOU HAVE TO REPLACE, AND THAT COSTS YOU EVERY TIME.

BEST PRACTICE

Edumar creates flow and circularity with digital control

(SOMEREN, NORTH BRABANT)

From machining to process flow

Edumar is a metalworking company that turns and mills complex components for high-tech and industrial customers. The company continuously looks at how it can work smarter, not only in the machine but throughout the entire process and in collaboration with customers. Digitalisation helps to create flow, because every delay directly costs value. On the shop floor, the company is working step by step towards a digitally controlled process. Planning and drawings are digitally available at each workstation and quality assurance is integrated into the process. Critical dimensions are recorded during production, not only at the end. This creates calm, predictability and fewer errors in production.

Collaborating and designing with customers

The same way of thinking is applied upstream towards customers. By contributing ideas at an early stage about material choice, tolerances and manufacturability, Edumar helps customers to design more efficiently, with fewer operations, less waste and a longer product lifespan. With data, better insight is created into material use, stock and sawing loss, enabling more targeted purchasing and preventing unnecessary stock.

Data as the basis for circularity

At Edumar, circularity lies in these kinds of concrete choices. By keeping material flows clean, pressing swarf and consciously choosing European origin, value is retained in the chain. In this way, digitalisation is not a goal in itself, but a practical means of working more efficiently, reliably and circularly together with customers.



PREVENT WASTE

4

“What you don’t see, you lose every single day.”

Why loss occurs while everything seems to be running normally

In many manufacturing companies, the process appears to be under control. Products are made, orders are delivered and machines are running. Yet this is precisely where a large part of the loss occurs. Rejects, production errors, cutting waste and small faults do not occur incidentally, but recur every day. These are things everyone recognises: parts that have to be made again, material that is thrown away and operations that do not go right first time. Because this is spread across machines, operators and process steps, and is often solved immediately, it remains under the radar. It lies in small deviations that keep recurring. A setting that is just slightly off, an operation that deviates slightly or a correction that is not recorded. As long as this is not made visible, it remains part of how the process runs.

From running to understanding and targeted improvement

Here, the process is made visible while it is running. Not afterwards, but during execution. Information from machines, production and quality is brought together to gain insight into where material is lost, where errors occur and where work has to be done again. What was once a feeling becomes fact. And what becomes fact can be improved. This is where digitalisation makes the difference. Machines report what is happening, systems record where deviations occur and processes are monitored instead of assumed. In many companies, systems and machines increasingly signal deviations themselves, allowing errors to be corrected earlier. They are not repeated unnecessarily. As a result, the focus shifts from solving to preventing. Small deviations often turn out to be structural and therefore addressed. What was once accepted becomes a concrete control variable.

Where you can prevent loss tomorrow

The first gain lies in making visible what is already happening. In many companies, the information is already there, but scattered across machines, systems and people’s experience. Bringing this together provides immediate insight into where loss occurs and what it costs. Companies that start doing this see results quickly: less material loss, less rework and more stable processes, without the need for major investments. What you prevent here does not have to be repaired later. Circularity therefore does not start with reuse, but with preventing loss.



**IF YOU DON'T SEE
WASTE, YOU KEEP
PRODUCING IT.**

BEST PRACTICE

Falco maximises material use and prevents waste in production

(VRIEZENVEEN, OVERIJSEL)

From material to process control

Falco produces street furniture, shelters and bicycle parking systems with a clear focus on service life and material use, with material use and process control at the centre. In the factory, circular thinking and digital precision come together. The company actively manages how materials, design and process influence one another. By designing and producing in-house, control is created over every step in the process and it becomes visible where waste occurs and where it can be prevented.

Digital precision prevents loss and errors

In production, data, automation and craftsmanship are combined to work smarter and more resource-efficiently. With advanced tube lasers, robots and nesting software, material is used optimally and cutting waste is minimised. Data helps to substantiate choices and continuously improve processes. Deviations, errors and inefficiencies become visible more quickly and can be corrected immediately. This creates a production process in which fewer rejects occur and raw materials are used more efficiently.

Process, product and reuse as one system

The production method is directly aligned with how products are used and reused. Products are designed to be dismantled, repaired and redeployed, without compromising on quality. Used products are digitally registered, assessed and redeployed. With instruments such as the Environmental Cost Indicator and Environmental Product Declarations, Falco makes the impact of choices visible to customers. This creates a system in which design, production and reuse are aligned and in which less waste and more value retention are central.



PART 2 USE

Earning from use

Most value is created while a product is in use. Maintenance and service are therefore aligned with actual use. This makes it possible to keep products in top condition for longer and to create new value through maintenance, upgrades and services. In this way, manufacturers not only earn from the sale, but also remain in continuous contact with their customers' needs, for example through maintenance contracts. Those who manage for performance and availability achieve circularity as a logical consequence of better use.



LEVERAGE THE INSTALLED BASE

5

“Most of the value is already with your customer, but you are not managing it.”

Why your biggest asset remains out of sight

Many manufacturing companies earn money once, at the point of sale, while most of the value is created afterwards and remains out of sight. As soon as a product leaves the premises, attention shifts to the next order, while the product often continues to operate at the customer's site for another ten, fifteen or twenty years. It is during this period that the majority of the value is created, yet it is barely utilised. Particularly when working with distributors, service partners or international chains, direct contact is lost, and with it visibility of where products are located and how they are used. As a result, the installed base, the products at the customer's site, becomes not an active asset, but a blind spot. As long as this insight is lacking, value remains untapped and you remain dependent on new sales for growth. At the same time, companies show that this is not a given. By registering products at installation, making agreements with service partners or retrieving use data through digital systems, insight can still be created. Not complete, but sufficient to manage in a targeted way and utilise value.

From delivery to control over what is running

This is not an operational step, but a strategic choice: do you manage based on what you sell, or on what is running? Companies that take this step no longer treat the installed base as something beyond their influence, but as a strategic part of their business. They organise the return of information from the field and bring use, performance and maintenance together in a single view. This reveals where problems arise, where capacity remains underused and where opportunities lie for maintenance, upgrades or reuse. It does not have to be perfect to be valuable. Precisely a first layer of insight makes targeted management possible. In practice, you see that companies then start making different choices. Design is aligned with use, service becomes more targeted and the relationship with the customer shifts from a one-off delivery to long-term engagement. The installed base thus becomes the place where strategy, operations and the revenue model come together.

Where you can start tomorrow

The first step lies not in technology, but in creating an overview. Map which products are still running, through which channels they were delivered and what information is already available about them. Combine existing data from service, sales and systems and make it visible in a single overview. It often turns out that this information is already available, but not yet being used. Companies that do this quickly discover that their greatest asset is not in the factory, but is already running at the customer's site and that this is where the most value can be found.



**IF YOU CANNOT SEE
WHAT IS RUNNING,
YOU CANNOT
MANAGE IT.**

BEST PRACTICE

GSE Dispensing extends service life with machines, software and service

(BRUMMEN, GELDERLAND)

From new build to usage phase

GSE Dispensing develops dispensing systems, software and services for the graphics industry, with applications in packaging, labels and coatings. The systems are installed at customers worldwide and together form a large installed base that often remains in operation for many years. As a result, the focus is not only on new build, but also explicitly on the usage phase.

Modularity and service

GSE's machines are modularly built and work closely together with proprietary software. Customers use only the modules and functions they need. This modularity simplifies engineering, reduces variation and makes it possible to expand or adapt systems later without having to replace everything. Service plays a central role. Much support is provided remotely, with faults and settings quickly analysed via software. This reduces downtime and requires fewer travel movements. The combination of software knowledge and practical experience from field service makes this support effective.

Data and service life extension

GSE's software records process settings, deviations and traceability information required for audits and quality assurance. Return flows, such as ink reuse, are also recorded in a controlled way. In this way, GSE makes reuse controllable and reproducible. There is insight into the installed base, including configurations, software versions and service history. This enables targeted upgrades and refurbishment. When systems are returned, they are assessed, technically updated and redeployed according to current standards. At GSE, digitalisation is not a separate project, but a practical way to keep a global installed base manageable and to extend the service life of systems.



MANAGE MAINTENANCE WITH DATA

6

“If you don’t see it coming, you repair it too late.”

Why maintenance often remains reactive

In many companies, maintenance is still driven by experience, fixed intervals or simply by something breaking down. That seems logical, but in practice it leads to unnecessary costs and disruptions. Parts are replaced while they are still functioning, or too late, causing downtime. At the same time, machines and installations continuously send signals about their use and condition. Temperature, load, vibrations and performance tell you exactly what is happening, but that information is rarely used systematically. Data is scattered across systems, service reports and the minds of technicians, but is not brought together into a single picture. As a result, maintenance remains largely reactive, and action is only taken when the problem is already visible in operations.

From reacting to managing based on use

Companies that take this step connect data from use, faults and maintenance into one coherent picture. This reveals patterns that were previously hidden: components that wear out structurally faster, deviations that keep recurring and situations in which the load is higher than expected. What once seemed coincidental becomes predictable. This is where you see companies organising maintenance differently. No longer replacing parts because it is scheduled, but intervening when data shows it is necessary. As a result, maintenance shifts from a cost item to a management tool. Service becomes a way to continuously monitor and improve performance. This has an immediate effect: less unexpected downtime, fewer unnecessary replacements and a more stable operation. Digitalisation makes this possible by making data accessible and translating it into concrete actions for technicians and planners.

Where you can gain control tomorrow

Start with a single product or installation. Collect all information on faults, maintenance and use and bring it together in one overview. Often, the necessary data is already available, but not yet linked. Companies that start doing this quickly see where they are intervening too late or replacing parts too early. This immediately creates room to organise maintenance more intelligently and efficiently. Even if parts are available, things go wrong here if you do not know when something will fail.



**IF YOU DO NOT
MANAGE WHAT IS
HAPPENING, YOU
WILL BE MANAGED BY
WHAT GOES WRONG.**

BEST PRACTICE

Prodrive gains control of return flows with data and agreements

(SON, NORTH BRABANT)

From return to insight

Prodrive Technologies develops and produces high-tech systems, electronics and software for, among others, the semiconductor, automotive and medical sectors. The company does not see circularity as something that only begins when a product comes back, but as something that needs to be organised much earlier. For Prodrive, the biggest challenge lies not in the technology, but in the lack of insight once a system has left the premises. Internally, a great deal can be recorded, but after delivery it is often no longer clear how a product has been used, adapted or shared. Then every return becomes a new project, while what is actually needed is to know in advance whether reuse makes sense.

From assumptions to verifiable processes

That is why Prodrive is working on fixed processes in which it is clear what comes in, what condition it is in and what can be reused. This does not rely on assumptions, but on controllable steps. What comes in is checked, recorded and only then financially settled. In this way, circularity is taken out of the project sphere and becomes part of daily operations.

Data as the basis for service life extension

At the same time, it becomes clear that real progress requires better information about the use phase. If it is known how a system has been loaded, under what conditions it has operated and which parts show wear, decisions on service life extension and reuse can be made much more specifically. This requires agreements on which data can be shared without compromising IP. That discussion must be conducted jointly within the chain. Design plays a key role in this. When upgrades, traceability and replacement of critical parts are considered from the beginning, space is created to preserve product value for longer. This sometimes requires choices other than only the lowest cost price. The return is not immediately visible, but becomes apparent over the years. For Prodrive, circularity is not a separate sustainability goal, but a way to gain control over complexity, manage risks and retain value in a high-tech chain.



EARN FROM PERFORMANCE

7

“You are not paid for what you deliver, but for what it delivers.”

Why you currently earn at the wrong moment

Many manufacturing companies still derive their turnover from the sale of products. Service and parts follow afterwards, but these are often secondary and less predictable. Customer demand is shifting. Customers are not just buying a product; they expect it to keep working, remain available and perform well. This makes the use phase increasingly important. Those who earn only from sales earn once, while the greatest value is actually created in the years that follow. You see that companies that do not respond to this remain dependent on new orders and become more vulnerable to market fluctuations. At the same time, many companies are already delivering value during use, without systematically earning from it.

From product to performance

Companies that take this step shift their revenue model towards the performance of their products in use. The focus is no longer on the product itself, but on what it delivers over time. This translates into service contracts, maintenance subscriptions and performance agreements in which availability or output are central. In practice, this happens step by step: first additional services, then structural agreements and finally steering on performance. Digitalisation makes this possible by providing insight into use and performance, making clear what is being delivered and where it is possible to steer. At the same time, the role of the manufacturer changes. Those who earn from performance remain involved in use and maintenance and gain more influence over the outcome. This requires clear agreements and trust, but also provides greater control and a more stable revenue model.

Where you can earn differently tomorrow

Start with one product or customer and determine which performance indicator is truly valuable, such as availability or output. Establish how you measure that performance and make a simple agreement about it. Often, the necessary information is already available, but not yet linked to the revenue model. Companies that start doing this see that their income becomes more stable and that they gain a better understanding of how their product is used. This creates the basis for a revenue model that is less dependent on new sales and more based on what is already running.



THOSE WHO EARN FROM PERFORMANCE REMAIN CONNECTED FOR AS LONG AS THE PRODUCT IS RUNNING.

BEST PRACTICE

Jansen extends service life through craftsmanship and adaptation

(THOLEN, ZEELAND)

From building to adapting

At Jansen, solving technical challenges in production environments has been central since the 1980s. From a family business that started with maintenance and modifications to installations, the company has grown into an enterprise that builds, overhauls, modifies and redeploys machinery across a wide range of industries. The work ranges from plastics processing and the food industry to cable recycling, chemicals and process industry. It is almost always bespoke work. Machines are rarely built in series, but developed for a specific application or adapted to an existing production line.

Extending service life in practice

It is precisely in these kinds of environments that a great deal of circular value is created. Many installations still have a long technical and economic life, provided the right intervention points are known. At Jansen, machines are not only built, but also refurbished, adapted to new processes or fitted with new control systems. As a result, installations that would otherwise be written off can often continue to operate reliably for years. Sometimes this involves a mechanical modification, sometimes a new control system or software modernisation. In other cases, machines are refurbished and redeployed with another user. Jansen's strength lies in the combination of disciplines under one roof. Mechanical engineering, electrical engineering, control engineering, assembly and service come together in one team. This means that a customer with a problem can turn to one party that oversees the whole and actually solves it, from repairing worn parts to modifying complete installations.

