Smart Consumption Market Study

2020 Report

Interreg Baltic Sea Region
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1. Introduction

The growing demand for green products and services has provided entrepreneurial opportunities for new business ventures that are developing and applying technologies that are cleaner and save more energy, and resources. As technological breakthroughs, and more products and services that are customer-centric enter the markets, an increase in consumer demand for sustainable solutions can be expected. Therefore, addressing the food waste problem is important and needed as the problem is only going to get worse.

In this report, different ways of reducing environmental impact and resource consumption in our daily lives are considered. It is based on the principles of a circular economy, which includes such solutions as reducing/eliminating food waste, reducing climate impact from food consumption (e.g. diet trackers, alternatives to meat and dairy products, etc.), household waste processing, sharing economy solutions (e.g. service platforms, rentals, financial services, crowdfunding etc.), awareness-raising/nudging solutions (e.g. CO_2-trackers, training etc.) and clothing.

Smart consumption is an element of a circular economy – it is an economic system based on repurposing, refurbishing, essentially reusing everything so that nothing goes to waste. The system operates at the micro-level (products, companies, consumers), meso-level (eco-industrial parks, networks and clusters) and macro-level: city, region, national and international). The goal of a circular economy is sustainable development, meaning environmental quality, economic prosperity and social equality that benefit current and future generations [1].

Figure 1[2]. Circular economy cycle

[1] https://circularoslo.com/what-is-the-circular-economy/
[2] Ibid.

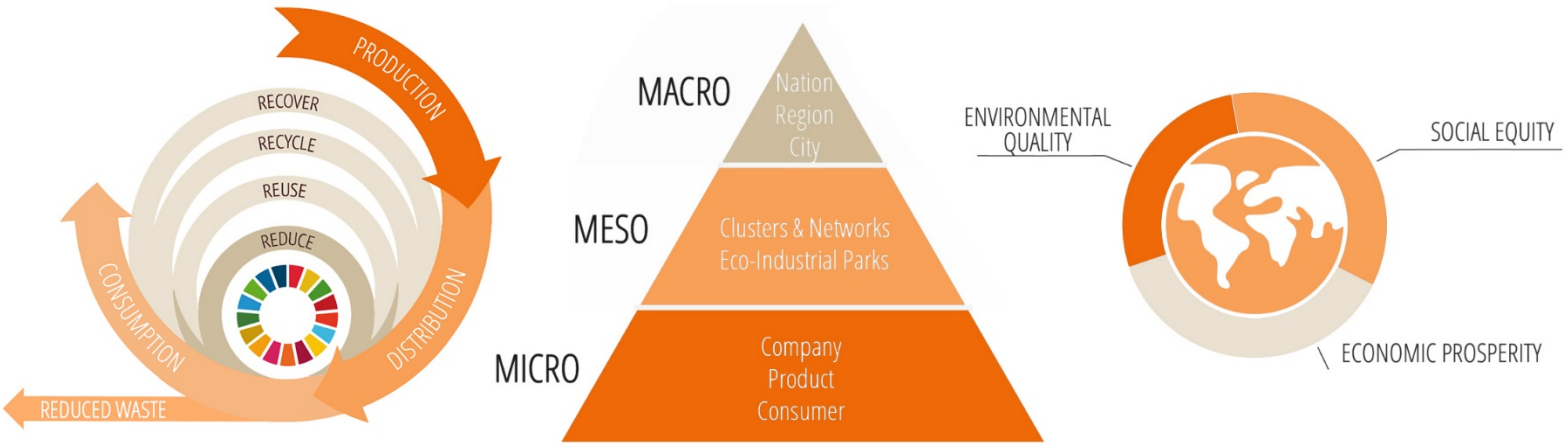

Figure 2[3]*. Circular Economy model*

[3] https://circularoslo.com/what-is-the-circular-economy/

2. Smart consumption trends

2.1 Regulations and strategies

Estonia

The Waste of Electrical and Electronic Equipment (WEEE) Directive is part Estonian legislation through the Waste Act[4].

The Waste Act stipulates that the so-called products of concern are the producers' responsibility. This means that producers are obliged to guarantee that the waste generated by a product of concern is collected and recycled or disposed of.

