Role of the textile industry in the Circular Economy *

The situation in Hungary

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Abstract

Achieving a circular economy is one of the key challenges of our time and a fundamental condition for sustainable development. Its aim is to ensure that humanity uses the Earth's natural resources as sparingly as possible, that products and the materials and energy sources used to produce and use them are exploited for as long as possible and that what is possible is recycled back into nature from where it was originally obtained. Recognising the growing need to do this, the European Union has initiated measures which the Member States, including Hungary, are trying to implement as effectively as possible. In this article we summarise the tasks facing the textile and clothing industry and the results achieved so far by the Hungarian textile and clothing industry in this field.

Introduction

The concept of a circular economy is an important element of sustainable development. Its aim is to extend the life cycle of products as much as possible and thus to allow for the least possible new material and energy inputs and the associated increase in specific carbon footprint. The solution may be to reuse the end-of-life product (perhaps for a completely different use from the original), or to reprocess it, if necessary upgrading or reusing it, to produce an identical, similar or completely different new product, instead of destroying it (burning or throwing it in the trash, where it will either decompose or remain for a long time and harm the environment). The recycling or reprocessing of this new product after it has been used up can be repeated several times – this makes the process circular.[1, 2]

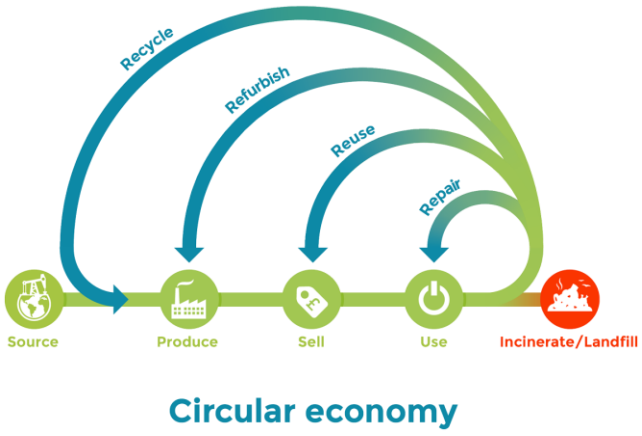
The circular economy is the opposite of the traditional, so-called linear economy, which uses products only once and destroys them when they are worn out.

The circular economic model is not really new but a return to the natural order, since in nature almost all materials (chemical elements) are involved in cycles and there is no dead-end: the end product of each process is the starting material of another process. This is what is meant by the English expression 'cradle to cradle' for the nature of the circular economic system.

Background

The idea of a cycle of materials and energy was put forward by *Kenneth E. Boulding* in 1966, who argued that we should live in a "cyclical" production system. The term "circular economy" was first coined in 1988 to describe an economic system in which waste from the extraction, production and consumption stages is recycled into a recyclable feedstock. Since the early 2000s, China has introduced this concept into its industrial and environmental policies to become resource, production, waste, consumption and life-cycle oriented.[3]

In 2014, the European Commission presented its first proposal "Towards a circular economy: a zero-waste agenda for Europe", which was revised in 2015 to present a new, more comprehensive proposal focusing not only on the waste phase of the product life cycle, but also on the entire life cycle. [4] Its Action Plan, presented in March 2020, proposed the implementation of circular economy in the European Union, product design ("eco-design"), waste reduction and the right to repair products. The Action Plan focuses on the sectors that consume the most energy, such as electronics, information and communication technology, plastics, construction and textiles. The Action Plan was voted by the European Parliament in February 2021 and, on this basis, the Commission published the first package of measures to accelerate the transition to a circular economy in March 2022. The proposals include promoting sustainable products, encouraging consumers to "go green", revising the construction products regulation and a strategy for sustainable textiles. [2] The green transition is about effectively replacing today's fossil fuels – coal, lignite, oil, natural gas – with climate-friendly solutions (nuclear, wind, solar), promoting the use of green hydrogen and energy saving. (By "green hydrogen" we mean H_2 molecules produced in a "green" way, i.e. from a carbon-free source of electricity, by water decomposition and electrolysis.[5]) The shift towards a circular economy is a key objective of EU environmental and economic policy.