Digitalisation and circular value

Digitalisation is playing an increasingly important role in this. For various installations, control systems and process data can be monitored remotely. This often allows Jansen to quickly identify where a fault lies or which parameter needs to be adjusted. This saves travel time, prevents downtime and enables machines to run more efficiently. Circularity therefore takes on a practical meaning at Jansen. By repairing, modernising and reusing machines, the value of materials, parts and technical systems is retained. A system that can continue to operate for ten years longer, a component that can be reused, or a machine that is given a second life: that is where real circular value is created. In this way, Jansen shows that digitalisation, maintenance and technical expertise together form a strong foundation for an industry in which machines last longer and existing systems can create value again.



SECURE CRITICAL COMPONENTS

8

“Even if your maintenance is well organised, you come to a standstill without parts.”

Why availability is your biggest risk

Many companies still base their purchasing on price and efficiency, while the real risk lies in availability. Products and installations are becoming increasingly complex and consist of thousands of parts, some of which are difficult to replace or hard to source. Often, it is not a large number of parts that matters, but a small number of critical components that determine the entire system. A single missing part can bring an entire installation to a standstill. In practice, this often only becomes clear when it is too late. Orders are placed under time pressure, alternatives are limited and downtime quickly mounts up. Recent years have shown just how vulnerable supply chains can be, with long lead times and unexpected shortages. As a result, the problem shifts from cost to continuity and dependence on external parties.

From purchasing to managing availability

Companies that take this step link information on use, wear and demand to purchasing and stock management. This provides insight into which parts are critical, when they are needed and what the impact is if they are missing. Not every part is equally important, and precisely that distinction makes the difference. Instead of reacting to shortages, these companies look ahead. Stock is no longer just a safety buffer, but a conscious choice based on risk, use and lead time. In practice, you see that this enables companies to plan better, need less emergency stock and experience less downtime. Digitalisation makes this possible by combining data from different sources and turning it into insight. It does not have to be perfect, but it does have to be enough to reveal dependencies and manage them more effectively.

Where you can reduce risk tomorrow

Start with the components that have the greatest impact on your operations. Bring together use, lead times and risk in a single overview. Do not only look at what you have in stock, but especially at what you cannot do without. This information is often already available in different systems, but has not yet been combined. Companies that do this quickly see where their greatest vulnerabilities are and where they can take immediate action. This gives them greater control over supply reliability and reduces dependence on whether something happens to be available. Even if maintenance is well organised, your system will grind to a halt as soon as a critical component is missing.



THOSE WHO HAVE PARTS ON TIME KEEP RUNNING. THOSE WHO DO NOT COME TO A STANDSTILL.

BEST PRACTICE

Pentas connects digitalisation, manufacturability and circularity

(ALMELO, OVERIJSEL)

From process to digital foundation

Pentas is a producer of rotationally moulded plastic products for OEM customers in, among others, tractor manufacturing and agricultural mechanisation, trailer and motorhome construction, wind energy and utility applications. Customers retain ownership of the product design, while the company contributes ideas on design and manufacturability. At Pentas, digitalisation, Industry 4.0 and circularity are not separate projects, but successive steps that reinforce one another. Digitalisation has been the foundation for this for many years. Around 2000, the company began developing its own ERP environment to gain control over its processes. Now, virtually the entire organisation runs on this system, from order and production to quality and logistics. At Pentas, data is therefore not separate from the process, but sits at its heart, forming the basis for control over circularity and raw material use.

Industry 4.0 and insight into waste

That digital foundation has been further expanded with Industry 4.0 principles. Machines, sensors and measuring instruments are connected to the network, supported by investments in infrastructure and security. In production, reliability and predictability are crucial. Incorrect planning or suboptimal machine combinations lead directly to additional downtime, material loss and energy consumption. By linking data from machines, planning and quality, insight is gained into where waste occurs and how it can be structurally reduced.

Traceability and circular organisation

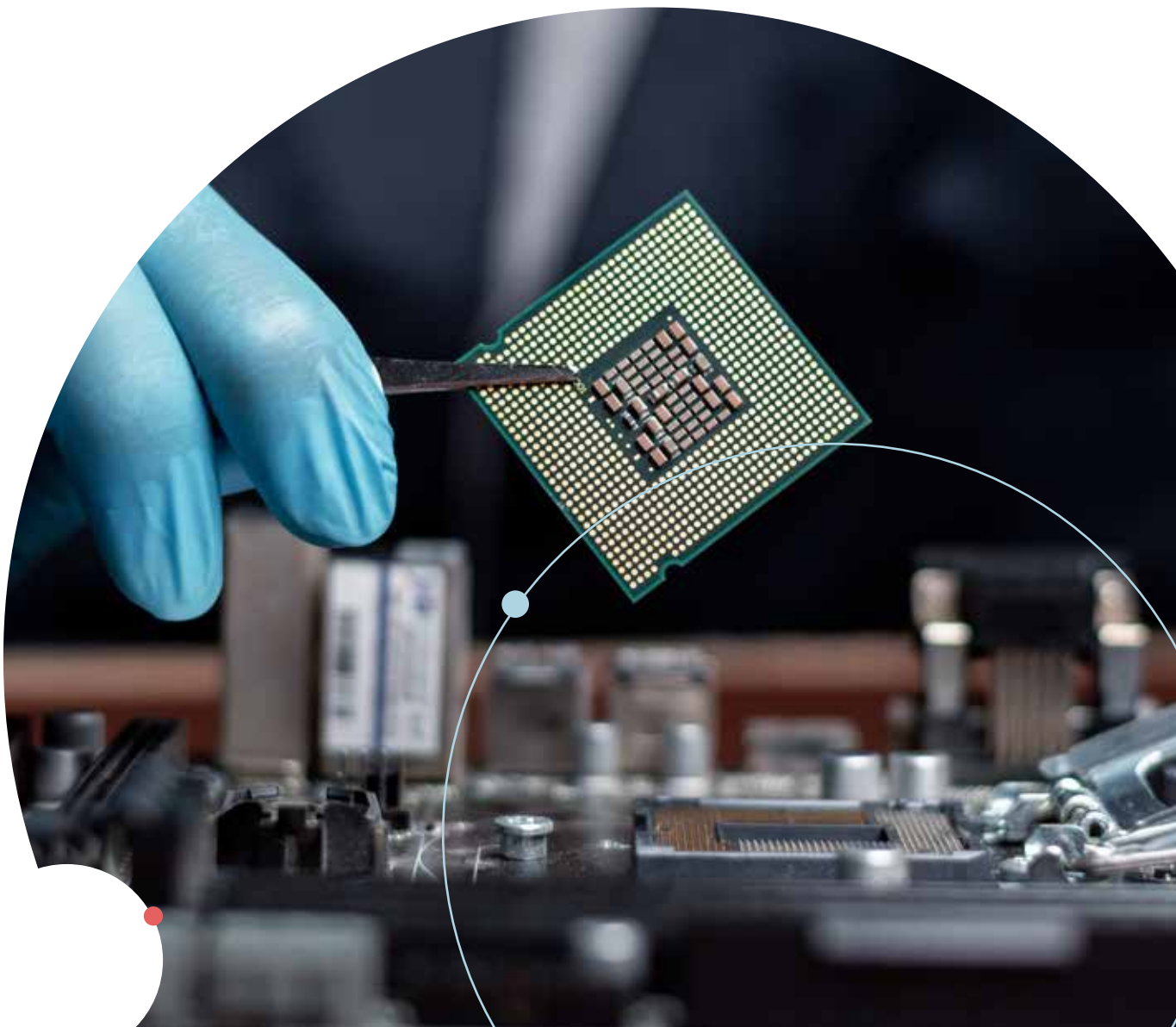
Product traceability is organised on this basis. Each product is given a unique code, linked to process and material data in a digital product passport. This is designed with quality and efficiency in mind, but also explicitly with circularity in mind. With laser engravings and QR codes, this information remains available for high-quality recycling and future reuse. In parallel, knowledge is being built up on the responsible use of recycled materials. AI-driven planning marks the next step towards further reducing waste in time, energy and capacity. This creates a future-proof factory: digitally controlled, industrially manageable and circularly organised.



PART 3 REUSE

Realising residual value

If you replace something without looking, you are throwing away value. Often, only a small part is worn out or defective, while the rest still has considerable value. Digital insight into a product's condition makes reuse practical and reliable. When the residual value of parts and materials is visible, reuse, remanufacturing and refurbishment become not only easier, but also more reliable and economically viable. In this way, the end of a product's use becomes the start of a new revenue stream. Reuse thus becomes not merely a sustainability goal, but an economically logical choice.



ORGANISE REUSE AND SERVICES

9

“We no longer replace as a matter of course; we first assess what still has value.”

Why replacement costs money every time

In many companies, replacement is the safe option. If something breaks or the risk seems too great, the part or system is replaced with a new one. That feels logical and manageable, but in practice it often means that value is being thrown away. Parts are replaced while they are still partly usable, systems are written off while only a small part is actually worn out, and delivery times for new parts cause unnecessary downtime. Many replacements seem necessary, until you see what actually comes back. In many companies, that realisation only comes once parts are back on the workbench. What comes back as “waste” is often still perfectly usable. Every time you replace something without checking, you throw away value and make yourself dependent on new supplies.

From throwing away to targeted use

Companies that take this step look differently at what they already have. Not everything has to be new, and often that is not necessary. They start to examine which parts, modules and products are actually worn out and which can still be reused or reconditioned. As a result, the approach shifts from standard replacement to targeted repair and reuse. What initially seemed like waste turns out to be a source of value. That changes the way of working. Parts and products are assessed instead of being replaced immediately. Reconditioning becomes a fully fledged alternative and return flows become meaningful. Digitalisation helps to substantiate these choices. By recording use, wear and faults, insight is gained into the condition of parts. Reconditioning is then no longer a gamble, but a conscious decision. In many cases, reconditioning proves to be faster, cheaper and more readily available than buying new.

Where you can see value tomorrow

The benefits become visible quickly. Shorter lead times because parts are reused rather than ordered. Lower costs because materials and components last longer. Less dependence on suppliers and scarce parts. At the same time, new activities emerge around reconditioning, refurbishment and remanufacturing that create value instead of only costing money. Circularity follows naturally: less material use, a longer lifespan and better use of what is already there. It does, however, require companies to take overhaul seriously and organise it properly, rather than treating it as an exception. Start with one part that you replace frequently. Lay the last ten returned units side by side and assess what is still usable. Often, it turns out that a large proportion is still usable. Companies that do this quickly discover where reuse is immediately possible and where value remains untapped.



THOSE WHO LOOK BEFORE THEY REPLACE SAVE MONEY. THOSE WHO DO NOT ARE THROWING MONEY AWAY.

BEST PRACTICE

IRS Robotics gives robots a second life

(WEERT, LIMBURG)

From depreciation to reuse

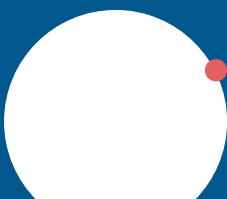
IRS Robotics gives industrial robots a second life in a way that is technically sound and economically viable. IRS purchases used robots from production lines all over the world, assesses them thoroughly and brings them back to the market through a structured refurbishment process. In doing so, it follows its own 77-point protocol, which systematically checks the technical condition of each robot, replaces parts where necessary and ensures that only machines that can be reliably reused are released. In this way, IRS makes robotisation accessible to many more companies. An IRS refurbished robot costs roughly one-third to one-fifth of the price of a new robot.

Preservation of industrial value

For IRS Robotics, circularity is not about a slogan, but about preserving industrial value. A robot contains an enormous amount of material, energy and technology. If such a system is written off after one use phase, a great deal of value is lost. By professionally refurbishing robots, that value can be preserved and reused. This not only saves companies investment costs, but also large quantities of material and CO₂. Those savings can now also be made increasingly visible, for example through calculations of the CO₂ impact of refurbished robots compared with new ones.

Data and quality in refurbishment

Digitalisation plays an increasingly important role in this. Robots are complex systems of software, electronics and mechanics. To give them a second life responsibly, it must be known exactly what their condition is, which parts have been replaced and how they have been tested. Data and documentation are therefore essential to make quality and reliability demonstrable. As robots generate more and more information about their use and maintenance, new opportunities also emerge to better understand their lifespan and organise reuse more effectively. The mission is to make refurbished robotics professional and transparent. This means showing customers what to pay attention to, respecting the quality of brands and systems and selling only robots that the company fully stands behind. This makes it visible that automation and circularity are not opposites. On the contrary: precisely by keeping technology in use for longer, industry can deal more efficiently with resources and investments. For IRS, a robot is not written off as soon as it comes out of a production line. Only when the technical condition, the remaining value and the knowledge of what needs to be refurbished are properly assessed and consistently applied, does it become clear how much potential it still contains.



PART 4

CONNECT AND MANAGE

From individual levers to a single whole

These are the two connecting levers that ensure everything works as a single system. In the previous parts, the levers for design, use and reuse were central. The greatest benefit lies not in the levers themselves, but in how they come together. The greatest loss does not occur within a single process, but between processes and between companies. In this part, the connecting levers take centre stage. They ensure that information does not stop at departments or links in the chain, but flows through the entire lifecycle. As a result, the focus shifts from optimising each step to managing the whole.



FACILITATE SUPPLY CHAIN COLLABORATION 10

“What you cannot see costs you money.”

Why value disappears between links in the chain

The biggest losses do not occur within companies, but between them. Suppliers supply components, customers use products and, in between, there are multiple links in the chain, each optimising its own part of the process. This creates a fragmented picture. Information stops at handover points and decisions are made based on a partial view of reality. In practice, the cause of disruptions often lies just outside one's own company. Parts are unavailable even though they are present elsewhere in the chain, and downtime occurs because information is shared too late or is incorrect. This is not due to unwillingness, but is the consequence of systems that are not connected and parties each using their own information. As long as this remains the case, everyone will continue to optimise their own part of the process and the problem will be passed on rather than resolved.