The government's new waste management plan for 2014–2020, focuses mainly on modern product design, clean resource-saving production and the recycling of already produced materials. Frugality, innovation, comfort and effectiveness capture the approach of waste management for the next seven years.

Estonia's sustainable development principles have been determined by the National Strategy on Sustainable Development "Sustainable Estonia 21". The strategy basics are derived from the Law on Sustainable Development adopted by the Riigikogu (Estonian Parliament) in 1995. This Act sets out regulations on sustainable use of the natural environment and natural resources. This constitutes as a strategy for developing the Estonian state and society until 2030.

The aim of the strategy is to combine the requirements for success arising from global competition with the preservation of sustainable development principles and Estonia's traditional values. Strategy "Sustainable Estonia 21" proposes objectives and policies contributing to the sustainable development of Estonia and is implemented through various strategies and development plans[5].

Finland

In Finland, there is no overarching regulatory framework built specifically for the smart consumption sector, although there are particular policies that intend to guide its development. What regulations are applicable, depends significantly on a type of company, business model, type of product or service provided within – for example, the food or clothes market – and the particular risky aspects for a company or consumers[6].

For instance, in the food sector, there are several parts of legislations for different parts of the food chain, set by the Food Safety Authority, Evira. Legislation on food waste reduction and prevention smart consumption solutions is about storage temperature requirements which vary between different products. Another important regulation is about temperature limits of -18°C for food transportation which is the same for all products. It is also compulsory to register if the business relates to food as a feed business operator within the food chain[7].

It is important to note that the Finnish regulatory framework is in line with the one at the EU level. Additionally, it is necessary to consider the strict character of the Finnish regulatory system and its tendency to "play by the rules" which provides stability, security, confidence and a sense of reliability for consumers and companies[8].

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[4] https://www.envir.ee/en/weee
[5] https://www.riigikantselei.ee/en/sustainable-development/
[6] E. Hodge, February 24, 2020.
[7] Hietala, S., Riipi, I., Välimaa, A. L., and Katajajuuri, J. M., 2018.
[8] E. Hodge, February 24, 2020.

The first thing to do when entering the Finnish market, is to identify the laws that apply to the type of business one aims to run, and to decide what type of company the business is going to be registered as. The second thing to do, is to determine which particular aspects of the business model might represent a higher risk for the startup. The third thing to do, is identification of the supervising authority that is relevant to the type of business entering the Finnish market. For example, the relevant institutions in the smart consumption field are the Finnish Food Authority, the Finnish Competition and Consumer Authority, and the Finnish Textile and Fashion Authority.

There are many specialized organizations that provide guidance and advice to companies regarding relevant legislation for free or for a small membership fee. For instance, a company with a turnover of approximately 91 000 EUR in 2019 would pay a membership fee of 304 EUR to be part of the Finnish Textile and Fashion Authority, the membership fee for ProAgria Central Finland which supports food-related businesses is 80 EUR. Another option is to ask for advice directly from a lawyer, but this requires considerably higher financial resources than the first alternative, which in the case of public institutions comes without a cost[9].

Finally, as mentioned earlier, since Finnish regulation is in line with EU regulations, it is worth following the development of regulations at the EU level. There are two important developments underway at the EU level in connection with the clothing market that helps illustrate this point. First, there is an intensive discussion on the regulation of textile waste, both through the creation of an action plan and special regulation to separate textiles from the waste stream. Currently, companies operating a fibre recycling business model need to develop their own system to gather the fabrics they need. They often rely on people, or large companies to supply the textiles and there are huge challenges in the efficient recycling of the fibres due to the mixture of different fibre types. However, the change in the EU legislation would push a change in the dynamics of the business so that Finnish regulations are in line with the new regulations at the EU level. Second, is the need to identify alternatives to natural resources that might not be available in a couple of decades, and which will bring significant problems to the industries[10].

The Finnish government is recognized worldwide as a forerunner in innovation and across all national agencies, there is strong support for smart consumption, particularly linked to sustainability and climate change mitigation. There are also specific strategies related to the support of smart consumption, some of which are detailed below.

In 2012, the Ministry of Environment launched a programme to promote sustainable consumption and production that intended to decrease greenhouse gas emissions from households and the public sector, with the goal to reduce the environmental impact of consumption[11]. The programme focused on improving efficiency and reducing waste in energy, housing and food, in the latter the core elements aimed to improve food quality and eliminate waste.

