Expert Group

Data management for a circular economy

Data management in a circular economy

shopping tomorrow

Takeaways

1. The highest priority is awareness. Once all the links in the supply chain are fully aware of the benefits of recycling, the circular ball will start rolling.
2. Standards make it possible to share information. Through the use of standards, items are assigned a digital identity – with all the associated circular benefits. This might include information about composition, origin and production. Making sure this information can be shared creates unlimited opportunities for recycling.
3. New technologies cause an acceleration. Artificial intelligence and blockchain technology will speed up the transition toward a circular economy. More accurate forecasts and the secure sharing of information will help increase transparency.

Host

GS1 Nederland

Chair

CGI

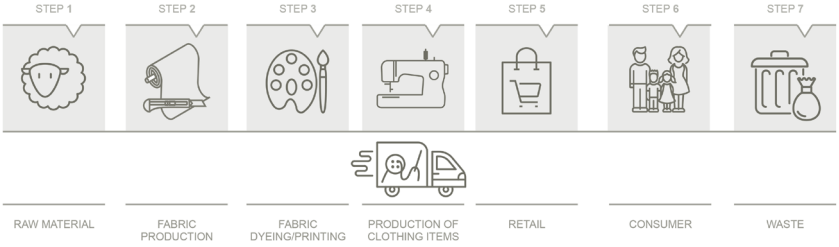
The Journey of the Jeans

In order to be certain there is sufficient food, drink and prosperity for everyone by 2050, a transition from a linear to a circular economy is essential. In this type of economy, finite natural resources are not exhausted and residuals are used again. This blue paper focuses on the fashion industry, as the waste of natural resources in this industry is substantial.

In order to be able to manage these processes in this economy, information is required that is collected by the parties concerned and which they can exchange among themselves. This includes specific product data (e.g., materials passport), process data, events (traceability) and party-related information. Facility information, like certification, is also relevant in this context. This type of certification, which generally consists of a scope and a transaction certificate, demonstrates that the manufacturer can satisfy the requirements and that the shipment was made in accordance with these requirements.

Although the terms “sustainability” and “circularity” tend to be used interchangeably, there is a difference between the two: whereas sustainability relates to people, planet and economy, circularity contributes to a more sustainable world and is focused on the cycle of natural resources. Circularity has no value perception in and of itself; circularity is factual (similar to 1+1=2) and is about data: data that can be recorded, transferred, and analyzed. The use of data will support the transition toward a circular economy.

Our expert group explored the various processes and measures implemented in the supply chain within the fashion industry and assessed their relevance in the short and long term. We examined how the collection and exchange of information can be organized most efficiently. What basic standards and new technologies might be able to play a role in this process, in order to transition from the current linear supply chain (see the image on the next page) to a fully circular economy (see the image on page 182)? In this blue paper, we provide an outlook for the near and slightly more distant future. We hope to offer you, as a link in the (fashion) retail supply chain, guidelines for getting started with circularity through the use of data.



The linear supply chain: Journey of the Jeans

1. From seed to thread

Circular economy versus a traditional linear economy: the above image shows what the expert group calls the "Journey of the Jeans." Note that "jeans" is a metaphor in this case; you can substitute any other product you like. The birth of this pair of jeans starts when a seed is planted on a cotton plantation: a seed carrying DNA, where each step in the process signifies the growth of the DNA. DNA is a metaphor for data in this case, with each step delivering data and each transfer indicating the transfer of this data. Data represents the key to a circular world.

The fabric manufacturer purchases cotton grown on a cotton plantation. On this plantation, chemicals (including pesticides and fertilizer) are added to the cotton plants. This data represents relevant information for tracking and tracing products. This is already being used throughout the food and beverage industry, but there is still considerable progress to be made in the fashion industry. We are all familiar with phenomena such as labor conditions in Bangladesh, registrations on the back of a cigar box, and agreements established simply by a handshake. There is no equal level of development worldwide, let alone in terms of data development. If a materials passport were to be created of the jeans, this would contain a long series of data of various types. If the jeans are sold along with the materials passport, the consumer can use this passport to make more informed decisions when making purchases. Once the jeans had been worn, the consumer can then choose to either recycle the processed natural resource (cotton) or to have it responsibly destroyed.