From control to facilitation with data

Companies taking steps in this direction do not start by trying to control the supply chain, because in practice this is often unrealistic. They start by facilitating collaboration by making information more readily available between parties. This is done on a small and concrete scale, for example by feeding service data back to the manufacturer, making stock levels visible to suppliers or providing insight into how products are actually used. Not everything needs to be shared, but precisely the information needed to manage the whole better. Digitalisation makes this possible by connecting existing data and making it accessible to multiple parties. Through simple dashboards, portals or links between systems, a shared view emerges that is rarely complete, but sufficient to improve coordination. The greatest benefit lies not within a single company, but in the transition between companies, because that is precisely where delays, waste and poor decisions arise.

Where you can gain control tomorrow

The impact lies in removing friction between links in the chain. Information becomes available earlier, resulting in less downtime and better use of components. Decisions become more consistent and dependencies become visible, increasing delivery reliability. In practice, this does not start on a large scale. Companies that start with this choose one supply chain partner and one specific problem, for example, downtime due to missing parts or uncertainty about return flows, and make information visible precisely there. It often turns out that the necessary data is already available, but is not yet being shared or connected. Collaboration only really works when everyone is looking at the same information. That is what makes it possible to manage across the chain.



**THOSE WHO FACILITATE
INFORMATION ENABLE
COLLABORATION.
THOSE WHO DO NOT
CONTINUE TO PASS
ON PROBLEMS.**

BEST PRACTICE

CleanLease manages textile flows using data

(TIEL, GELDERLAND)

From textiles to a system

CleanLease handles the washing, management and logistical organisation of workwear and linen for hospitals and care institutions, among others. CleanLease does not work with piles of linen, but with a smart and living system in which textiles, logistics and data together form one rhythm. The company ensures that clean textiles are always available, exactly where and when they are needed, without waste or idle stock. Every item of clothing and every roll container is fitted with a sensor. This means there is no need for counting; it is always known where the textiles are, how long they have been in use and when they need to return to the flow.

Real-time insight and control

In the central cockpit, CleanLease sees the heartbeat of the process: what comes in, what is being processed, what is on its way and what needs to return to circulation. In this way, the company monitors the pace of washing, drying, repairing, packing and delivering, as one circular movement without interruptions. This prevents unnecessary purchases, keeps raw materials in motion and keeps costs manageable for customers. Using dashboards, CleanLease helps teams in hospitals and care institutions to use only the textiles they really need and to reduce waste at source.

Lifespan and circular flow

Through repair, CleanLease extends the lifespan of textiles; through recycling, it returns fibres to the supply chain. AI helps to recognise patterns, predict peaks and align stock levels, so that the cycle can run more calmly, more intelligently and more sustainably. This creates a system in which use and reuse are in balance. A circular cycle that is scalable, feasible and economically sound. CleanLease calls this: textiles that keep flowing, a heart that keeps beating.



THE CONTROL ROOM



“We no longer respond to individual signals, but to the bigger picture.”

Why the control room makes the difference

The control room is the place where all insights come together and where it becomes possible to manage the entire lifecycle. It is not an additional system, but a way of managing the whole rather than individual parts. The difference does not lie in the dashboard itself, but in the fact that you manage the whole rather than each separate link in the chain. Data on use, maintenance, parts and performance is connected into one coherent picture. This is not only about the current situation, but also about what happened before: what has been adjusted, replaced or modified. That history makes it possible to manage lifespan, reuse and performance more effectively. What happens in design, use and reuse comes together here and is translated into concrete management. In many companies, insight is growing, but coherence is lagging behind. Data is collected, analyses are carried out and dashboards are set up, but information remains scattered and decisions are made locally. As a result, problems are still solved where they become visible, rather than where they originate. You see more, but you are not yet managing as one whole, and that is where things go wrong. By connecting insights, you gain control and improvements become structural.

From isolated data to integrated management

Companies that take this step bring insights together and turn them into one whole. They connect information on use, performance, maintenance, parts and the supply chain, and manage the business from that whole. They ask different questions: what happens across the entire lifecycle, where is value created and where is it lost? What were once isolated signals become a coherent picture. This changes the way the business is managed. Decisions are made from the whole rather than by department. Problems are identified sooner, choices are better substantiated and actions address the cause rather than the consequence. Digitalisation makes this possible by connecting data and converting it into management information. Not everything has to be perfect, as long as it comes together and is used.

Where you start to gain real control tomorrow

The impact lies in coherence. Companies gain control over their entire operation, from use to maintenance and from parts to the supply chain. Downtime is prevented rather than solved, and decisions become more predictable. At the same time, a basis is created for service, reuse and supply chain management. Circularity follows naturally, because products and materials are managed as one system. Start with one product or installation. Bring use, faults, maintenance and parts together in one overview. Not everything has to be perfect. As long as it comes together and is used, you can manage it. Here, insight, management and data turn into earning potential.



THOSE WHO BRING EVERYTHING TOGETHER GAIN CONTROL. THOSE WHO KEEP LOOKING AT ISOLATED PARTS WILL ALWAYS BE PLAYING CATCH-UP.

BEST PRACTICE

QSTA makes the food chain manageable with a control tower

(NIJKERK, GELDERLAND)

From trade to supply chain management

QSTA in Nijkerk connects producers, retailers and food professionals with a scalable platform for food logistics, food data and e-commerce, so that the supply chain can operate faster, more reliably and with less waste. This did not begin as digitalisation for the sake of digitalisation, but out of necessity: the product range was growing, the number of suppliers was increasing, margins remained thin and the labour market was becoming tighter. Anyone who continues to plan with separate files and gut feeling mainly scales up complexity and loss. That is why a control tower has been set up: one place where supply chain planning, procurement and data come together and where there is continuous visibility of inflow, stock, shelf life and forecasts. If the front end is not right, this is paid back in every link with lost sales, wastage and unnecessary loss of raw materials.

Data and AI as a control mechanism

The result is concrete. Deliveries are more reliable, with fewer lost sales and significantly less wastage, because QSTA predicts in advance instead of correcting afterwards. This not only prevents costs, but above all prevents the loss of raw materials, energy and labour that are already in the product. AI generates automatic order and stock proposals for thousands of items. This relieves planners, increases the service level and keeps products within their optimal shelf-life window. The real breakthrough is not in AI, but in the foundation: first get the data in order, then accelerate. That is the lever for structural value retention and scalable growth.

From optimisation to full supply chain management

The additional benefit is significant. Teams steer based on realistic figures instead of safety margins, enabling QSTA to deploy hours more efficiently and reducing the need for emergency measures. Deviations are identified earlier and intervention takes place before products are written off. Suppliers gain sharper insight into demand, which also reduces waste upstream. QSTA applies the same management logic to energy and distribution, from real-time temperature monitoring to smart steering of solar and battery power. This keeps value in the supply chain for longer. The next step is a supply chain portal in which suppliers, transporters and customers work with the same information. That is not only efficiency, but real supply chain management. QSTA believes the company is moving from a trading company to a tech company with deep knowledge of food: value increasingly arises from predictability, transparency and control across the entire supply chain.



IN CONCLUSION

Start small, but do start.

This is not an end point, but a different way of managing


What these eleven levers around making, using, reusing and managing demonstrate is not a new programme or a separate set of improvement actions. It is a different way of looking and working. Companies that start with this do not wait for a perfect plan. They start with what is already there: with a product that is already running, a recurring problem or data that is already available but not yet being used. Movement arises from there. Step by step. What starts as a solution to a single problem often grows into a different way of managing. Companies gain more control over their operations, see sooner where things are going wrong and discover where value is being created that previously remained hidden. Companies that connect these steps build their own control room, step by step.

The biggest gains are closer than you think

Many companies look to new technology, new products or new markets for improvement. These are important, but practice shows that the greatest gains are often closer at hand. They lie in making better use of existing products, in smarter maintenance, in reducing waste and in gaining a better understanding of what is already happening. These areas offer immediate opportunities to cut costs, reduce downtime and increase revenue. At the same time, companies become less dependent on external factors such as lead times, shortages and price fluctuations. What starts as working more efficiently develops into greater stability and predictability. As a result, you automatically use less material and get more out of what you already have. Not because you have to, but because it makes sense when you manage for value.

How to get started tomorrow

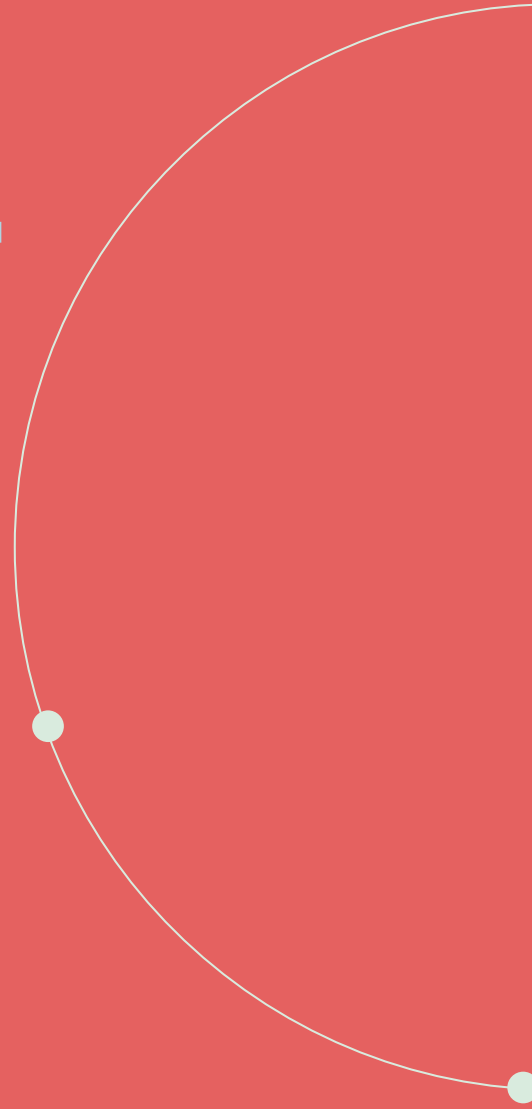
Getting started is easier than you think. Choose one product, one installation or one recurring problem. Map out what happens, where costs arise and where things go wrong. Bring together the information that is already available and make it visible. Look at where you can manage rather than react, and where you can retain rather than replace. That is enough to get started. Companies that start this way soon find that they gain more control and that new questions arise. From there, the next step follows naturally. Not all at once, but step by step, based on what works.



THE VALUE IS ALREADY THERE. THE QUESTION IS WHETHER YOU CAN SEE IT AND MANAGE IT.



Attachment



50 real-world examples: these companies are leading the way

Here are fifty examples from the Dutch manufacturing industry. Companies that are already steering their products, processes and performance differently today. Not because they have to, but because it works. You can see how they deal with downtime, waste, availability and reuse, how they gain control over what happens during use and how they derive immediate value from it. Sometimes small and practical, sometimes structural and strategic. What they share is simple: they don't wait until everything is clear, but start where the pressure is and build from there. These are not theories, but choices that have already been made. The question is not whether it can be done; the question is where you start.

These companies went before you



Gelderland

CleanLease
GSE Dispensing
Hydro Extrusion
QSTA
REWIND
Solutions on Silicon

Limburg

ACT IN
AKAB
AMI
APT Platform
GEA Food Solutions Weert
Interduct
IRS Robotics
Habets
Remade in Holland
SAM Panels
Vebevo Bright Solutions

Noord-Brabant

Affix
CBOOST
Connected Load Carrier
Edumar
Inner
FAES Industrial Packaging
Fluidor Equipment
Heijmans
Koninklijke Ahrend
Landport
Lenze
NuuTro
Philips
Prodrive
QuestPair
SandGrain
TSG
Vanderlande

Overijssel

Althea
Duspot
Falco
Pentas
OVSoftware
TechNikkels
Veldkamp
Zehnder

Zeeland

Heros
Jansen Tholen
Kraker Trailers
Napoleon
Prince

Utrecht & Friesland

BD Kiestra
ZYTEC

Best practices from
GELDERLAND



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GSE Dispensing extends service life with machines, software and service

BRUMMEN, GELDERLAND

From new build to usage phase

GSE Dispensing develops dispensing systems, software and services for the graphics industry, with applications in packaging, labels and coatings. The systems are installed at customers worldwide and together form a large installed base that often remains in operation for many years. As a result, the focus is not only on new build, but also explicitly on the usage phase.

Modularity and service

GSE's machines are modularly built and work closely together with proprietary software. Customers use only the modules and functions they need. This modularity simplifies engineering, reduces variation and makes it possible to expand or adapt systems later without having to replace everything. Service plays a central role. Much support is provided remotely, with faults and settings quickly analysed via software. This reduces downtime and requires fewer travel movements. The combination of software knowledge and practical experience from field service makes this support effective.

Data and service life extension

GSE's software records process settings, deviations and traceability information required for audits and quality assurance. Return flows, such as ink reuse, are also recorded in a controlled way. In this way, GSE makes reuse controllable and reproducible. There is insight into the installed base, including configurations, software versions and service history. This enables targeted upgrades and refurbishment. When systems are returned, they are assessed, technically updated and redeployed according to current standards. At GSE, digitalisation is not a separate project, but a practical way to keep a global installed base manageable and to extend the service life of systems.



Hydro Extrusion increases resource productivity

HARDERWIJK, GELDERLAND

From recycling to process control

Hydro Extrusion Harderwijk is part of the Norwegian aluminium and energy company Hydro. Hydro in Harderwijk produces large and wide aluminium profiles in long lengths for applications in transport, construction and industry throughout Europe. Aluminium is inherently a sustainable material. It has a very long lifespan, does not rust like steel and retains its quality. In addition, aluminium is easy to recycle, and this is done on a large scale. It can be remelted again and again without any loss of quality. Around seventy per cent of the material processed by Hydro in Harderwijk consists of recycled aluminium. For Hydro, circularity begins not only with recycling, but also right in the middle of the production process. During extrusion, an average of around thirty per cent process scrap is generated through sawing losses, transitions between material bars and small deviations. Every percentage point less waste means lower energy consumption and fewer additional processing steps.