The national government has also published a document to promote cleantech solutions in public procurement. Accordingly, government procurement units must follow these goals in all procurement procedures. For instance, it states that food services have to procure food that complies with nutritional recommendations, that is organically produced, and with a high number of, preferably, seasonal vegetables. The goal for 2020 is to provide at least 20% of organic food in institutional kitchens whilst reducing waste and improving energy efficiency[12].

The most recent governmental commitment to fostering the circular economy and cleantech is the President Sipilä's programme that provides a strategy for the circular economy for the next 10 years. Several ministries have committed to this endeavour, particularly the Ministry of Agriculture and Forestry which launched a nutrient recycling experimental programme with a 12 million EUR budget (Sitra, 2016).

Furthermore, the government has shared its vision regarding food for 2030 in the Food Policy Report so that domestic consumers eat food that is tasty, healthy and produced in sustainable and ethical way,

[9] Ibid.
[10] Ibid.
[11] Ministry of the Environment, 2013.
[12] Sipilä Board of Directors, 2013.

but also that consumers are able to make conscious choices about it. The transformation of the food industry is supported also with high-level research and innovation work. The already mentioned road map to the circular economy from 2016 to 2025 is to materialize in the Food Economy 4.0, which recognizes the contribution of important actors in the field such as VTT Group and Sitra[13].

Germany

In February 2016, the federal government released the ‘’National Programme on Sustainable Consumption: From Sustainable Lifestyles towards Social Change’’ report. The report was published as a result of a collaborative effort between the Federal Ministry for the Environment, Nature Conservation, Building and Nuclear Safety (BMUB), the Federal Ministry of Justice and Consumer Protection (BMJV) and the Federal Ministry of Food and Agriculture (BMEL). It provides a comprehensive consumption overview of Germany, setting the scene for sustainable consumption as an element of the governmental policy but also as an international policy field. The report also outlines cross-cutting approaches within a sustainable consumption policy regarding education, consumer information, environmental and social labels, eco-design, sustainable public procurement, research on sustainable consumption social innovations and monitoring sustainable consumption.

In order to ensure the national programme for sustainable consumption is institutionalised and, thus, impacts main stakeholders at every policy level, institutional support for the programme has been implemented. An inter-ministerial working group has been established to support and implement the programme. In addition to the competence centre, the National Network for Sustainable Consumption has been established to promote the implementation of the National Programme on Sustainable Consumption and strengthen the social commitment towards sustainable consumption. Coordinated by the UBA competence centre, the network facilitates communication between all stakeholders – the scientific and academic community, policymakers, business and civil society. The network also assists in communicating good practices and cooperation in sustainable consumption.

Within the National Programme on Sustainable Consumption, the themes of food and clothing are considered significant.

Sustainability has been promoted in food and agriculture at the federal level through interventions and projects such as the Federal Organic Farming Scheme and other forms of sustainable agriculture (BÖLN), and the protein crops strategy (EPS). Both strategies have a goal to help develop sustainable consumption. According to the National Programme on Sustainable Consumption, BÖLN aims to contribute to sustainable growth that is based on balanced growth of supply and demand for organic products (and other sustainable food products). In addition, reliable labelling of sustainably produced products is also recommended by the National Policy on Sustainable Consumption.

Clothing labels that show consumers information about the sustainability of their clothes are already being produced in Germany. However, the labels are not standardized and as such it is hard for consumers to fully understand them. People sometimes prefer second-hand shops, and clothes recycling bins to recycle their old clothes.

The federal government established a political environment conducive to production of sustainable clothing include the following:

- Organising campaigns and education workshops about the fact that current production and distribution of the textile chain are non-sustainable, and delivering information in such a way that consumers can understand.
- Working to ensure that recommended sustainability labels are better known; supporting their use and increasing their visibility, for example through public procurement measures and the Siegelklarheit.de, a consumer information portal.

[13] Poutanen, K., Nordlund, E., Paasi, J., Vehmas, K. and Åkerman, M., 2017

- Expanding the Partnership for Sustainable Textiles' membership base; the target is to recruit 75% of the German retail market to join the partnership.
- Expanding scientific research into chemical substances and mixtures in textiles, their effects on human health and the environment.