We are about to embark on this circular journey and want to prevent a loss of focus by getting bogged down in the details. The idea is to start small and end big. Increasing awareness of circularity, with respect for the other players in the supply chain.

What is a circular economy?
A circular economy is an economic system based on minimizing the use of natural resources by recycling products, components, and natural resources. It is an economy of closed loops in which products retain their value, renewable energy sources are used, and we look at the entire system from production to waste management.

This is centered on the optimal use of products (re-use) combined with (secondary) raw materials (recycle), which have a net positive value. This should eventually result in less use of raw materials/natural resources (reduce).[1]

1 CIRCULAIR.COM - WAT IS CIRCULAIR? CIRCULAIR.COM/WAT-IS-CIRCULAIR/

2. Three cornerstones

Three cornerstones have been defined in which we see a jump-off point for retailers to start the journey toward circularity:

1. Awareness
2. Transparency
3. Opportunities

2.1 Awareness

Government incentives

A growing number of cities and towns across the Netherlands are developing initiatives to create public awareness. One of these cities is Tilburg, in the province of North Brabant, which is already quite advanced in this regard. "The most important thing for local authorities to do now is to promote and drive circular business, and that also happens to be the best part of my job," says Robert Kint, who is in charge of Circular Economy policy for the City of Tilburg. He believes it is important to start with the business community. "You need to make sure circular products are available before you can ask people to start consuming on a circular basis. This means supply before demand, particularly since supply is still limited right now. We're working on this together with start-ups, as well as with large companies that are already involved in this." The City of Tilburg has taken the initiative to create a national information site that, due to significant interest from other local authorities, stopped using the name "Tilburg Circular" last November and changed this to **www.circulair.com**.

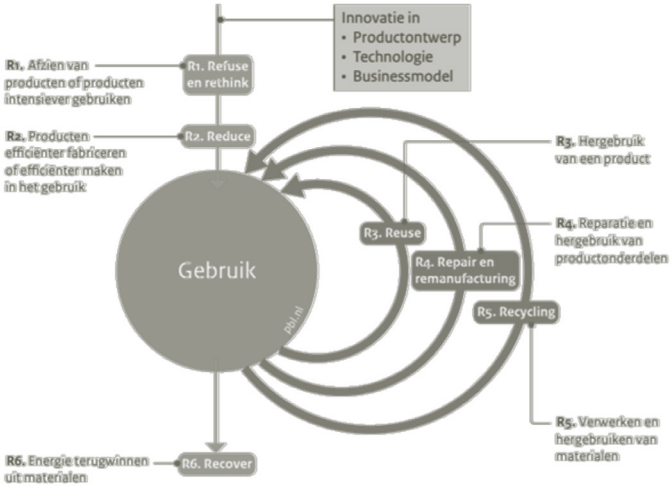
Check out circulair.com

Awareness among retailers

"Make the world a better place, starting with yourself... It all begins with awareness." As a global thought leader, the Ellen MacArthur Foundation has managed to put the circular economy on the agendas of major players, including governments, universities and retailers such as H&M Group, Unilever, and Philips. The Foundation promotes public awareness of the finiteness of natural resources. Before any major steps can be taken, it is important to lay a broad foundation within the current economy, where everyone is aware of the necessity and opportunities of a circular economy.[2]

Is it important, then, that we can measure the circularity of a company or the products it manufactures? Standardization could potentially serve as an accelerator, while at the same time introducing a slew of new rules. It is particularly important to create awareness, and for people to realize that the Earth's resources are finite and that we are engaging in environmental degradation at a rapid rate. Retailers who demonstrate that they can be intrinsically different from their competitors in this respect, will appear credible to the increasingly critical population of consumers. In fact, many companies have already taken steps on the circularity ladder (see the examples shown in Section 3.3). Rather than seeking to achieve the highest returns, they prefer to engage in responsible business. And let's be honest: when it comes to circularity, it's back to square one. We used to repair things when they were broken, wear clothes until they were threadbare, and pick apart old knitted sweaters so we could make them into socks. In many ways, we used to be circular back in the 1950s, i.e., within the lifetimes of many of us. As a retailer, allow yourself to be surprised by the simplicity of the R-ladder in the image on the following page.