Scrap reduction as the key lever

Scrap reduction is the key circular lever for Hydro in the production process. The company manages this daily through optimal furnace settings, stable process control, preventive maintenance and smart alignment of material with orders. For Hydro, circularity lies in craftsmanship and discipline. The company uses both material that returns from its own process and aluminium collected from the market after use. Hydro blends this with new aluminium to always deliver the right strength and quality. With clear recording of material flows, Hydro makes visible how much recycled material is in the products and what the CO₂ impact is. Circularity does not stop at supplying profiles. Hydro is also working on product reuse, for example through Pole Products, where lighting columns are taken back, refurbished and redeployed. In doing so, the company extends the lifespan of complete products, not only of the material.

Insight into material use and waste

Digitalisation helps Hydro to gain better insight into design, production and material use. By better connecting data from different systems, the company can focus even more specifically on reduced losses and more reuse. For Hydro, process control, recycling and product reuse are one story. Through less waste, high use of recycled material and attention to reuse, the company increases the value of every kilo of aluminium it processes.



QSTA makes the food chain manageable with a control tower

NIJKERK, GELDERLAND

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QSTA

Rewind turns return flows back into valuable installations

MALDEN, GELDERLAND

From replacement to extension

Rewind refurbishes and remanufactures fans, control electronics and complete ventilation and heat recovery systems for the installation market, so that existing installations are given a second or even third lifecycle. In the sector, replacement still happens too often when it is not technically necessary. A ventilation unit or heat recovery system that is fifteen or twenty years old is quickly seen as written off, while the majority of the components are still perfectly reusable. The company offers a different model. Not a cosmetic refurbishment, but remanufacturing according to fixed standards: wear-prone parts are replaced as standard, systems are fully tested and the company provides a five-year warranty. This makes reuse a fully-fledged alternative to new.

High-quality reuse as an alternative to new

The proposition is concrete. Installers receive high-quality refurbished parts and overhaul kits that they can apply on site. This saves material, prevents unnecessary demolition work and reduces labour input. For housing associations and end users, it means less inconvenience and lower costs. For the sector, it means less dependence on new raw materials and international supply chains. The key lies not only in technology, but in organisation.

Organising return flows as raw material

The company works with a closed return principle: what is replaced comes back. That defective flow is not waste, but the raw material. By tightly organising logistics, testing and stock management, the company keeps quality high and lead times short. Through digitalisation in ERP and the webshop, the company links supply and demand more efficiently, so that reuse becomes scalable. For the company, circularity is not idealism, but a business model. What comes back represents value. By systematically retaining that value, the company creates new value in the chain alongside value retention. In this way, the company turns replacement back into extension.



Solutions on Silicon gives used semiconductor machines renewed value

NIJMEGEN, GELDERLAND

From written-off machines to reuse

Solutions on Silicon works every day with machines that have often already been written off by others. In the semiconductor industry, these are extremely capital-intensive systems that can often still last for years or even decades, provided there is a clear understanding of how they are built and how they can be reconfigured. The role of Solutions on Silicon is to give those machines, components and process chambers a second or third life. The company does this through refurbishment, upgrades and reconfiguration, but above all by deeply understanding what a machine actually does and how it can be redeployed for a different application. In doing so, the company not only extends the lifespan of equipment, but also makes new innovation possible. Starting production lines, pilot factories and new technologies often simply cannot begin with only new machines; refurbished equipment makes it possible to start faster and with lower investment.

Hardware becomes a software challenge

What the company sees is that the real challenge in the future lies not only in hardware, but increasingly in software. New machines are becoming more digital, but also increasingly closed. Manufacturers close off control systems, making it harder to adapt or reuse machines later on. That is precisely where circularity and digitalisation meet. If Solutions on Silicon wants to make machines truly circular, they must not only remain repairable, but also reconfigurable. For Solutions on Silicon, this means thinking about more open control, modular software and universal control. For the company, this is not a theoretical discussion, but a practical necessity.

Reusing the installed base

Solutions on Silicon wants a machine built today to still be adaptable for a new application in ten or twenty years' time. Only then can the true value of the installed base be used. Circularity is therefore not only about recovering materials, but above all about preserving the functionality, knowledge and investments already embedded in those machines.



SOS



Best practices from
LIMBURG



ACT in lets the factory talk back in real time

ROERMOND, LIMBURG

From signals to steering based on reality

ACT IN develops MES software that shows in real time what is happening on the production floor: from machines and people to material flows, planning, scrap and maintenance. ACT IN helps producers to work smarter, more stably and more resource-efficiently. Every factory contains far more control information than people realise. Machines, materials and processes send signals all day long about where waste occurs, where quality is under pressure and what is needed to produce predictably.

Real-time insight into quality and waste

ACT IN's software makes those signals visible in real time. One faulty start, one missing raw material or one incorrect setting can have a huge impact on quality, lead time and material consumption. If that is brought together in one system, it becomes possible to finally steer based on what is really happening in the factory. For ACT IN, digitalisation is not a goal, but a way to turn insight into better decisions.

A factory that talks back and improves

That is the basis for less scrap, more stable planning and a production environment that deals more intelligently with raw materials. When the factory talks back, space is created to become a little better and more sustainable every day.



act-in

AKAB turns the door into a data carrier

HOENSBROEK, LIMBURG

From traditional product to data carrier

AKAB takes steps every day to transform a traditional product into something that is digital, smart and circular. Robotisation is not intended to replace people, but to keep production possible here in the Netherlands. Robots make no mistakes, are not subject to physical strain and ensure that the company can supply tens of thousands of high-quality door cores per year with a small team. What really makes the difference for the company is the NFC chip in every door. That chip controls the robots during production, records which materials and settings have been used and, in thirty or forty years' time, can tell exactly how a door can be taken apart again for high-quality recycling.

NFC chip controls production and reuse

In this way, AKAB suddenly turns a wooden door into a carrier of data and a key link in a circular chain. At the same time, AKAB is working hard on new materials. Aluminium is being removed because it blocks recycling; recycled steel is replacing it. The company is developing demountable structures and, together with partners, is looking at bio-based fillings that are suitable for outdoor use. And because the company will soon only have wood waste left, the company wants to 3D-print that waste itself into new components. The printers will then keep running in the evening and at night, while the production robots are standing still.

A factory that runs on data

In this way, AKAB is building, step by step, a factory that runs on data, wastes little and closes its own loop. For the company, digitalisation is not a goal in itself, but a way to produce better, cleaner and smarter. That is the future AKAB in Hoensbroek is working towards every day.



AMI makes circularity work by embedding it throughout the entire manufacturing process

LOMM, LIMBURG

From procurement to end of life

AMI is a family business that develops and produces aluminium building hardware for the professional construction market. What the company makes must be safe, durable and demonstrably sound. This starts with procurement. Aluminium is at the core of the company, with a high proportion of recycled material, because resource availability and security of supply can no longer be taken for granted. In design, AMI steers towards reduced material use without compromising on safety, standards and quality. A product must not only be technically sound, but also feel right in use.

Residual flows directly back into the chain

In its processes, AMI reduces waste wherever possible. Aluminium residual flows go directly back into the chain. Automation and robotisation help the company with this, especially in repetitive and heavy work, so that people can continue to work healthily and productively for longer. The products are designed for a long service life and often last for decades. They are usually replaced because of renovation or changing tastes, not because they are technically worn out.

Data steers material and process

AMI has investigated reuse and take-back, but this only works if it makes economic and organisational sense within the chain. Recycling, however, is well organised and scalable for aluminium. Data is indispensable in this. Through years of certification, the company has extensive insight into material, energy and process data. The next step is to make that data intelligently accessible at product and composition level. For AMI, digitalisation, automation and circularity are not separate tracks. They reinforce one another. Circularity only really works when it is built into procurement, design, production, use and end of life. That is not a project, but a way of working.



APT Platform makes residual flows manageable by making them recognisable and tradable

SITTARD, LIMBURG

From residual flows to tradable value

APT Platform is building a digital platform that helps companies to better recognise, record and move industrial residual flows through the chain. The company's background lies in maintenance and industry, where downtime costs money immediately and where processes often get stuck not only on technology, but also on administration and coordination. In practice, APT sees that there is no lack of material, but a lack of structure. As soon as materials are treated as residual flows, they quickly lose value through unclear recognition, poor information and complex handling.

Recognition and material passport

As a result, valuable flows disappear in bulk or are exported. Not because that is logical, but because the system offers no simpler alternative. APT's approach starts with recognition. APT makes it possible to identify materials in an accessible way, for example with a simple photo. The company links that recognition to a digital material passport in which relevant information comes together, such as material properties, datasheets and administrative requirements.

Matching without manual work

That passport forms the basis for further processing and transfer in the chain. APT then organises matching and settlement. The platform supports finding suitable processors and helps with the administrative process around quotations, orders and transport. By taking manual work out of these steps, it becomes practical and economically attractive for companies to keep materials separate and sell them at high value. For the company, digitalisation is not a goal in itself, but a means to reduce transaction costs and shorten lead times. By making residual flows recognisable, traceable and tradable, APT brings them back into the chain and makes circularity feasible in daily practice.



GEA Food Solutions extends service life with service, design and data

WEERT, LIMBURG

From use to value creation

GEA Food Solutions Weert develops and builds vertical packaging machines and lollipop machines for the global food industry. The machines are designed for high speeds, reliability and a long service life, and run in production at customers for up to twenty-five years. Circularity therefore lies mainly in the use phase. Service, spare parts, tooling and modifications are a structural part of value creation. Machines continue to adapt to new product developments, different packaging and changing production requirements.

A realistic approach to end of life

At the same time, there is a realistic view of the concept of 'end of life'. Due to high hygiene requirements and rapid technological development, full take-back and rebuilding is often not logical. In some cases, end of life also really means end of life, particularly for machines located outside Europe. The real strength lies in learning from use. Through service questions and wear patterns, it becomes visible what is happening in the field. GEA uses that knowledge to make new machines more robust, more accessible and more adaptable.

Connecting data and design

Data is becoming increasingly important in this. Not as a goal in itself, but to make maintenance more predictable and prevent downtime. Planned maintenance is always more efficient than ad hoc intervention. The same balance is sought in design: not necessarily building lighter, but modular, accessible and focused on a long service life. In this way, the value of machines is preserved over time.

The GEA logo is displayed in a bold, blue, sans-serif font. It is positioned on the right side of the page, partially enclosed by a large, thin, light green circular arc that overlaps with another similar arc on the left. The overall design is clean and modern, with a focus on the company's branding.

Interduct extends service life by overhauling installations

NEDERWEERT, LIMBURG

From replacement to preservation

Circularity does not arise by talking about it a lot, but by putting it into practice. Interduct starts small and scales up step by step, because this is the only way to learn what does and does not work. In the renovation market, installations are often automatically replaced even though their technical condition gives no reason for this. A ventilation unit that has been in a home for fifteen or sixteen years is quickly considered written off, while the majority of its parts still function perfectly well. In practice, this usually involves limited interventions such as rebalancing a motor or replacing a small electronic component on the circuit board.

Analysis shows what is really needed

When Interduct systematically analyses the product, it becomes clear that hardly any new raw materials are needed to make it fully functional again. That insight changes the whole approach. Interduct therefore focuses on overhaul and targeted improvement, not on cosmetic refurbishment. The aim is not necessarily to put back exactly the same product, but to remove known weak points and improve performance. In some cases, the refurbished version is therefore even better than the original design.

Reuse with a guarantee

By offering these solutions with a guarantee, trust is created in the market and reuse becomes a fully-fledged alternative. At the same time, the environmental impact remains lower and dependence on new materials and complex logistics decreases. In this way, the focus shifts from replacement to preservation and, alongside value retention, new value is created in the chain, technically, economically and organisationally. Installations are therefore no longer seen as waste streams, but as assets that generate returns over multiple lifecycles.



IRS Robotics gives robots a second life

WEERT, LIMBURG

From depreciation to reuse

IRS Robotics gives industrial robots a second life in a way that is technically sound and economically viable. IRS purchases used robots from production lines all over the world, assesses them thoroughly and brings them back to the market through a structured refurbishment process. In doing so, it follows its own 77-point protocol, which systematically checks the technical condition of each robot, replaces parts where necessary and ensures that only machines that can be reliably reused are released. In this way, IRS makes robotisation accessible to many more companies. An IRS refurbished robot costs roughly one-third to one-fifth of the price of a new robot.

Preservation of industrial value

For IRS Robotics, circularity is not about a slogan, but about preserving industrial value. A robot contains an enormous amount of material, energy and technology. If such a system is written off after one use phase, a great deal of value is lost. By professionally refurbishing robots, that value can be preserved and reused. This not only saves companies investment costs, but also large quantities of material and CO₂. Those savings can now also be made increasingly visible, for example through calculations of the CO₂ impact of refurbished robots compared with new ones.

Data and quality in refurbishment

Digitalisation plays an increasingly important role in this. Robots are complex systems of software, electronics and mechanics. To give them a second life responsibly, it must be known exactly what their condition is, which parts have been replaced and how they have been tested. Data and documentation are therefore essential to make quality and reliability demonstrable. As robots generate more and more information about their use and maintenance, new opportunities also emerge to better understand their lifespan and organise reuse more effectively. The mission is to make refurbished robotics professional and transparent. This means showing customers what to pay attention to, respecting the quality of brands and systems and selling only robots that the company fully stands behind. This makes it visible that automation and circularity are not opposites. On the contrary: precisely by keeping technology in use for longer, industry can deal more efficiently with resources and investments. For IRS, a robot is not written off as soon as it comes out of a production line. Only when the technical condition, the remaining value and the knowledge of what needs to be refurbished are properly assessed and consistently applied, does it become clear how much potential it still contains.



Habets shows how written-off parts become indispensable again

NUTH, LIMBURG

From written-off parts to reuse

Habets works every day on parts that others had already written off. Not because that sounds sustainable, but because it is technically and economically sound. In heavy industry, virtually nothing is truly broken. Usually, only a small part is worn out, while most of it can still last for years. With heavy machining, blasting, thermal spraying and other forms of advanced surface treatment, Habets gives industrial components a second and sometimes even a third life.

Wear predictable with data

Reuse shortens lead times, lowers costs and increases security of supply for the company's customers in, among others, the steel industry, wind energy and heavy industry. Habets started with parts that were seen as scrap, but is moving further and further forward in the chain. The earlier the company is involved, the greater the value that is retained. Through inspections, measurements and increasingly also data and sensors, the company makes wear predictable and shifts maintenance from an emergency measure to a conscious choice.