The most important environmental laws concern the areas of waste, emissions and water:

1. The Closed Substance Cycle and Waste Management Act
2. The Federal Emission Control Act
3. Water law comprises legal standards that deal with water bodies and their use

Latvia

There are several regulations and strategies related to climate change.

The Smart Specialization Strategy (RIS3) is a national research and innovation strategy for economic transformation that seeks to gain permanent competitive advantage, strategic priority setting and policy tools that maximize the country's knowledge-based development potential, thereby contributing to economic development. In 2014, Latvia joined the EU RIS3 platform to develop competence in RIS3 implementation and to cooperate in research and innovation with other EU regions. The most relevant chapters of the strategy are Smart Energy and Smart Materials, Technology and Engineering.

The Ministry of Economics is responsible for the implementation of the energy efficiency policy. The ministry put together a national energy efficiency action plan, where it laid out its energy efficiency targets and analysed the progress of its implementation. The Ministry of Economics sets a target for final energy consumption savings and develops an energy efficiency policy action plan to achieve this. The plan sets out the deadlines for implementation of the measures, the responsible authorities and the sources of financing, as well as the estimated annual final energy savings.

Green procurement is a systematic integration of environmental (including social) conditions into all activities related to the procurement of goods or services, from the identification of needs, the development of appropriate specifications and evaluation procedures, to the monitoring of the results.

Except for the general legal regulations, there are motivational certificates and procedures for businesses for instance, Quality Product certificate from the National Food Quality Scheme shows that the product is high quality.

Poland

In Poland, the priorities for the circular economy were established in 2015. In 2019, the government published the road map for Polish transformation towards the circular economy[14]. The main goal is to optimize economic efficiency and protect the environment, mainly through waste management, so that waste is minimized and

recycled. This way the use of products is optimized. According to the document, the main issues that need to be taken care of are:

- Sustainable industrial production
- Sustainable consumption
- Bioeconomy (managing renewable resources)
- New business models

[14] "Mapa drogowa transformacji w kierunku gospodarki o obiegu zamkniętym".

In Poland, the circular economy concept is grounded in strategic documents, including, the Strategy for Responsible Development, Productivity Strategy and Ecological Policy. These documents constitute the foundations for the development policy, based on innovation, R&D, as well as investment. The implementation of the circular economy is coordinated by the Ministry of Development.

An important part of the transition towards the circular economy in Poland is legal transformation that will set an appropriate legal framework. Some of the most important acts are the Recycling Act and the Energy Efficiency Act. The latter stipulates that enterprises must monitor their energy efficiency and save energy. The former regulates segregated waste collection (e.g. plastics, paper, glass).

Also, there are regulations for particular areas of smart consumption, such as:

- Food Waste – Combating Food Waste Act (2019)[15]
- Packaging – Management of Packaging and Packaging Waste Act (2013)[16]
- Waste – Waste Act (2012)[17]

This last area is a priority in the context of the circular economy implementation. The Polish strategy towards minimization of waste is described in the National Programme Against Waste Production (2014).

Russia

The framework for the deployment of the circular economy (including smart consumption market development) in Russia is defined in the Rights of Citizens of the Russian Federation. Russian legislation has a term “joint use” which describes a situation where several property owners own and use resources jointly. However, this term does not reflect the essence of the circular economy and does not apply to this model.

The rise of the circular economy in Russia contributes to fulfilling at least half of the objectives enshrined in the Decree of the Russian President, May 7, 2018, No. 204, titled “On national goals and strategic objectives of the Russian Federation’s development until 2024”.

The Amendments to the Federal Law, titled “On Protection of Consumer Rights” propose a special legal status for market “aggregators” that enable users to get information about goods and services and buy them online. It is suggested that such aggregators of goods/services, like traditional shops, would be liable for losses incurred by the consumer due to the provision of unreliable information. According to the document, internet aggregators are responsible for information about goods and services they provide.

In terms of tax regulations, most circular economy companies in the smart consumption market charge a commission on transactions between the service or goods provider and the purchaser. Circular economy companies’ revenue varies depending on the industry, but generally, they do not exceed 15% of the total turnover. The remaining 85% is distributed between the users providing the services. International circular economy companies operating in the smart consumption market in Russia are liable for tax equivalent to the local VAT, under the so-called “Google Tax.”