2 ELLEN MACARTHUR FOUNDATION *OUR STORY*. WWW.ELLENMACARTHURFOUNDATION.ORG/OUR-STORY/MISSION



R-ladder with strategies of circularity[3]

Creating consumer awareness

Although the term "circularity" is not yet common currency among consumers, 70% of consumers state they are concerned about the depletion of natural resources.[4] If circular fashion is to become "the new normal," the role (behavior) of consumers is the key to actually closing the loop. Awareness among consumers is vital in this regard: making more informed choices, more conscious purchases and being more aware when returning these items after using them. Retailers can respond to this by offering circular alternatives or by demonstrating the cost per wear, i.e., the level of sustainability of individual clothing items. Finally, consumers can be encouraged to follow the "right" procedures when returning items at the end of the usage period. Share your data with your customers.

2.2 Transparency

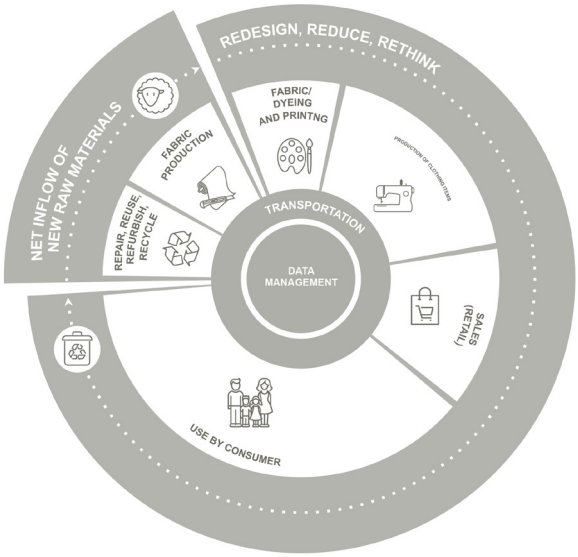
The perfect circular economy has no secrets, by which we don't mean to say that companies must reveal their recipes, but if they want to sell the jeans mentioned above with a specific certification, they must be able to demonstrate that the jeans merit such a label. How can data in the supply chain be and remain available to all links in the supply chain?

Awareness and recycling require that information should be available about the product, about the fabrics and materials used, and about the journey completed by the product (i.e., from production through to usage.) This information is both generated and used by the various links in the supply chain. Data must be stored and sometimes retained for longer periods of time. This may be done in the location where it is generated, in a central database or on a decentralized basis (e.g., through a blockchain). The challenge remains in the fact that partners in the supply chain must agree with each other in order to be able to implement this system.

3 NETHERLANDS ENVIRONMENTAL ASSESSMENT AGENCY (PLANBUREAU VOOR DE LEEFOMGEVING) (2019). BLUEPRINT FOR A CIRCULAR ECONOMY: HTTPS://WWW.FASTCOMPANY.COM/2679241/A-BLUEPRINT-FOR-A-CIRCULAR-ECONOMY-REUSING-AND-REFURBISHING-FOR-PROSPERITY?ITM_SOURCE=PARSELY-API

4 PANEL WIZARD COMMISSIONED BY ABN AMRO DRIEKWART NEDERLANDERS ONBEKEND MET 'CIRCULAIRE ECONOMIE' ("THREE-QUARTERS OF DUTCH POPULATION UNFAMILIAR WITH CIRCULAR ECONOMY") WWW.PANELWIZARD.COM/CIRCULAIRE-ECONOMIE-ABN-AMRO

The type of data that needs to be recorded depends on the use further down the supply chain. Since the processes within the circular economy are still under development, this also applies to the data. The recording and sharing of data serves as the heart of the circular economy (see the image below).



Circular economy and data

2.3 Opportunities

As the saying goes, "when one door closes, another opens." The expert group notes that circular living is becoming fashionable, resulting in the emergence of an all-new market. Business owners who choose circularity as the foundation of their company are not likely to be interested in profit maximization alone, as this would be contrary to the basic principle of not consuming more than is strictly necessary. In order to demonstrate that circular businesses are viable, real, and inspiring, we will share a few examples below of start-ups and established businesses that focus on circular production processes. You will find more information on the expert group page, which you can view through the QR code.