Reliability and continuity at the centre

At Habets, circularity is not in ideals, but in the business case. Less new material means lower costs, less transport and less dependency. The CO₂ savings follow naturally. The company's customers ask for reliability, speed and continuity. That is what Habets delivers, and has done for generations. Steel does not end here; it begins again.



Habets

Remade in Holland gives remanufacturing industrial logic

HORST, LIMBURG

From end of life to industrial level

Remade in Holland works every day with components that others have often already written off. Electric motors, pumps, fans, gearboxes and other drives come back from industry because, according to traditional logic, they have reached 'end of life'. In practice, this usually turns out not to be the case. Often, only a small part is worn out, while most of it can technically last for years. By carefully dismantling, analysing, repairing and, where necessary, upgrading systems, the company brings them back to a reliable industrial level.

As good as new, but better

The starting point of Remade in Holland is simple: as good as new, but better. Known weaknesses can be improved by the company, components can be upgraded and performance can be tested again before they go back into industry. The expertise required for this does not come from one discipline. ACE Transformers and Coils operates from the same location, bringing deep craftsmanship in coils, transformers and winding technology. This combination of drive overhaul and electrical engineering knowledge makes it possible to truly understand and rebuild complex systems.

Reusing the value of machines

This creates not only repair, but remanufacturing in the full meaning of the word. For the company, remanufacturing is therefore not a niche or a sustainable side project, but a different way of looking at industry. Machines and components represent enormous value, not only in material, but also in engineering, craftsmanship and investments that have already been made. When that value is reused, the focus shifts from replacement to preservation. From that practical experience, Ronduit Circulair also emerged, a spin-off that helps manufacturing companies make circular entrepreneurship concrete, for example by organising return flows, developing a business case for reuse and taking the first steps towards remanufacturing. Step by step, this creates an industry in which products are given multiple life-cycles and companies become less dependent on new raw materials and vulnerable supply chains.



RE MADE in HOLLAND
remanufacturing

SAM Panels scales bio-based construction with data and automation

VENLO, LIMBURG

From residual flows to circular panel

SAM Panels makes sheet material from residual flows that nobody else can use anymore. Hemp dust, roadside grass, cow manure: the company presses it without glue or chemicals into a strong, healthy and fully circular panel. It starts in the region and ends back in the region, because what the company supplies can simply be taken back and reused at the end of its service life. That is why SAM Panels has been investing for years in origin data, LCAs, product passports and inclusion in the National Environmental Database.

Transparency as the basis for scale

For the company, transparency is not an obligation but a condition for taking bio-based construction seriously. The next step is clear: scaling up and automating. If the company wants to go from twelve to five people on the line and at the same time run four times more production, SAM Panels must robotise and plan more intelligently.

Data and automation accelerate growth

Only in this way can the company compete with conventional materials and show that circular material is not only cleaner, but also scalable and economically strong. SAM Panels proves every day that circular production is possible and that data and automation are the key to scaling it up.

The SAM logo is positioned on the right side of the page, enclosed within a large, thin green circle. To the left of the logo, there are two smaller, overlapping circles: one light blue and one light green. A red dot is located at the intersection of the two smaller circles. The logo itself consists of the letters 'S', 'A', and 'M' in a bold, black, sans-serif font. The letter 'A' is stylized with a small triangle inside its upper section.

SAM

VebeGo Bright Solutions brings control to professional cleaning with products, data and craftsmanship

HEERLEN, LIMBURG

From cleaning to supply chain management

VebeGo Bright Solutions supports professional cleaning organisations with resources, machines, knowledge and guidance, so that quality improves and waste decreases. The company looks not only at what is delivered, but above all at how cleaning works in practice: the method, the deployment of people and the performance of materials and machines together. From that role, the company sometimes also develops its own products, such as the Triple T trolley, which has been deliberately designed to be modular and sustainable, and works on its own cleaning products and bottles, with the company using data to substantiate which choices are most logical across the entire lifecycle.

Products, data and craftsmanship combined

VebeGo Bright Solutions stands in the middle of the chain between manufacturer and user and sees opportunities there to retain value better, instead of consuming again and again. That is why the company invests in product passports for its core range, even when that information is not yet automatically available, because circularity can only really be managed if it is known what is in the products and what their impact is in use. The same applies to machines. Through service, maintenance and, increasingly, sensors and tracking, the company wants to move from searching to steering, so that equipment lasts longer, is used more effectively and actually returns to the chain.

Steering on lifespan and deployment

VebeGo uses those insights to further improve its services and to learn together with customers and suppliers. For the company, digitalisation is a practical means of gaining control over lifespan, deployment and residual value. In this way, the company turns cleaning from consumption into a well-organised chain in which craftsmanship, sustainability and economic logic reinforce one another and in which value is retained and can be created anew.

The VebeGo logo is positioned in the bottom right corner of the page. It features the word 'VebeGo' in a bold, purple, sans-serif font, followed by a stylized purple icon of three curved lines. The logo is set against a background of several overlapping, thin, light blue and green circles. Two of these circles have small red dots at their intersections. The overall design is clean and modern, with a focus on circular motifs and a color palette of blues, greens, and purples.

VebeGo

Best practices from

NORTH

BRABANT



Affix builds robotic solutions that hold their own when the going gets tough

BEST, NORTH BRABANT

From standalone robot to robust solution

At Affix Engineering, it is not about a robot that can do something once, but about a solution that keeps going every day when production has to continue. Affix comes from a world where 99 to 99.5 per cent uptime is the norm and even that sometimes still does not feel enough. The company brings that discipline to the manufacturing industry. That is why the company builds robotic solutions with vision and AI in such a way that they remain understandable to people on the shop floor and are robust when there is variation in products, packaging and supply.

AI understandable on the shop floor

This delivers concrete benefits for Affix's customers: less repetitive work, more stable quality and production lines that are less likely to come to a standstill when something changes. Affix chooses technology based on what works in the application, not based on the brand someone wants to sell. Precisely because of this, lead times are shorter, the solution remains manageable and the chance of success increases. Affix too often sees companies get stuck on black boxes: systems where it is not possible to see or understand what is happening inside, with licences and dependence on external parties for every change.

Maintaining control and reducing dependency

That is why Affix makes AI practically applicable. Operators can improve the system while it is running, with clear safety layers, and if necessary they can return to a previous version in seconds. In this way, control remains on the shop floor and dependency decreases. Affix's ambition is to grow from bespoke solutions that run invisibly somewhere to products that can be copied and rolled out quickly. Depalletising, vision inspection and smart pick-and-place are logical building blocks in this. Ultimately, Affix wants to take the robotic work out of people's work, so that people can do human work and companies become less vulnerable to shortages, downtime and hassle. When Affix arrives and the customers opens the door, you know what you are doing it for.

The logo for Affix Engineering features the word "AFFIX" in a bold, orange, stylized font with a handwritten feel. Below it, the word "ENGINEERING" is written in a clean, blue, sans-serif font. The logo is positioned in the lower right quadrant of the page, partially enclosed by a large, light green circular arc that overlaps with other decorative arcs on the left side of the page.

AFFIX
ENGINEERING

CBOOST strengthens craftsmanship with smart automation

BREDA, NORTH BRABANT

From standalone tools to systems

CBOOST does not build standalone tools, but smart, collaborating systems with which professionals can multiply their impact fivefold. The strength lies in three pillars that always come together: seeing (AI vision), measuring (sensors) and acting (robotics). With this, CBOOST solves problems where standard solutions get stuck: high-mix production and harsh conditions. In the construction sector, for example, the company replaced the manual and error-prone spraying of casting moulds with a system that first scans, then calculates intelligently and ultimately applies the material extremely thinly and evenly.

Seeing, measuring and acting combined

In aviation, the company developed SensAI: an inspection system that detects deviations on engine components that the human eye misses and thereby accelerates remanufacturing. A combination of visual inspection, proprietary electronics and flexible handling. And for industrial machine builders, the company helps to automatically scan, recognise and assess varying components, so that operators know exactly what is reusable and where maintenance is needed.

Technology strengthens craftsmanship

That is what CBOOST stands for: high-tech that strengthens craftsmanship, prevents waste and keeps materials in use for longer. Smart technology as a means, not a goal, and always applied in practice.



Connected Load Carrier makes supply chains fully visible

'S-HERTOGENBOSCH, NORTH BRABANT

From assets to supply chain transparency

Connected Load Carrier makes the full supply chain visible, from supplier to retailer, from trailers to warehouse. The company connects all moving assets, such as pallets, containers, roll containers, crates, trailers and racks, and also maps fixed links such as warehouses. With smart sensors, connectivity and the company's 360° Asset Control Tower, full insight is created into every link in the chain. Return flows become predictable, rotations increase, downtime is reduced and loss is minimised.

Real-time insight without searching

Connected Load Carrier's approach is both digital and circular. With IoT-as-a-Service, the company offers hardware, software, connectivity, data and support in one scalable model. This creates real-time insight into locations, rotations, stock and arrival times. No more counting rounds, no more searching, no confusion in handovers, but calm, overview and reliable processes. The company always chooses the technology that fits the application, from simple identification to active tracking when that adds value.

Control over return flows and rotation

This keeps the system light, scalable and affordable. The result is full transparency in the chain. Companies gain control, work more efficiently, reduce downtime and optimise return flows.



**Connected
Load Carrier**

Edumar creates flow and circularity with digital control

SOMEREN, NORTH BRABANT

From machining to process flow

Edumar is a metalworking company that turns and mills complex components for high-tech and industrial customers. The company continuously looks at how it can work smarter, not only in the machine but throughout the entire process and in collaboration with customers. Digitalisation helps to create flow, because every delay directly costs value. On the shop floor, the company is working step by step towards a digitally controlled process. Planning and drawings are digitally available at each workstation and quality assurance is integrated into the process. Critical dimensions are recorded during production, not only at the end. This creates calm, predictability and fewer errors in production.

Collaborating and designing with customers

The same way of thinking is applied upstream towards customers. By contributing ideas at an early stage about material choice, tolerances and manufacturability, Edumar helps customers to design more efficiently, with fewer operations, less waste and a longer product lifespan. With data, better insight is created into material use, stock and sawing loss, enabling more targeted purchasing and preventing unnecessary stock.

Data as the basis for circularity

At Edumar, circularity lies in these kinds of concrete choices. By keeping material flows clean, pressing swarf and consciously choosing European origin, value is retained in the chain. In this way, digitalisation is not a goal in itself, but a practical means of working more efficiently, reliably and circularly together with customers.



EDUMAR

Inner makes the physical condition of batteries visible

EINDHOVEN, NORTH BRABANT

From data to visible physical condition

In the transition to a circular economy, digitalisation is not only about data, but about visibility. Inner makes the invisible visible. The company's CT-based diagnostic technology looks deep inside automotive battery packs and reveals what traditional sensors and voltage tests cannot see: loose welds, hidden cracks, swelling cells or structural defects that imperceptibly shorten the lifespan of a battery. By combining advanced imaging with AI-driven pattern recognition and automated reporting, the company gives car manufacturers, service providers and remanufacturers a new level of insight without ever opening the battery pack.

Insight without opening batteries

Inner calls this the State of Integrity: a new digital layer that complements the familiar State of Charge and State of Health and shows the actual physical condition of each component. Inner's technology prevents billions in warranty losses, avoids unnecessary recycling and keeps valuable materials in use for longer. The company transforms automotive battery diagnostics from a cost item into a driver of sustainability.

Integrity as the basis for value

From the factory floor to applications in a second life, Inner helps to close the loop, so that car batteries last longer, perform better and can safely return to circulation. In the company's view, digitalisation is not only about efficiency. It is the key to integrity: the foundation of real circular value.



INNER

FAES Industrial Packaging makes packaging circular

REUSEL, NORTH BRABANT

From packaging to circular data carrier

FAES Industrial Packaging develops smart, reusable packaging for high-tech, medical and industrial customers. What once began as a producer of crates has grown into an innovation partner that lets digitalisation and circularity go hand in hand. FAES does not see packaging as disposable products, but as valuable assets full of data, raw materials and customer impact. The company is building a digital control tower that follows the full lifecycle of packaging: from production and use to return, cleaning and reuse. In this way, the company makes every step visible and automatic.

Digital control over the lifecycle

FAES designs products to be modular and repairable, avoids glue and materials that are difficult to recycle, and uses smart design and automation tools to combine standard components efficiently and speed up production processes. The ERP system forms the digital heart in which the company brings together all material data, compliance information and environmental impact. As a result, the company will soon be able to automatically generate product declarations and passports, without manual work.

Data extends lifespan and value

FAES digitally records every returned package: it measures usage cycles, analyses defects and plans maintenance or replacement in time. In this way, the company extends the lifespan of its products and keeps valuable raw materials in circulation. FAES has the ambition not only to supply, but to manage: packaging as a service in a smart, data-driven and circular ecosystem.



Fluidor Equipment organises circularity by keeping track of every machine

RAAMSDONKSVEER, NORTH BRABANT

From delivery to responsibility over the service life

Fluidor Equipment develops and builds machines for the food industry that process raw materials and concentrates in vats and containers of up to 1,500 litres. The machines are installed at customers worldwide and often run for twenty to thirty years. That long lifespan determines how the company works. For Fluidor Equipment, responsibility does not stop at delivery; the company feels responsible for how the machines function for as long as they are in use. That responsibility begins with design and engineering.

Standardisation and PDM provide control

Fluidor Equipment has extensively standardised the machines and built them modularly. In doing so, Fluidor Equipment limits variation, reduces risks and ensures that the company knows exactly what it is delivering. The core of this is the PDM environment: a digital system in which all product information comes together, from 3D drawings and bills of materials to specifications and changes. Engineering always starts from these established standards. Deviations are deliberate and traceable, creating consistent documentation and a solid basis for service and maintenance.