Circular economy companies in the smart consumption market often act as information aggregators (at a global level) about goods and services provided by consumers from all over the world. Therefore, it is challenging to understand market differences between states. Circular economy companies in the smart consumption market are extra-territorial. This means that anyone with access to the internet can become a member of a circular economy company community and exchange goods and services with users from all over the world. Law on the location of personal data (2014) stipulates that companies operating

[15] https://www.infor.pl/akt-prawny/DZU.2019.170.0001680,ustawa-o-przeciwdzialaniu-marnowaniu-zywnosci.html
[16] http://prawo.sejm.gov.pl/isap.nsf/download.xsp/WDU20130000888/U/D20130888Lj.pdf
[17] http://prawo.sejm.gov.pl/isap.nsf/download.xsp/WDU20130000021/U/D20130021Lj.pdf

in Russia must store personal data of Russian citizens on the territory of the country. An initiative to regulate big user data (under review) calls for the introduction of a legal definition of big user data (potentially any user data collected by information systems and devices, including profiles of various internet resources, geolocation, biometrics and user behaviour) and regulating the use of such data by Russian and international companies.

Russian legislation limits the number of licences issued for circular economy service providers. This ensures quality over quantity and enables circular economy companies to attract more users to their online platforms, i.e. to develop their business. Several circular economy companies operating in Russia already need to obtain permits at the regional level. For example, in Moscow, Uber only works with drivers who have a taxi licence.

Sweden

The regulations and strategies connected to the tax system are controlled by the Swedish Tax Agency. In general, the Swedish Tax Agency works with other countries, within the OECD and the EU, to develop rules that ensure similar taxation of the sharing economy as in the traditional economy. The aim is to facilitate the reporting and taxation of such transactions because they fall below taxable income and to challenge the authorities' ability to tax these transactions [18].

For Sweden, some rules cover the possibilities of taxing the sharing economy, but the rules are difficult to apply, complicated to follow and understand. The legal concepts do not always fit in with how new business models run their business.

At the moment, second-hand sales are not taxed if profits are less than 50 000 SEK, second-hand sales are taxed on VAT alone (economic activity and taxable person). Rental of housing is taxed only if the amount is more than 40 000 SEK excluding rent. VAT may need to be paid if a property operates like a hotel and rent is over 113 nights in one year. Carpooling is tax-free if the driver and the passengers are travelling in the same direction and the carpooling fee does not exceed 18 SEK per mile.

There are no tax rules that expressly favour smart consumption (although the flat-rate rules for the housing sector set limits) and carpooling. Buying used clothes in a store means that VAT is included in the price.

In Sweden, there are the so-called RUT and ROT deductions. A person who hires another person to do ROT (Repairs, Conversion, Extension) or RUT (Cleaning, Maintenance and Laundry) work may get a tax reduction – ROT or RUT deductions for the labour cost. Material costs and travel expenses related to the work are excluded from ROT and RUT tax deductions. Performing work for a family member to is also excluded from ROT or RUT deductions [19]. These deductions are possible for some (household) services, which means that the deduction is equivalent to VAT on work carried out. These rules are targeted in smart consumption.

The "hyper deduction" has not yet been implemented but its aim is to remove VAT from price for different types of services [20], for example, renovation work. The inquiry proposes a new tax deduction for repairs to consumer products, services related to second-hand items sales and the rental of tools and equipment – the so-called hyper deduction. One would get to deduct 50% of the labour cost, as with the RUT deduction. Even today, one can deduct the repair of, for example, appliances and computers, but

[18] The Swedish Tax Agency published a report for the Swedish government in 2016 about sharing economy to prepare for new businesses and new business models: https://www.skatteverket.se/download/18.361dc8c15312eff6fd31f4b/1477898771480/Delningsekonomi+-+Skatteverktes+slutrapport+161031.pdf

[19] https://skatteverket.se/servicelankar/otherlanguages/inenglish/businessesandemployers/declaringtaxesbusinesses/rotandrutwork.4.8dcbbe4142d38302d793f.html

[20] https://www.regeringen.se/49550d/contentassets/e9365a9801944aa2adce6ed3a85f0f38/fran-vardekejda-till-vardecykel-2017_22.pdf

then the repairs must be done at home. The inquiry suggests that one should be entitled to a deduction even when the item is sent outside for repairs.