Go to the expert group page

- *Truly circular* company Loop.a life produces new clothing made from previously worn wool items. Consumers are encouraged to return any clothing they no longer want to Loop.a life, so they can turn them into all-new collections. Additionally, Loop.a life also supports fashion and textile companies in their transition toward circular production.
- In October 2019, the Dutch Salvation Army's ReShare division and sustainable fashion designer Sjaak Hullekes made a statement against *fast fashion* and throwaway clothing. Used clothing (made from natural materials such as cotton and linen) from the Salvation Army was transformed

into an exclusive and sustainable collection that is affordable to all. The items selected for recycling were dyed using natural colorants sourced from waste generated by kitchens of Arnhem restaurants. In this way, existing clothing was transformed into new and unique designer items with their own backstories under the brand name of Hul le Kes.

- In March 2020, IKEA is set to launch TILLVERKA: a circular collection of felt products, manufactured from residuals of IKEA textiles. TILLVERKA is produced locally by a social enterprise: the Netherlands-based i-did. The result of this partnership is a collection of foldable boxes, cushions, carrier bags and the signature FRAKTA bag, made from soft, colorful felt. Whereas i-did used to be known mainly by a niche audience for their circular products, they are now taking a step toward the mainstream.
- Mud Jeans, which manufactures new jeans made from used ones, opened its first brick-and-mortar store in the Dutch town of Laren in November 2019. The store sells all the jeans models in all the available sizes and colors, and customers can try on the jeans in the store and lease them on the spot. The jeans can be returned to the store at the end of their economic life.
- The sustainable socks from Healthy Seas Socks are developed on a fully circular basis and can be leased through NMSG. These socks are made in part from abandoned and stray fishnets, produced through the Healthy Seas initiative.

We note that the Netherlands has long been a master at recycling packaging. The Afvalfonds Verpakkingen ("Packaging Waste Fund") reports an increase in 2018 in the percentage of recycled packaging. With a recycling rate of 79%, the Netherlands outperforms both the Dutch target of 70% and the EU target of 55%.[5]

If you are interested in adopting a more circular approach to packaging, please scan the QR code on the previous page.

3. Facilitating circularity through technology

Referring back to the first image on page 179: technology can be used at every stage of the "Journey of the Jeans" in order to accelerate the transition to a circular supply chain. Our expert group looked at three existing technologies: standards, artificial intelligence, and blockchain.

3.1 Standards

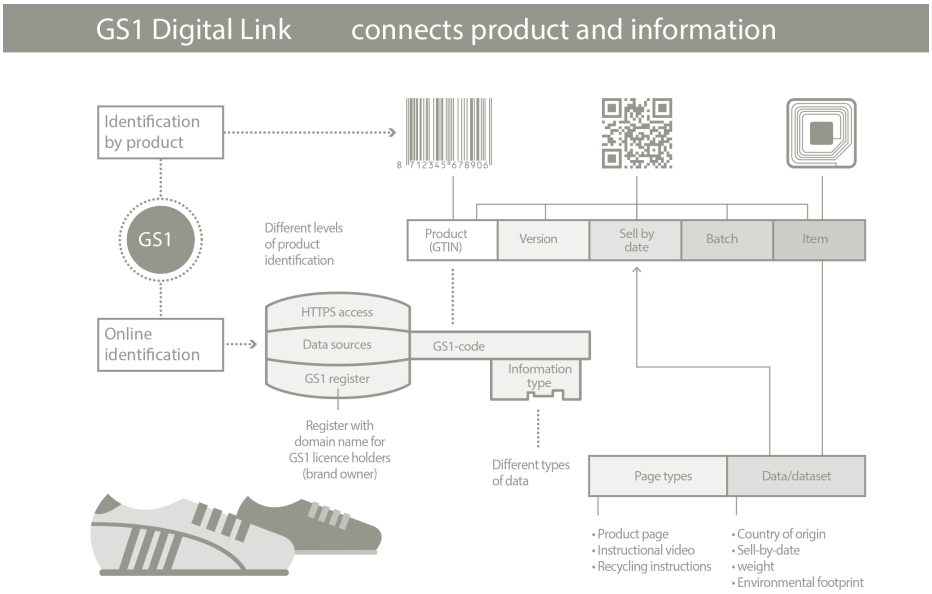
If you set up systems in order to make your supply chain circular, you must ensure that your systems are in sync with the other links in the supply chain. Standards play a key role in this process. Everyone needs to know what product the other parties are talking about, and perhaps also from what batch it was produced, and what specific item is involved. The various links in the supply chain must be well known, sometimes even a specific event. You can identify all these issues through GS1 codes. The GS1 organization created the EAN barcodes, which have been around for four decades at this point. In 2019, GS1 also provides codes for (for example) batches, locations, packages, pallets, and events. The company has also developed a language that facilitates the exchange of data on products, events,