Insight without a connection and control over service life

In the use phase, Fluidor Equipment has structured service by defining and standardising maintenance intervals. As a result, service teams know what is needed and when, and customers can rely on predictable maintenance. At the same time, the company takes into account the reality of the food industry. Many customers do not want a direct digital connection to their network. That is why Fluidor Equipment works with local data logging on the machine itself. Machines record key data such as operating hours and use, which customers can easily share. In this way, Fluidor Equipment gains insight without cybersecurity risks and the company can give targeted advice on maintenance and performance. Fluidor Equipment also takes responsibility at the end of the service life. When machines are returned, the company assesses them carefully. Only if they meet current technical and control standards does the company supply them again. In doing so, the company overhauls and upgrades these machines, so that they can reliably operate in the market again for many years. If this cannot be done responsibly, the company consciously chooses decommissioning or recycling. For the company, circularity is not a dogma, but a balance between safety, quality and value. Digitalisation helps the company to keep control of the installed base and to keep machines running reliably for longer, as a fixed part of how Fluidor Equipment has worked for decades.



Heijmans turns waste into reusable value

ROSMALEN, NORTH BRABANT

From waste to reusable value

The world around us is changing rapidly. Raw materials are becoming scarcer, customers are asking for sustainable solutions and regulations are setting ever higher requirements. Entrepreneurs who now commit to circularity and digitalisation are not only building a future-proof business, but also creating direct new value. Take Heijmans, for example. A large construction company, yes, but the approach may also be inspiring for SMEs. Heijmans did not start by changing everything at once, but with clearly chosen ambitions and concrete steps.

Building circularity step by step

First by stimulating the reuse of materials, then by designing for disassembly and, in the meantime, building up digital insight into where materials and installations are located. By smartly linking digitalisation to circularity, Heijmans can now retrieve, refurbish and redeploy components. Prefab modules with plug-and-play installations come from the factory and, thanks to digital monitoring, systems last longer. Everything is aimed at retaining value and preventing waste.

From pilots to a scalable chain

This is not something for the future; it is happening now. And it started with small pilots and partnerships, precisely where SMEs excel. So do not be deterred by the scale of the challenge. Start small, think big. Use data and digital systems to gain insight into materials and products and build a circular chain step by step from there. Circularity and digitalisation are not a cost item, but a source of innovation and new business. What Heijmans can do, anyone can do at their own scale and with their own resources.

The Heijmans logo is displayed in a dark blue, lowercase sans-serif font. The letter 'i' has a red horizontal bar above its dot. The logo is positioned to the right of two overlapping circles. The larger circle is light green and partially overlaps the bottom right of the page. The smaller circle is light blue and overlaps the larger one on the left. Both circles have a red dot at their intersection point.

heijmans

Koninklijke Ahrend makes circularity industrially feasible

SINT OEDENRODE, NORTH BRABANT

From standalone project to way of working

At Royal Ahrend, circularity is not a standalone project, but a way of working that runs through the entire organisation. It starts with design: lightweight, modular and using materials that the company knows for certain are safe in reuse and recycling. Chemical composition is just as important as ease of disassembly. If Ahrend wants to give materials a second or third life, the company must know in advance that this can also be done responsibly. These design choices make it possible to organise circularity at scale.

Reuse as part of the factory

In the Circular Hub, Ahrend takes back tens of thousands of products every year. These are not only refurbished, but fully checked, dismantled and rebuilt within the regular production process, with the same quality standards as new. In this way, reuse is not an exception, but part of the factory. At the same time, Ahrend understands that furniture is often not replaced because it is technically worn out, but because the environment or appearance changes. That is why Ahrend designs in families and with interchangeable components.

Digitalisation makes circularity scalable and manageable

This allows a product to get a new look without everything having to be made again. The biggest challenge lies not in technology, but in organisation and market dynamics. The second life of products does not automatically belong to the maker, certainly not in tenders. In addition, the quality of refurbishment is still insufficiently valued, while safety and reliability are essential. For Ahrend, digitalisation is the key to making this manageable and scalable. Not as a goal in itself, but to gain insight into products, chains and use, to better organise services and to continue to extract value from what is already there. Circularity only really works when it becomes business, across the full lifecycle.



ahrend

Landport keeps batteries healthy with smart sensors

RAAMSDONKSVEER, NORTH BRABANT

From manual work to real-time insight into batteries

In Landport's warehouses, thousands of batteries are ready for customers in mobility, industry and logistics. Measuring, checking and recharging the battery stock used to be manual work: sample-based and labour-intensive. With the LVS sensor, which the company developed with partner CBOOST, Landport has completely turned that around. Every pallet that comes in is connected to an extremely energy-efficient sensor that monitors multiple batteries at the same time.

Smart sensors steer on quality and maintenance

Landport's LVS sensor automatically sends voltage data, allowing Landport to see in one dashboard exactly which batteries need attention and which do not. The result is stock that is kept at optimal voltage, less driving around the warehouse and much better insight into quality over time. For Landport, the LVS is not just a piece of electronics, but a way to deal more intelligently with raw materials and labour. The company prevents premature degradation, makes quality easier to discuss with suppliers and gives people time back for tasks that really matter.

Immediately applicable digitalisation with a strong business case

This is exactly the kind of practical digitalisation that benefits the manufacturing industry: easy to apply, immediately valuable and focused on longer service life. And all this with a very positive business case, in which Landport's customers in particular benefit from stock that is kept at optimal voltage, so that they can fully rely on the high quality of the products.



LANDPORT
B A T T E R I E S

Lenze manages machine performance across the entire lifecycle

'S-HERTOGENBOSCH, NORTH BRABANT

From component to motion system architect

Lenze develops and supplies technology that makes machines move and function, from drives and motors to control systems, software and digital services. Lenze explicitly does not position itself as a supplier of individual components, but as a system partner for machine builders. With motion-centric automation, the company brings mechanics, electronics and software together in one integrated system. In doing so, Lenze has a significant influence on how machines perform, how efficiently they run and how long they last. Value shifts from individual hardware to the interplay of components, software and data, precisely where performance and service life are determined.

Standardisation and modularity increase control and supply reliability

In a market with increasing variation and pressure on delivery times, Lenze deliberately focuses on reducing complexity. Through standardisation, modular platforms and software-driven configuration, the number of variants is greatly reduced, while flexibility is maintained. This leads to shorter engineering processes, lower stock levels and simpler maintenance. At the same time, this strengthens supply reliability, which the company approaches as a strategic issue around business continuity management. By classifying components according to risk and criticality, developing alternative sources and adapting designs where necessary, Lenze reduces its dependence on vulnerable supply chains. Less variation means more control and higher predictability in a dynamic market.

Insight into use and retrofit extend service life

After installation, the focus shifts to the use phase. Monitoring and data analysis reveal how machines function, where inefficiencies arise and when maintenance is needed. This shifts maintenance from reactive to predictive and prevents downtime. An important part of this is retrofit, in which existing machines are specifically updated with new drives, control systems and software. This keeps installations in use for longer and reduces material use. At the same time, the role of service, software and the installed base as a source of value is growing. Circularity does not arise here as a separate intervention, but as the result of better design, smarter use and keeping existing systems productive for longer.



Lenze



Nuutro builds modular installations that adapt to changing needs

UDEN, NORTH BRABANT

From bespoke solutions to modular building blocks


Nuutro designs, builds, installs and maintains process installations for the food industry, especially for SME companies and innovative producers that do not fit within standard solutions. The company guides customers from an initial idea to a working installation in the factory, and remains involved throughout the entire service life. Nuutro's strength lies in combining engineering and realisation. Conceiving and building in-house. As a result, Nuutro takes responsibility for ensuring that the process actually works, even with new and not yet proven applications.

Modularity enables reuse and scale

Nuutro started with fully bespoke solutions from a blank sheet, but has learned that this means reinventing the wheel again and again. Nuutro is increasingly working modularly. Building installations from well-considered building blocks that can be reused in future projects. This increases quality, reduces risks and makes knowledge scalable. This modularity is not only efficient, but also opens the door to reuse. An installation is then not one fixed whole, but a set of modules that can create value again in other applications.

From design to maintenance throughout the service life

Nuutro works in clear project phases, so that customers gain early insight into choices, risks and investments. After delivery, the company supports the technical service with periodic inspections and subscription-based service, so that installations continue to run reliably and can be adapted in time. In this way, Nuutro combines technical depth, practical feasibility and future-oriented thinking about the way food production is developing.



nuutro
greengineers

Philips uses digitalisation as a driver for circularity

BEST, NORTH BRABANT

From new sales to retaining existing value

The greatest value lies not in what rolls off the production line tomorrow, but in the hundreds of thousands of systems that are already installed at customers today. For years, Philips mainly thought in terms of new sales, until the company realised that real growth begins with retaining existing value. Digitalisation has been the key to this. Only when Philips mapped the installed base did the company gain insight into where the systems are, how they perform and when they return for reuse or refurbishment.

Insight into the installed base drives customer dialogue and service

Thanks to integrated data, Philips can now see within ten minutes which systems are installed at a customer, how intensively they are used, whether there are service issues and which upgrades are possible. In this way, circularity does not become a separate project, but part of every customer dialogue. Real-time usage data allows Philips to predict when systems need maintenance, which parts the company can reuse and what capacity the company needs to plan for. It makes the work more reliable, more sustainable and more customer-focused.

From manufacturer to involved partner across the service life

Ultimately, this is not about technology, but about mindset. Philips no longer thinks as a manufacturer that delivers and leaves, but as a local business that knows its customers and continues to care for them. That is the shift that truly makes circularity possible.

The Philips logo is displayed in a bold, blue, sans-serif font. It is positioned to the right of a large, light green circle. To the left of this circle, there are two smaller, overlapping light green circles, one of which has a small red dot at its center. The background is white.

PHILIPS

Prodrive gains control of return flows with data and agreements

SON, NORTH BRABANT

From return to insight

Prodrive Technologies develops and produces high-tech systems, electronics and software for, among others, the semiconductor, automotive and medical sectors. The company does not see circularity as something that only begins when a product comes back, but as something that needs to be organised much earlier. For Prodrive, the biggest challenge lies not in the technology, but in the lack of insight once a system has left the premises. Internally, a great deal can be recorded, but after delivery it is often no longer clear how a product has been used, adapted or shared. Then every return becomes a new project, while what is actually needed is to know in advance whether reuse makes sense.

From assumptions to verifiable processes

That is why Prodrive is working on fixed processes in which it is clear what comes in, what condition it is in and what can be reused. This does not rely on assumptions, but on controllable steps. What comes in is checked, recorded and only then financially settled. In this way, circularity is taken out of the project sphere and becomes part of daily operations.

Data as the basis for service life extension

At the same time, it becomes clear that real progress requires better information about the use phase. If it is known how a system has been loaded, under what conditions it has operated and which parts show wear, decisions on service life extension and reuse can be made much more specifically. This requires agreements on which data can be shared without compromising IP. That discussion must be conducted jointly within the chain. Design plays a key role in this. When upgrades, traceability and replacement of critical parts are considered from the beginning, space is created to preserve product value for longer. This sometimes requires choices other than only the lowest cost price. The return is not immediately visible, but becomes apparent over the years. For Prodrive, circularity is not a separate sustainability goal, but a way to gain control over complexity, manage risks and retain value in a high-tech chain.

QuestPair brings together supply and demand for used laboratory equipment

'S-HERTOGENBOSCH, NORTH BRABANT

From fragmented market to global overview and discoverability

QuestPair is a data-driven marketplace that brings together supply and demand for high-quality used laboratory equipment worldwide. In a market that has remained fragmented and invisible for years, the company provides overview, discoverability and trust. Worldwide, enormous quantities of equipment are standing idle, while researchers, lab managers and R&D teams are at the same time looking for precisely that functionality. QuestPair connects these two worlds. The company's proposition is built around real market demand.

Connecting supply and demand efficiently and transparently

Buyers are not looking for 'second-hand', but for a working device that is quickly available, functions reliably and fits their application. Sellers want to keep their stock rotating instead of leaving it standing still in warehouses. QuestPair ensures that supply and demand come together efficiently and transparently, on a global scale. The company focuses on a broad spectrum of laboratory equipment, including microscopes, centrifuges, spectrometers, incubators, balances and complete test and setup systems. From compact lab instruments to complex and capital-intensive installations.

Data and market forces keep equipment in use

By combining in-depth product knowledge with structured data on specifications, applications, condition and availability, QuestPair makes this equipment findable and comparable. On the supply side, the company supports professional sellers, refurbishers and organisations with stock that often remains hidden. Much value is locked away in storage, not because equipment is written off, but because discoverability is lacking. By smartly matching supply and demand, QuestPair accelerates transactions, shortens lead times and keeps valuable assets in use for longer. This is based on the belief that a mature, transparent second-hand market is essential for innovation, affordability and circularity in research and industry. By connecting data, market forces and trust, QuestPair ensures that laboratory equipment continues to do what it was designed for: enabling research and innovation, also in the next phase of life.



SandGrain gives every component a digital identity

EINDHOVEN, NORTH BRABANT

From device without identity to verifiable identity

SandGrain is a deep-tech company that gives every electronic device its own unique and un-changeable identity. The small hardware chip and secure cloud service make every component verifiable, traceable and protected throughout its entire lifecycle. This is done by placing a secure ID chip in the product. This chip communicates with the cloud platform, which confirms authenticity, records use, enables secure firmware updates and tracks changes of ownership.

Full insight into use and performance

In this way, manufacturers and service providers always know what is in the field, how it is performing and when maintenance or reuse is needed. SandGrain works with companies in electronics production, energy systems, lighting, mobility, medical equipment and industrial machines. SandGrain's technology helps them protect intellectual property, prevent counterfeiting and develop new circular services, such as reuse, refurbishment and take-back programmes.

Digital identity enables circularity and value

By giving products a verifiable identity, SandGrain makes it possible to reuse more and waste less. Only what is truly defective is replaced, while materials and costs are saved. Because the history of every component is known, sustainability can be demonstrated and lifecycle data supports audits and product passports. At the same time, new value is created, because secure products form the basis for smart circular business models. SandGrain turns trust and traceability into material savings, stronger margins and real circularity in electronics.



SandGrain

TSG connects machine building, software and process knowledge

EINDHOVEN, NORTH BRABANT

From separate Excel files and knowledge in people's heads to a visible process

TSG works at the intersection of machine building, software and digitalisation. The company develops and builds smart machines and products, but just as important is that TSG understands how the customer's process really works. Many companies think that digitalisation starts with software, dashboards or data analysis. In practice, however, it almost always starts with the process on the shop floor. If TSG does not understand how a factory really runs, it cannot support customers in making digital improvements.