The role of the textile industry in the circular economy

The European Union's sustainable and circular strategy for textiles includes the following elements [10]:

- New design requirements for textiles (minimum value of recycled fibres in textile products, ban on the destruction of unsold products or products returned to the manufacturer/retailer).

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- More precise information on the origin, characteristics and environmental aspects of textile products, using a "digital passport".
- Measures to prevent the release of fibrous microplastics from textiles in product design and manufacturing processes (aqueous treatments).
- Harmonised EU rules on extended responsibility for textile products and on economic incentives to make products more sustainable, review of waste management requirements.
- Supporting research, innovation and investment, including the development of skills for the green and digital transition.
- Promote a halt to the export of textile waste to non-OECD countries to prevent waste exported from the EU being mislabelled as second-hand goods.
- Identify the way forward and concrete steps to achieve the 2030 targets of the strategy.
- The strategy encourages the discouragement of fast fashion and encourages Member States to promote recycling and repair services at national, regional and local level through positive economic instruments.
- On the consumer side, it encourages a shift towards quality, durability, longer use, repair and reuse (slow fashion). It encourages designers, manufacturers and retailers, advertisers and consumers themselves to achieve the goals set out in the strategy.
- In social terms, the strategy combines environmental and labour aspects to promote more environmentally friendly and equitable cross-border supply chains. It promotes fair working conditions, respect for women's work, and supports third partner countries in improving working conditions and respect for international labour standards in bilateral relations and multilateral fora.
- The proposed Directive on corporate sustainability due diligence introduces a corporate sustainability due diligence obligation for very large companies to address negative impacts on human rights and the environment, both in their own operations and in the global value chains.
- Under the EU's Skills Pact, workers in the textile sector will be given the tools to up-skill, retrain and acquire new skills. EU funding programmes will continue to support the sector and its employees.

The importance of the objectives of the circular economy has been recognised by leading organisations and enterprises in the textile sector. There are many examples of the drive to achieve this in our industry, too.

For example, in 2018, the World Economic Forum in the Netherlands created the Platform for Accelerating the Circular Economy (PACE), an organisation with a wide range of sectors, governmental bodies and professional organisations from around the world, representing a wide variety of disciplines. In their programme for the textile industry, they state that today's fashion industry is worth USD 1.3 billion and employs more than 300 million people worldwide. However, the textile industry has finite resources, yet billions of products are wasted (left unsold in shops, warehouses, unused in wardrobes or go the landfill). People throw away $460 billion worth of clothes they could still wear. Trends such as fast fashion are exacerbating the problem, with large quantities of cheap but poor quality, hard-to-recycle fashion items being produced. If we doubled the average number of times a garment is worn, the greenhouse gas emissions of textiles would be 44% higher. They argue that the inclusion of textiles, fashion and clothing in the circular economy is important because it aims to eliminate waste in the textile industry, promotes the reuse of resources and has co-benefits for natural resources, for the well-being and for health and safety of the people who work in the production and disposal of the products.

They argue that businesses, governments and professional organisations all have a role to play in creating a circular economy. In the following ten points, they summarise the actions that can be taken to accelerate the most effective transition of the textile industry to a circular economy [9]:

1. Encourage design for long life and to ensure recyclability.
2. Growing natural fibres sustainably under virgin conditions.
3. Encouraging the consumer market to buy fewer clothes and use them for longer.
4. Introducing business models that promote the rental of clothing and the retail of second-hand clothing.
5. Around 70% of used clothes are sold abroad, but most of the rest are likely to end up as scrap instead of being recycled. However, the trade in second-hand clothing must be managed in a way that does not make the textile and clothing industry impossible.
6. Strategy should be developed on how to collect and recycle waste. Collection and sorting of used textiles is very labour intensive and recycling facilities are large-scale projects requiring long-term investment. All this needs to be carefully planned.
7. Improving the efficiency and quality of textile sorting is key to recycling.
8. Improving the marketability and competitiveness of recycled fibre materials. This can further stimulate the development of recycled material supply chains.
9. Promote fair work in all areas of production, manufacturing and trade.
10. Exploring the socio-economic impact of the circular economy in the textile and clothing sector.