The proposal of the Swedish Tax Agency is estimated to create around 10 000 new jobs. Many of them require neither academic education nor flawless Swedish language skills. The reform could lead to a better environment and help with societal integration and employment.

2.2 Institutions, programmes and financial support

Estonia

There are several organizations promoting smart consumption in Estonia, for example:

- Eesti Pandipakend
- The Estonian Food Bank established in 2010.
- Startup Estonia lists all investment funds in Estonia[21]
- Different support programmes, e.g. environment and climate action sub-programmes[22]
- Enterprise Estonia offers several support services[23]

All waste generators, including households, are part of the obligatory municipal waste collection system. All municipal waste must be segregated into separate containers and is collected from the premises.

Rohering, Europe's largest home composting pilot project started in Tallinn in 2019. The aim of the project was to determine whether bioboxes are effective in removing food waste from cities. Half of the participants were from the Haabersti district and half were from other parts of Tallinn. For four months, the Tallinn Waste Centre weighed the mixed municipal waste containers of the participants from Haabersti to determine whether the amount of biowaste in municipal waste has decreased after the distribution of the composter. Wastefox received over 50 innovative ideas from the participants on how to further develop bioboxes and which type of new biobox models should be made available in the future. The project was carried out in cooperation with EIT Climate-KIC, Cleantech Forest NGO, Tallinn Waste Centre, Tallinn City and the Ministry of Environment.[24]

Finland

There have been different approaches to supporting smart consumption amongst the actors, and the overall situation regarding the support process and instruments is promising. At the EU level, agrifood incubator/accelerator programmes have grown from six in 2016 to 80 in 2019. Amongst them, there are funds available to propel innovation like the VTT Launchpad boosting spinoffs, the Nordic Food Tech VC funding for startups, additionally the Founders Institute for early stage startups behind the earlier example[25].

In terms of public support instruments, there are no accelerator programmes specifically for smart consumption startups, which could be an opportunity to explore if there is a market need for this. However, there are also different support systems and funding available from Business Finland and Kasvuopen"[26].

In connection to food smartups, the Finnish Organic Food Association Pro Luomu established the European Organic Food Innovation Award to promote new companies in the food industry introducing innovative organic products or services to the Finnish market. Another example is the Food Tech Programme in Helsinki with the support of the Founder Institute's Food Tech initiatives. This initiative intends to provide support to entrepreneurs working in the food field at the beginning of their endeavours[27].

In terms of clothing smartups, VTT has also provided support in several ways. Firstly, through a specific project Clothing 2.0 to promote business creation in the Finnish smart clothing and services field[28].

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[21] https://startupestonia.ee/startup-ecosystem#funding3
[22] https://ec.europa.eu/easme/en/section/life/calls-proposals
[23] https://www.eas.ee/teenused/?lang=en
[24] shorturl.at/abLOW
[25] Nordlund, 2019.
[26] C. Chang, personal communication, February 25th, 2020.
[27] Founder Institute, 2018.
[28] Advanced textiles source, 2017.

Secondly, in collaboration with Aalto University, it has developed fibre technologies through the TeKiDe (Demonstration Platform for Textile Fibre Recycling) project. These efforts have the support of the Helsinki-Uusimaa Regional Council as well. This research has not only started commercial production through the Infinited Fiber Company (a local startup), but there is also a research complex – VTT's Bioruukki – for the development of wet fibre spinning processes that produce fibre at a rate of 60kg per day. Additionally, TeKiDe offers companies the possibility to test and experiment with their new ideas (Helsinki Smart Region).

Generally in the public sector, the main institutions providing funding for any kind of startup are the Ministry of Economic Affairs and Employment, the TE-palvelut, Business Finland, Sitra Finnish Innovation Fund, City of Helsinki Innovation Fund and Helsinki Business Hub. Other entities also provide research funding to generate innovation, e.g. the Finnish Academy and Strategic Research Council, Business Finland Research and Development, research programmes of ministries (MMM) and ELY centres Sitra[29].

In terms of private funding for startups, there are two main channels. There are angel investors who are not restricted to smart businesses but there seems to be a lot of interest within the smart consumption sector. This channel includes between 12 and 20 investors[30]. However, angel investments in this arena are not systematic. The second channel is VC, which can be characterised as risk-averse and to a large extent not interested in food smartups.