Machines and software together provide control information

TSG sees that many manufacturing companies still work with separate Excel files, manual coordination and knowledge that sits in operators' heads. This works as long as the factory remains small, but as soon as complexity increases, it becomes a limitation. TSG uses those insights to make processes more stable: planning, material flows, operations and decision points. Once that is clear, the company can apply automation, robotisation and software in a way that creates real value. TSG's strength is that it brings hardware and software together. Developing machines, but also the software, data integration and digital applications around them. As a result, TSG can build machines that not only produce, but also provide data on performance, use and maintenance.

Digitalisation extends service life and prevents waste

This information helps customers to make their processes more stable, prevent downtime and organise production more efficiently. Circularity often arises naturally in that process. If TSG understands and digitalises processes better, errors, downtime and waste can be prevented. Machines run more stably, products are made more accurately and raw materials are used more efficiently. In some cases, this also leads to better designs, for example lighter or stronger components that need less material. TSG also sees that digitalisation helps to maintain the value of machines for longer. By being able to read machines remotely and monitor performance, customers can identify problems earlier and plan maintenance better. This extends the service life of installations and prevents unnecessary replacement. In this way, value shifts from only new machines to a combination of engineering, software and services across the entire lifecycle. For TSG, digitalisation is a way to make industry smarter, more robust and less prone to waste. By connecting machine building, software and process knowledge, TSG helps companies organise their production in a future-proof way. This not only delivers higher productivity, but also more efficient use of materials and energy. Digitalisation and circularity then turn out not to be separate tracks, but two sides of the same system.



Vanderlande connects service life, data and circularity

VEGHEL, NORTH BRABANT

From standalone sustainability programme to operational system

For Vanderlande, circularity is not a standalone sustainability programme and also not a final step at the end of the lifecycle. Vanderlande's systems often remain in place for decades and form the heart of critical logistics processes. This means that value creation mainly lies in service life extension, availability and predictability. Digitalisation is not a goal in itself, but a way to better understand what happens with existing systems: where systems wear, why components fail, how performance and energy use develop and where interventions have a demonstrable effect.

Targeted maintenance and upgrades keep systems available

In this context, circularity does not arise because Vanderlande takes back complete systems, but because the company manages component flows, can upgrade modules and performs maintenance in an increasingly targeted way. For the company, remanufacturing, refurbishment and reuse are not standalone activities, but means to support the operational availability (uptime) and reliability of systems. They shorten delivery times, lower operational costs and reduce material use, precisely because they are embedded in the existing system and service organisation.

Data closes the learning loop and steers design

At the same time, Vanderlande sees that the real next step lies in closing the learning loop. The company is increasingly able to determine when a component needs to be replaced, but it also wants to systematically record why it fails, how often this happens and what this means for design choices, purchasing strategies and service concepts. This is where operational data, the supply chain and circularity come together. Not as abstract sustainability goals, but as concrete steering information for better systems that last longer, use less energy and perform more predictably in practice.

The logo features the word "VANDERLANDE" in a bold, black, sans-serif font, underlined with a thick orange horizontal bar. The logo is positioned on the right side of the page. To its left, there are several overlapping circles of varying sizes and colors (light blue and light green). Two of these circles have a small red dot at their intersection point.

VANDERLANDE

Best practices from
OVERIJSSEL



Althea connects precision craftsmanship, material insight and digitalisation

DEVENTER, OVERIJSEL

From end-of-life recycling to good production at the start

Althea Plastics Products in Deventer develops and produces, with a small team, plastic solutions for the construction sector, such as cavity trays, profiles and custom components used in window frames and façade structures. These are products that are no longer visible after installation, but that are essential for waterproofing, protection against moisture and weather influences and the long service life of a building. The strength of the company lies in combining craftsmanship with practical input throughout the chain. Althea works closely with joinery workshops, prefab builders and suppliers to create solutions that fit the application precisely.

Joint development prevents errors and extends service life

At Althea, this can involve small adjustments to profile shapes, smart click systems or custom welding of foils and profiles. By developing this together, Althea prevents installation problems, limits damage and extends the service life of structures. For the company, circularity does not begin with recycling at the end, but with good production at the start. By working precisely and producing products exactly to specification, Althea prevents material loss and unnecessary waste. Residual flows of PVC and film are collected separately and returned to the chain. At the same time, the company is working with suppliers to explore how it can increasingly use recycled materials without compromising on quality or workability.

Data provides control over materials and the production process

Digitalisation helps Althea to further improve that process. The company is working on an integrated system that brings together orders, material flows and production planning. This gives the company better insight into which profiles and materials it uses, where cutting waste occurs and how it can organise production more efficiently. Data helps to purchase more intelligently, reduce residual material and stabilise production processes. For Althea, digitalisation is not a goal in itself, but a means of gaining control over materials and processes. By planning better, producing more accurately and continuing to improve together with customers and suppliers, the company shows that even a relatively small manufacturing company can play a major role in a circular and future-proof construction chain.



Duspot connects companies in circular chains

ENSCHEDÉ, OVERIJSEL

From separate residual flows to connected chains

Duspot believes that circularity only really works when companies are smartly connected. That is why Duspot has developed an independent digital platform that seamlessly matches supply and demand for residual flows, obsolete materials and circular products. With Duspot's SaaS tool, companies retain their own identity and systems, while benefiting from the power of a broad ecosystem. This creates direct access to new markets, customers and revenue models without complexity or loss of autonomy.

Digital platform makes circular matches real

Duspot's platform goes beyond the digital realm. The company also organises networking events, programmes and regional partnerships. In doing so, Duspot brings stakeholders together and ensures that circular matches are not only visible, but actually take place. The approach is practical and results-oriented, from initial chain collaboration to large-scale upscaling. Entrepreneurs appreciate this, because they mainly need concrete solutions. They want to know what they can do today so that materials can be repurposed tomorrow. That is precisely what Duspot makes possible.

Scaling up to new chains and markets

Duspot has built up its experience in the construction sector, where the company has set up successful circular chains together with large construction companies and regions. Now Duspot is taking the next step with a new initiative in the steel chain, where reuse of steel at product and component level is central. There are also enormous opportunities in the high-tech manufacturing industry. By making smart use of stocks and return flows, Duspot creates new value, saves costs and takes a step towards a future-proof economy. Duspot provides the digital engine, the network and the approach to turn circularity into tangible returns, directly from practice and tailored to the needs of entrepreneurs.

The Duspot logo is positioned in the bottom right corner of the page. It features the word 'duspot' in a lowercase, sans-serif font, with 'du' in green and 'spot' in black. A registered trademark symbol (®) is located to the upper right of the 't'. The logo is set against a background of several overlapping, thin, light blue and green circles of varying sizes, some of which have small red dots at their intersections.

duspot[®]

Falco maximises material use and prevents waste in production

VRIEZENVEEN, OVERIJSEL

From material to process control

Falco produces street furniture, shelters and bicycle parking systems with a clear focus on service life and material use, with material use and process control at the centre. In the factory, circular thinking and digital precision come together. The company actively manages how materials, design and process influence one another. By designing and producing in-house, control is created over every step in the process and it becomes visible where waste occurs and where it can be prevented.

Digital precision prevents loss and errors

In production, data, automation and craftsmanship are combined to work smarter and more resource-efficiently. With advanced tube lasers, robots and nesting software, material is used optimally and cutting waste is minimised. Data helps to substantiate choices and continuously improve processes. Deviations, errors and inefficiencies become visible more quickly and can be corrected immediately. This creates a production process in which fewer rejects occur and raw materials are used more efficiently.

Process, product and reuse as one system

The production method is directly aligned with how products are used and reused. Products are designed to be dismantled, repaired and redeployed, without compromising on quality. Used products are digitally registered, assessed and redeployed. With instruments such as the Environmental Cost Indicator and Environmental Product Declarations, Falco makes the impact of choices visible to customers. This creates a system in which design, production and reuse are aligned and in which less waste and more value retention are central.



Pentas connects digitalisation, manufacturability and circularity

ALMELO, OVERIJSEL

From process to digital foundation

Pentas is a producer of rotationally moulded plastic products for OEM customers in, among others, tractor manufacturing and agricultural mechanisation, trailer and motorhome construction, wind energy and utility applications. Customers retain ownership of the product design, while the company contributes ideas on design and manufacturability. At Pentas, digitalisation, Industry 4.0 and circularity are not separate projects, but successive steps that reinforce one another. Digitalisation has been the foundation for this for many years. Around 2000, the company began developing its own ERP environment to gain control over its processes. Now, virtually the entire organisation runs on this system, from order and production to quality and logistics. At Pentas, data is therefore not separate from the process, but sits at its heart, forming the basis for control over circularity and raw material use.

Industry 4.0 and insight into waste

That digital foundation has been further expanded with Industry 4.0 principles. Machines, sensors and measuring instruments are connected to the network, supported by investments in infrastructure and security. In production, reliability and predictability are crucial. Incorrect planning or suboptimal machine combinations lead directly to additional downtime, material loss and energy consumption. By linking data from machines, planning and quality, insight is gained into where waste occurs and how it can be structurally reduced.

Traceability and circular organisation

Product traceability is organised on this basis. Each product is given a unique code, linked to process and material data in a digital product passport. This is designed with quality and efficiency in mind, but also explicitly with circularity in mind. With laser engravings and QR codes, this information remains available for high-quality recycling and future reuse. In parallel, knowledge is being built up on the responsible use of recycled materials. AI-driven planning marks the next step towards further reducing waste in time, energy and capacity. This creates a future-proof factory: digitally controlled, industrially manageable and circularly organised.



OVSoftware makes existing machines smarter and more valuable

ENSCHEDÉ, OVERIJSEL

From new sales to value in existing machines

OVSoftware has been helping companies for more than fifty years by building and managing smart software. The company has more than 200 employees in the Netherlands, Germany and Romania and has one goal: to strengthen what already exists, together. The company believes that standard solutions are often not enough. Every machine, every process and every company is unique. That is why the company creates bespoke software, so that it truly fits the way the customer works.

Step by step towards smart digital services

OVSoftware works step by step. First, the company gets to know the customer. Then OVSoftware works with the customer to draw up a plan and develop a solution that actually works. After launch, OVSoftware continues to monitor, improve and ensure that everything remains secure and future-proof. Examples of customers that have made their products smarter with digital services include Nedap Livestock Management, Nedcon and Moba. In this way, the focus shifts from only new sales to also the machines that are already in use. In simple steps, the customer develops step by step: from a supplier of a product, to a supplier offering additional services, to a fully-fledged partner providing comprehensive services, and ultimately to products that function as services.

Longer lifespan and new revenue models

For the customer, this means greater convenience, more overview, greater certainty, new revenue models and a stable foundation for the future. It also contributes to sustainability. Through better maintenance, reuse and a longer service life, fewer raw materials are needed. In this way, OVSoftware works with customers not only on profit, but also on a circular future.



OVSoftware

TechNikkels connects machine building, automation and data

HOLTEN, OVERIJSEL

From machine to system

TechNikkels develops and builds machines for product handling and packaging solutions, where the real value lies not only in the machine that is delivered, but in how that machine continues to perform in practice. Machines often run for years at customers and must remain reliable, flexible and adaptable in an environment that is constantly changing. This requires a different way of looking: not only at technology, but at the whole of control, software, data and service across the full lifecycle.

Automation and digitalisation as a foundation

Automation plays a central role in this. Together with technology partners, the company ensures that machines not only move, but also 'understand' what they are doing. Control, drive technology and software form the foundation on which further development is built. As a result, processes can be made more stable, adapted more quickly and better supported remotely. Digitalisation does not arise from dashboards afterwards, but from the machine itself, as an integral part of the process. In practice, this combination of machine building and digitalisation directly contributes to circularity and raw material use. Through better insight into use, performance and wear, machines can remain in operation for longer and be adapted or upgraded in a more targeted way. Parts are not replaced because they have to be, but because data shows that it is necessary. This shifts the focus from replacement to improvement and continuously creates new value from the installed base.

Standardisation and continuous improvement

TechNikkels' strategy is aimed at structurally strengthening this development. Investments are being made in standardisation and modular design, so that machines remain easier to adapt and maintain. Service is becoming increasingly important in this context: not as a side issue, but as an integral part of the proposition. By monitoring machines and customer projects more closely, continuity and efficiency can be safeguarded and changes in practice can be responded to more quickly. At the same time, innovation is given a clear place within the company. New technology should not stand alone, but be directly applicable in machines and for customers. This creates a learning system in which design, use and improvement are continuously connected. Digitalisation, automation and circularity come together in this as one logical whole. For TechNikkels, digitalisation is a way to make machines perform better, maintain their value for longer and structurally support customers. In this way, a machine fleet is built step by step that not only works today, but also continues to deliver value tomorrow and the day after.

Veldkamp creates new value from old production lines

RAALTE, OVERIJSEL

From new machines to making the most of existing lines

Veldkamp from Raalte gives existing packaging lines and production machines a second, third and sometimes even fourth life. Since 1988, the company has not built new machines, but keeps the installed base of customers running, up to standard and future-proof. The company's mission is clear: to keep a production line profitable for as long as possible. This starts with availability and reliability, but goes further than maintenance alone. Veldkamp uses targeted data to analyse where performance is being lost, replaces outdated control systems with modern, intelligent systems and combines mechanical overhauls with digital monitoring.

Targeted upgrades bring lines back to top condition

In this way, the company brings old lines back to a condition that is not only technically sound, but also ready for the next phase of their lifecycle. What makes Veldkamp distinctive is that the company does not think from new build, but from value retention. Instead of automatically replacing, the company looks at what is truly necessary. Through selective logging, energy and process analysis and short payback periods, the company shows that 80 per cent of a 'new' line is often already on the shop floor. With targeted upgrades, modular modifications and remanufacturing, Veldkamp keeps machines in the chain and reduces dependence on new raw materials and vulnerable supply chains.