In addition to this Dutch example, various platforms, events and campaigns are being organised in many other countries to prepare or even implement the above-mentioned guidelines. The European Association of Textile and Clothing Manufacturers (EURATEX) has also developed guidelines for the application of the circular economy in the textile industry.[16]

There are many such links on the Internet, and professionals should look through them and learn from them.

The situation in Hungary

Following an initiative of the European Union, the Hungarian Circular Economy Platform was established in 2018 by the Embassy of the Netherlands and the Ministry of Innovation and Technology to promote the implementation of circular economy in Hungary.[6] In February 2021, the Hungarian Parliament adopted a bill on the renewal of the waste management system, which aims at the transition to a circular economy, the elimination of illegal waste landfills, stricter penalties for illegal waste disposal and the establishment of a return system. This is the first piece of legislation in Hungary to include a reference to the circular economy. It focuses on the regulation of waste management, but does not include a comprehensive strategy or roadmap for the national economy to make the transition to a circular economy.[7]

In the field of waste management, several measures have been taken: the clean-up of illegal landfills has started, the number of selective waste collection points has increased, the production and sale of several single-use plastic products (ear cleaning sticks, plastic cups, cutlery, etc.) has been banned, the creation of an aluminium and glass recycling and deposit scheme has been

prepared, and the expansion of solar panel production capacity is being promoted. Various companies have already taken effective steps in the spirit of the circular economy model, in particular in the field of waste recovery.[1]

From textile point of view, a major initiative is the *Tex2Green* project, a consortium of the Trade Union of Mine, Energy and Industrial Workers, which aims to promote the development of sustainability in the production of clothing and, in this context, to implement the principles of the circular economy in the domestic textile, clothing, leather and footwear industries. (e.g. "green" public procurement, collection, treatment and recycling/reprocessing of waste materials, creation of a market for the secondary raw materials thus produced).[8]

The organisers and participants of the project have done a lot of work on the ground: data collection and processing, which resulted in a database of textile, clothing, leather and footwear manufacturing enterprises in the country, a self-assessment questionnaire for enterprises on their progress towards environmental objectives and their readiness to apply human ecology and other labels, created and run an online advocacy platform through the social partners, organised lectures, training courses, plant visits, held information events at various venues, produced publications to publicise the proposals and results, for publication in the *Magyar Textiltechnika* (the Hungarian textile periodical) and the project's website.[11]

The role of the Hungarian light industry in the circular economy is largely examined by domestic experts in relation to foreign organisations. One such example is the European Union's *Interreg Central Europe* programme, which presented a training material on the textile and fashion design aspect of ecodesign.[12] Within the framework of the same programme, INNOVATEXT Textile Engineering and Testing Institute Co. published a publication on the strategic agenda for the treatment and recycling of textile waste.[13]

Textile and clothing designers and stylists also contributed by presenting innovative solutions in the spirit of circular economy. Through exhibitions, presentations and publications, they have presented their products, which have been created to improve waste recovery, labour efficiency and usability, and which have been partly commercialised, mostly through their own enterprises. Ecodesign has also been introduced in higher education (e.g. Moholy-Nagy University of Art and Design, Óbuda University, Budapest Metropolitan University). The subject of circular economy has, of course, been included in the curricula of all higher education institutions.

Consultancy companies have been set up to help people to get more accurate and useful information for their activities in the circular economy (e.g. Bay Zoltán Research Non-profit Ltd.), and well-known consultancy firms have included this topic in their range of activities (KPMG, PwC, Deloitte, etc.). The National Association of Waste Management Companies also provides training courses, lectures and presentations on waste management issues.

Some further thoughts

A basic prerequisite for the adoption of the slow fashion trend is a *good quality product*. This applies both to the choice of materials and to the workmanship. The designer, who "dreams" the garment, not only in terms of form but also in terms of the conditions and methods of production, has a major role to play here.