5 AFVALFONDS VERPAKKINGEN RECYCLING VERPAKKINGEN IN 2018 OPNIEUW GESTEGEN ("PACKAGING WASTE FUND: NEW SPIKE IN RECYCLED PACKAGING IN 2018") AFVALFONDSVERPAKKINGEN.NL/PERS/RECYCLING-VERPAKKINGEN-IN-2018-OPNIEUW-GESTEGEN

and commercial transactions between the various links in the supply chain. It draws on tried-and-tested technologies such as databases, web links and scanning technologies. The combination of the experience with standards and the use of tried-and-tested technologies make for a more accessible solution. This makes it easier to share information. The technology is there; the next challenge is to ensure the standard is adopted worldwide.

In order to be able to implement a standard, all data must be compact, clear, and accurate. GS1 therefore recommends taking the following steps:

1. Use GS1 identifiers to ensure everyone is on the same page.
2. Record the corresponding basic data in the GS1 product register.
3. Use standard definitions and standard formats for data, such as the GS1 data standard or Web Vocabulary.
4. Scan GS1 Digital Link codes to link directly to the right data sources.
5. Use the EPCIS standard to record events.
6. Focus on data quality.



The GS1 data model

The implementation and execution of this type of data standard (see the image above) makes it easier for links in the supply chain to trace products and natural resources to their source. However, it is important for the GS1 code of the item in question to remain in the product. If you identify this code for individual items, you can return your jeans (in which an identifier – a visual barcode or digital chip) is still visible to the store where it was purchased. The old jeans are scanned, traced as "your" jeans and accepted by the retailer for recycling.

3.2 Disruptive technologies

In addition to the acceptance and the implementation of standards mentioned above, the new technology must also be accepted. Looking ahead to the immediate future, there are technical solutions available that can greatly accelerate the pathway to circularity, comparable to the impact of the Internet on the global availability of information.

Use of artificial intelligence

Artificial intelligence (AI) is part of the emerging era of the fourth industrial revolution. This revolution involves the use of models and systems that are generally associated with human intelligence, including reasoning and learning. What makes these types of technologies special is their active involvement in data processing, the generation of forecasts, the use of smart algorithms, and providing advice based on large amounts of data.

Prior to the production process, AI can predict how much demand there will be for a specific type of natural resource. By combining this forecast with other data, sourced from meteorological satellites and geographic sources, for example, farmers can be supported in making choices regarding irrigation or the use of pesticides. This can improve the efficiency of their production processes. The result: reduced use of additional substances and fewer surpluses. We can also use this example to optimize transportation schedules and (for example) avoid trucks returning empty.

In processes related to product design, the added value of AI can consist of analyzing what types of materials are most suitable for use in specific patterns or designs. AI can also be used to structure unstructured data on the Internet and subsequently identify any emerging trends and hypes. Retailers can respond to this trend, for example by offering personified products.