Lifecycle thinking makes circularity operational

As part of the Swedish XANO Group, Veldkamp is now broadening this approach to international OEMs. Service, upgrades and lifecycle thinking are not seen as aftercare, but as strategic pillars. The company's conviction is that circularity is not a separate project, but the logical consequence of good organisation, smart measurement and technical craftsmanship. Veldkamp does not sell new machines. The company maximises the value of what is already there. That is the company's contribution to a manufacturing industry that is both economically strong and circularly organised.



VELDKAMP

Zehnder connects indoor climate, digitalisation and service life

ZWOLLE, OVERIJSEL

From individual product to indoor climate system across the full lifecycle

Zehnder is focusing less and less on individual products and increasingly on the total indoor climate system across the full lifecycle. The company supplies ventilation, heating and climate solutions that often operate in buildings for decades. The value therefore lies not only in developing and selling new products, but precisely in how installations perform in practice, how long they last and how the company can support them during use with service, maintenance and data. Modular design has long been in the company's DNA.

Modular design keeps systems in use for longer

Not because the company used to call it circularity, but because a good product must be maintainable and logically constructed. If a component needs to be replaced, Zehnder does not want the entire system to have to be written off immediately. That design philosophy now makes it possible to keep products in use for longer, replace components and limit material use. In the factory too, Zehnder has been working for years with lean production and continuous improvement, enabling the company to use raw materials and processes more efficiently.

Data makes performance transparent and predictable

For Zehnder, the next step lies emphatically in digitalisation. The company's systems contain sensors that measure airflows, temperature and humidity. Through apps and digital platforms, the company is working towards better insight into how installations function in the field. This enables predictive maintenance, helps installers and gives Zehnder, as a manufacturer, the opportunity to further optimise products during use. Ultimately, the company wants to move towards solutions that focus not only on the product, but on the guaranteed performance of the indoor climate system. Circularity does not arise here from one separate project, but because design, production, service and data are becoming increasingly connected. The better Zehnder understands what is happening in the field, the better the company can retain the value of its products for longer and the more intelligently it can manage materials and components.

The graphic features three overlapping circles in light blue and green. A red dot is located at the intersection of the two larger circles. The word "zehnder" is written in a bold, red, lowercase sans-serif font, slanted upwards from left to right, positioned over the right side of the circles.

zehnder

Best practices from
ZEELAND



Heros recovers metals and minerals from bottom ash

SLUISKIL, ZEELAND

From waste product to industrial raw material flow

Heros in Sluiskil processes bottom ash from waste incineration plants into new raw materials for industry. What many people see as a waste product, Heros sees as a complex mixture of materials in which significant value is still present. Through a combination of separation technology, process knowledge and analysis, the company recovers metals and minerals that can be reused in industrial chains. For example, iron and steel find their way back to steelworks, aluminium goes to smelters and other metals are reused in new products.

Industrial separation makes hidden value visible

Heros' operations resemble an industrial factory in many respects. The company receives large volumes of material from an international network of waste incineration plants, analyses these flows, separates them in multiple steps and then supplies secondary raw materials to various markets. In practice, circularity proves to be primarily an industrial challenge: it requires scale, technology, logistics and continuous process improvement. An important part of Heros' work is to continuously increase the recovery of materials. With techniques such as magnets, different types of separation installations and smart sorting systems, the company extracts metals from bottom ash that would otherwise be lost.

Data steers efficiency and process improvement

Materials are separated based on properties such as magnetism, weight, shape and density. By improving the process step by step, Heros is able to recover more and more value from these flows. Digitalisation is playing an increasingly important role in this. From the moment material arrives at the company, the company tracks batches throughout the entire process. Analyses, production data and logistics information are linked, creating better insight into quality, yield and process performance. This information helps Heros to work more efficiently, reduce losses and maintain installations more effectively. What Heros does here shows that waste is not the end of a chain, but the start of a new raw material flow. By systematically analysing, separating and reusing residual flows, materials remain in circulation for longer and retain their value in industry.



Jansen extends service life through craftsmanship and adaptation

THOLEN, ZEELAND

From building to adapting

At Jansen, solving technical challenges in production environments has been central since the 1980s. From a family business that started with maintenance and modifications to installations, the company has grown into an enterprise that builds, overhauls, modifies and redeploys machinery across a wide range of industries. The work ranges from plastics processing and the food industry to cable recycling, chemicals and process industry. It is almost always bespoke work. Machines are rarely built in series, but developed for a specific application or adapted to an existing production line.

Extending service life in practice

It is precisely in these kinds of environments that a great deal of circular value is created. Many installations still have a long technical and economic life, provided the right intervention points are known. At Jansen, machines are not only built, but also refurbished, adapted to new processes or fitted with new control systems. As a result, installations that would otherwise be written off can often continue to operate reliably for years. Sometimes this involves a mechanical modification, sometimes a new control system or software modernisation. In other cases, machines are refurbished and redeployed with another user. Jansen's strength lies in the combination of disciplines under one roof. Mechanical engineering, electrical engineering, control engineering, assembly and service come together in one team. This means that a customer with a problem can turn to one party that oversees the whole and actually solves it, from repairing worn parts to modifying complete installations.

Digitalisation and circular value

Digitalisation is playing an increasingly important role in this. For various installations, control systems and process data can be monitored remotely. This often allows Jansen to quickly identify where a fault lies or which parameter needs to be adjusted. This saves travel time, prevents downtime and enables machines to run more efficiently. Circularity therefore takes on a practical meaning at Jansen. By repairing, modernising and reusing machines, the value of materials, parts and technical systems is retained. A system that can continue to operate for ten years longer, a component that can be reused, or a machine that is given a second life: that is where real circular value is created. In this way, Jansen shows that digitalisation, maintenance and technical expertise together form a strong foundation for an industry in which machines last longer and existing systems can create value again.

Kraker Trailers develops lightweight, strong moving floor trailers

AXEL, ZEELAND

From robust and heavy to strong and light

At Kraker Trailers in Axel, the company develops and builds moving floor trailers for customers across Europe and beyond. One question is central to everything the company does: how does the company make a trailer that is as light as possible, yet remains strong, reliable and versatile? In this industry, weight is directly linked to value. The lighter the vehicle, the more cargo the customer can carry. This is economically advantageous, but also means that fewer journeys are needed for the same transport capacity. In this way, efficiency and sustainability are already built into the design.

Smart design with aluminium and less material

The trailers consist largely of aluminium. This material is light, strong and highly recyclable, but it requires smart design. That is why the company constantly looks at how it can improve structures, standardise parts and deliver the same or even better performance with less material. Over the years, the company has continuously optimised its products, not by building them heavier, but by constructing them more intelligently. An important part of this development is the modular design. Kraker is increasingly working with bolted and assembled parts instead of welding everything together.

Data extends service life and reduces costs

This approach originated from logistics and production: parts are easier to transport, assemble and replace where necessary. At the same time, it offers other advantages. Damaged parts can be replaced more easily, materials are easier to separate and trailers can be adapted more easily during their lifespan. In addition, digitalisation is playing an increasingly important role. With the Moving Smart concept, Kraker collects data from the trailer on use, wear and performance. This enables the company to better support customers in the maintenance and management of their fleet. Good insight into, for example, the condition of the floor helps to intervene at the right moment, extend service life and reduce total cost of ownership. For Kraker, the strength lies in the combination of design, material choice, standardisation and data. In this way, the company not only builds a trailer for today, but develops a product that can be managed more intelligently, maintained better and used for longer throughout its full lifespan.



Napoleon keeps its confectionery factory running with data and supply chain management

BRESKENS, ZEELAND

From simple sweet to industrial process

Confiserie Napoleon in Breskens has been making hard sweets for generations, which are sold worldwide. What consumers see as a sweet is, for the company, an industrial process in which raw materials, machines and supply chains must work together seamlessly every day. The production process seems simple: sugar, glucose and water. In reality, it is about a precise interplay of temperature, timing and material behaviour. The mixture is cooked, shaped and cooled under controlled conditions, after which the product is packaged and distributed. Small deviations have a direct impact on quality and yield.

Control over raw materials and supply chain risks

The biggest changes today are mainly in the supply chain. Raw materials come from different countries and are increasingly under pressure from regulations, geopolitics or fluctuations in availability. This makes insight into the supply chain more important: Napoleon needs to know where raw materials come from, when to purchase them and how risks are managed. Digitalisation helps the company to keep that overview. The company has digitised maintenance, production data and registrations step by step. Machines, processes and planning are supported by data and dashboards, making it easier to see quickly what is happening in the factory.

Extending service life and reducing waste

At Napoleon, circularity is primarily about practical choices. Product rejects and cutting residues can be brought back into the process. For packaging, the company has switched from plastic to waxed paper wrappers for the Napoleon sweets, saving a significant amount of plastic each year. The machinery also requires attention. Many machines have been operating here for decades. Through overhauls, upgrades and adjustments to control systems, the company aims to keep them in use for as long as possible and retain the value of existing installations. Ultimately, it is about reliability. The factory must produce consistently every day and customers must be able to rely on constant quality and delivery. Digitalisation, supply chain visibility and extending service life help the company to achieve this.



Prince makes customisation manageable in a non-standard environment

THOLEN, ZEELAND

From non-standardisation to manageable customisation

Prince Kunststof Infra develops and produces plastic fittings for gas, water and sewerage pipes. The company provides solutions for situations that can never be fully predicted in advance. Underground, all kinds of things come together: different materials, diameters and systems from different periods. That is precisely where it has to fit and continue to function. That is where Prince comes into its own. What the company makes disappears from view, but often remains there for decades. Once it is in place, it simply has to be right. Replacement is not an option, so Prince must get it right the first time. That requires precision in design, material choice and production. Prince takes responsibility for what it makes, even outside direct sight. This is visible, for example, in the development of biodegradable end caps for pipes and fittings, in collaboration with Hemcell. These replace the current caps made from recycled material, which in practice are almost impossible to recover and recycle. At Prince alone, this concerns several thousand caps per year.

Capturing experience makes quality repeatable

This reality makes the work complex. Not everything can be standardised, so Prince must gain control in another way. Much knowledge lies in people's experience, for example in injection moulding, where settings and material behaviour determine the end result. That is why the company decided to record that knowledge step by step. In this way, processes become repeatable and Prince becomes less dependent on coincidence or individual experience. The company works with a limited number of plastics, but in many different applications. By better recording what Prince purchases, processes and where it ends up, the company gains more insight into quality and use.

Working smarter prevents unnecessary use

This helps Prince to work more consciously and limit material waste. A good example of how Prince works is RenoJoint. This is a coupling that allows a pipe to be temporarily sealed off without installing an emergency pipe. In practice, this means less excavation, less material and less time on site. What normally takes several days can often be done in one day. In this way, Prince simplifies outdoor work and prevents unnecessary use of people and resources. Ultimately, it is about control over what the company does. By recording knowledge, better understanding how processes work and making products that last, Prince ensures that what it makes continues to function where it is needed: underground.



Best practices from
**UTRECHT &
FRIESLAND**



BD Kiestra gives systems a new life

DRACHTEN, FRIESLAND

From phasing out to reusing systems

BD Kiestra develops and builds automated systems for microbiological laboratories that have been in operation worldwide for many years. These systems rarely disappear because they are technically at the end of their life, but because laboratories switch to a new generation or reorganise their processes. That is precisely where the reuse question begins for BD Kiestra. Instead of seeing phasing out as the same as discarding, the company increasingly looks at what is already there. Existing installations, modules and components represent value that is often overlooked. By retrieving systems, assessing them and redeploying them in a controlled way, opportunities for reuse arise within a highly regulated context.

Control and quality in reuse

This does not require grand words, but practical steps: knowing what is in the field, understanding how it has been used and carefully determining what can be reused. Reuse starts with small, concrete interventions. Repairing parts that frequently fail, reusing robust components and consciously using scarce electronics form the basis. From there, the thinking extends to the reconditioning of complete systems. This is only possible if quality, decontamination and testing are taken just as seriously as in new build. Here, reuse does not mean 'second-hand', but controlled reuse with the same responsibility for performance and safety.

From replacement to extending value

This way of working goes beyond circularity alone. By reusing existing systems, dependence on vulnerable supply chains is also reduced and capacity remains available for customers who want to expand without having to redesign their entire lab. Data from the use phase helps to make better choices, both in service and in design and procurement. In this way, the focus shifts from replacement to extending value. Reuse is not an end point, but a logical part of how BD Kiestra manages quality, availability and value throughout the full lifecycle of its systems.



ZYTEC eliminates wear and energy loss in drives with contactless couplings

NIEUWEGEIN, UTRECHT

From fixed connection to contactless drive

Zytec develops and supplies drive systems without physical contact, as a replacement for the traditional coupling between motor and equipment. In traditional installations, such as pumps, fans, compressors and generators, the rotation of an electric motor is transmitted through a rigid, fixed connection. That connection requires perfect alignment, but in practice vibrations arise during use due to heat, thermal expansion, foundation problems and other factors. This leads to wear, malfunctions and maintenance. ZYTEC removes that rigid connection and replaces it with a contactless system based on magnetic transmission. A small air gap is created between the motor and the equipment, allowing motion to be transmitted without physical contact. This removes a fundamental cause of wear from the system.

No contact means no wear and less downtime

Because components no longer touch each other, many classic failure mechanisms disappear. Vibrations are not caused by misalignment and are not transmitted. Alignment errors are absorbed and thermal expansion no longer creates stresses in the system. Bearings, seals and couplings wear less or not at all, maintenance is greatly reduced and installations can run for longer without interruption. Deviations that would normally lead to damage or downtime have virtually no effect in this system. Maintenance therefore shifts from necessary intervention to exception, and the reliability of installations increases structurally.

Saving energy by supplying exactly what is needed

In addition to reliability, a second benefit arises: energy efficiency. In many industrial applications, systems are deliberately run at excess capacity, after which capacity is throttled with valves or other control mechanisms. By making the power transmission adjustable, the system can deliver exactly what is needed, without structural loss. In practice, this leads to energy savings of thirty to forty per cent, sometimes more. At the same time, material use, maintenance and dependence on service decrease. The solution therefore addresses several issues at once: lower energy consumption, less downtime, longer service life and lower raw material use. The challenge lies not in the technology, but in adoption. The solution is relatively invisible and requires a different way of looking at a system that has been working in the same way for decades.



 **ZYTEC**
Non-contact drive