The choice of material should take into account the *possibility of recycling*. From this point of view, it is preferable to use a single raw material, either natural (cotton, wool, silk, etc.) or man-made, in the latter case those that can be recycled on their own (e.g. polyester, nylon). However, this often contradicts the performance of the properties required of the product, which necessitates the use of raw material blends in the fabric mix. The separation of the individual components in mixed raw material waste is not a simple task and is currently the subject of considerable research and development work.

The issue of *repairability and repair services* for clothing is also very important and increased efforts in this direction would be of great importance. In our country, the possibilities for clothing repairs are nowadays very limited and even in the case of clothing it is often cheaper to buy new (fast fashion!?) than to have it repaired or transformed.

The European Union's strategy recommends *renting instead of buying* clothing. A well-known example is the occasional hire of wedding dresses for a single occasion. This practice could also be applied to other products, as it is often the case that an item of clothing is only worn once or a few times at most and then disappears in the depth of the wardrobe. In such cases, it would be worth borrowing them only occasionally from a specialised service provider.

Some barriers to take-up factors

But implementing very good ideas will not be easy anywhere. There are many barriers to reusing/recycling waste as much as possible:

- Separate collection of waste and material residues by type (selective collection) is in fact a prerequisite, which in our country, for example, leaves much to be desired.
- The question is whether the technologies are available to reuse/reform the materials of an existing product one by one. Most textile products are made up of several materials. Fabrics are made from blends of different fibres which cannot be separated easily or at all. Research institutes and universities are working to find solutions to this, and indeed, there are already known and under development processes. Garments are made up of different parts of different materials that have to be broken down and separated. This is usually a very labour-intensive operation, although, for example, the thread manufacturer Coats already advertises its thread [14] which dissolves in hot water and the parts sewn together with it fall apart (of course, such a garment should not be washed in hot water!).
- If the original material is recycled by an external company, this extends the supply chain. Companies have specialised and continue to specialise in this task, for example Temaforg Ltd., Tesa Ltd. and Textrade Ltd. in Hungary.
- For manufacturers, it is easier, more convenient and often cheaper to buy new raw material than to extract it from an existing product.
- The properties of recycled material are not always equivalent to brand new ones. For example, the shredding of textile waste inevitably means that the fibres that make it up are damaged, shortened, they are not of the same quality as the original fibres from the point of view of textile processing, which can affect the properties of the finished products. Therefore, these raw materials from waste processing are usually used in a blend with the originals so that the quality of the product does not deteriorate. It has also been found [15] that, for example, polyester fibres

produced from PET bottle materials result in more microplastic waste being washed into the wash water than virgin polyester fibres.

- In addition to textile waste, other materials and energy sources used in textile and clothing production are of course also of great importance. The textile industry, especially in dyeing and other wet finishing technologies and in textile cleaning, consumes a lot of water, chemicals and thermal energy, as well as electricity at all stages of production. All these generate waste:
- At the end of the treatment operations, the waste water must be discharged and contains a wide range of chemicals in addition to water. The water can be recovered after proper purification and recycled back into the process stream, but the chemicals it contains – which have been removed by purification and neutralisation – are usually not dealt with: they are a real waste to be disposed of.
- At the end of the process, a significant part of the thermal energy can be recovered by passing the hot water through heat exchangers and reused to heat fresh water. The equipment needed for these requires considerable investment, for which textile and clothing mills do not always have the financial resources. This is another factor that can hinder the full implementation of the circular economy in a company.
- The electrical energy used to run the machines, possibly to heat them, only becomes unnecessary when the machine is idle. This can and should be used sparingly.
- Finally, it should not be overlooked that the increased spread of fast fashion is undoubtedly a threat to the textile industry, and especially the clothing industry. The reduction in the number of collections issued each year and the lack of rapid replacement of clothing among consumers could lead to plant closures and job losses. The slow fashion trend, on the other hand, encourages the durability and quality of products (clothing), which on the one hand can stimulate the development of new materials for the textile industry and the development and application of innovative solutions for the clothing industry.

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