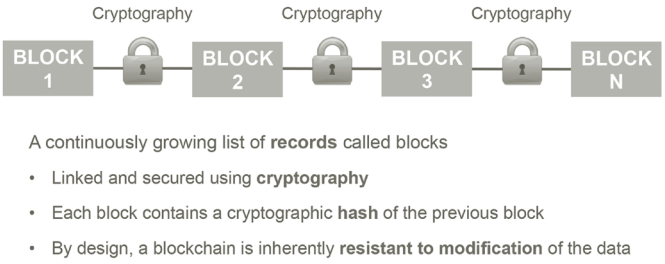
Personification is also possible by analyzing personal preferences: when (based on AI) can a consumer be expected to purchase a new pair of jeans? Then it becomes time to engage in *direct targeting*. At the end of a product's lifecycle, AI can be used to advise on the appropriate waste or recycle flows. One example is for a personalized recommendation to be displayed on the consumer's cell phone once the proof of identity inside the jeans has been scanned. Example: Return your item at... and receive a discount on your new purchase.[6]

Use of blockchain

At each stage of the supply chain, blockchain technology can be used to reliably record the information that has been added to a product in the process from the images shown on pages 179 and 182. Blockchain[7] is literally a chain of blocks containing data or information. As soon as the data is generated (for example, information on dyes used in a dye bath for jeans), they are added to the chain of information blocks. Only authorized users can add data, and every information block that is added is checked, linked, and secured through cryptography (see the image on the next page). The data contained in a blockchain cannot be changed.

6 GUEST SPEAKER DURING EXPERT GROUP SESSION: NEDA SEPASIAN (AI EXPERT AT CGI)

7 FOR MORE INFORMATION ABOUT BLOCKCHAIN, READ THE BLUE PAPER PUBLISHED BY THE BLOCKCHAIN BEYOND THE HYPE EXPERT GROUP, STARTING ON PAGE 278



Blockchain technology

Since blockchain can be used between the various stages of the supply chain, there is no need to wait for a circular economy in order to use it. The principle of blockchain – everyone has access to the same data – eliminates the need for *trusted third parties* (including banks or insurance companies). Due to the distribution of identical copies, it is not possible to commit fraud with information contained in the blockchain.
Blockchain technology creates the transparency required across the entire supply chain, from design through to recycling. Blockchain enables full tracking and tracing. If the day-to-day process arrangements are automated through blockchain technology, this results in efficiency and fosters the trust and motivation required to share data in this way.[8]

Retailers are the main initiators in this process. Make your vendors/suppliers aware of a shared vision, since transparency and authenticity across the entire supply chain are vital to any circular process. This is obviously a significant challenge in an international environment marked by cultural diversity, laws and regulations that vary by country, and the current focus on sustainability. However, if we can reach consensus on this vision, there is a great likelihood that this process will be successful.

4. Conclusion

We have a long way to go before achieving a circular economy. Awareness is being promoted, we are seeing an increase in both the transparency and availability of data, and opportunities are being created and seized. The four main conclusions:

- **The greatest priority is awareness**
  The main aspect in the road toward a circular economy is investing in awareness among all relevant stakeholders, whether they happen to be clothing manufacturers in Asia, retailers, or consumers. Once all the links in the supply chain are fully aware of the necessity, the circular ball will start rolling!
- **Standards are more vital than ever**
  Insight into the process from design to recycling among consumers requires substantial investments in widespread standardization, transparency, and shareability of data and information. Through the use of standards, items can be assigned a digital identity – with all the associated circular benefits.

8 GUEST SPEAKER DURING EXPERT GROUP SESSION: MOHAMED IBRAHIM (BLOCKCHAIN EXPERT AT CGI)

- **New technologies cause an acceleration.**
  In the near future, artificial intelligence and blockchain technology will speed up the transition toward a circular economy. More accurate forecasts are helping to reduce waste, and the ability to rapidly and securely share data across the supply chain will improve transparency and create efficiency benefits.
- **Making information shareable makes an impact**
  The ability and willingness to share information is a prerequisite for the transition to a circular economy. This also calls for more, better, and possibly a different type of cooperation than has been the case to date. Shareable information adds value for all stakeholders in the supply chain, with the main "stakeholder" being our planet.


Go to the expert group page

Dear retailer, grab the opportunities available by getting yourself noticed in the following ways:

- Identifying with environmentally conscious consumers;
- Adopting new standards;
- Experimenting with disruptive technologies.

ShoppingTomorrow, the expert group members, host, and chair will be happy to support you!

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