Regarding public funding for food-related smartups, currently the Helsinki-Uusimaa Regional Council is preparing a climate roadmap for the Helsinki-Uusimaa Region where smart consumption is one of its priorities. In the meantime, the strategy incorporates the EU's From Farm to Fork strategy to reduce the emission of food production to consumption. By the end of 2020, the roadmap will be adapted, and funding source/EU regional development funding will be sought for the implementation of this strategy[31]. In addition, institutions like Mavera provides funding for food smartups in Finland[32].

In terms of clothing smartups, the investment trends indicate that it is not easy to find investors, particularly for small companies. However, for products or services that successfully combine technology and clothing, there are more investors. Most of the sustainable fashion selling platforms have been financed by crowdfunding, which is a popular way of getting funding in the sector[33].

Private actors are financially supporting smart clothes projects, for instance, Business Finland (formerly Tekes), a Finnish funding agency, along with escalator manufacturer KONE Corp., insurance company LähiTapiola, workwear provider Image Wear, and textile manufacturer Finlayson are funding the Clothing 2.0 project[34]. Finally, the Finnish Textile and Fashion is a public organization providing funding in this field[35].

Germany

In Germany, companies producing low carbon and sustainable goods are encouraged to have their products or services certified so that they can be labelled with a well-known and reputable ecolabel. Information on how to do this is clear and readily available on the website of the Federal Ministry of Economics and Energy. Environmental labels are awarded by authorities, associations, companies or institutes. Most Germans know the "Blauer Engel" (Blue Angel) or the EU Ecolabel.

In addition to ecolabelling of products, companies can also use an environmental management system to make processes more environmentally friendly. What measures they take to be more sustainable can be verified as it is a documented process and it is in the interest of the public and above all to their

[29] Norlund, 2019.
[30] J. Saarikko, personal communication, 19.02.2020.
[31] C. Chang, personal communication, February 25, 2020.
[32] J. Saarikko, personal communication, February 19, 2020.
[33] A. Nurmi, personal communication, February 24, 2020.
[34] Advanced textiles source, 2017.
[35] A. Nurmi, personal communication, February 24, 2020.

customers. One example is the Environmental Management Seal of Approval of the EU (EMAS). EMAS allows for the evaluation and systematic improvement of all activities relevant to environment, in a company or organisation – from material consumption to energy and water use, to production, to wastewater and other emissions. It creates conditions for saving considerable costs and at the same time improving environmental performance.

The German Energy Agency GmbH (DENA) is a national centre of excellence for energy efficiency, renewable energy and intelligent energy systems for Germany. As part of the Initiative ‘’Energie Effizienz’’ (Energy Efficiency Initiative), DENA provides information on the efficient use of electricity to companies throughout Germany.

The German federal and state governments support environmental and climate protection measures in companies. The federal government support programmes include:

- Climate protection for SMEs [31]
- KfW Environmental Programme [32]
- BMUB Environmental Innovation Programme [33]
- Further programmes – including those of the federal states, can be found in the federal government's funding database[34].

Key supporting organizations are:

- Federal Ministry for Economics and Energy
- KfW Bank
- Berlin Partner for Business and Technology
- Projekt Zukunft
- Creative Cities Network of UNESCO
- REDICT networking project on digital innovation processes
- Cross Innovation
- Open Cities
- European Creative Industries Alliance
- BiTHOUSE Group
- Cleantech Initiative Ostdeutschland
- Social Impact gGmbH
- Veolia Deutschland GmbH
- Startup Germany
- Factory Berlin
- Startup-Berlin
- InQVentures GmbH
- Climate-KIC GmbH
- StarTUp LAB
- Exist Gründernetzwerk
- StartUp Bundesverband
- Digital Ecosystems BmWi
- Home and Smart GmbH
- Testbeds [36]:
- Fraunhofer Institut
- The TUB/Fokus Testbed
- Institute for Power Generation and Storage Systems

[36] List of all innovation labs in Berlin

- Luxinnovation
- Trescimo

Latvia

There are no specific tools or programmes for the smart consumption sector, but there is a lot of support available for all startups and SMEs. For foreign founders wanting to start their business in Latvia, LIAA together with the government of Latvia offer Startup Visas – permission to live and work in Latvia for no-EU citizens. Then there is startup law that gives special tax reduction for startup employees. LIAA also financially supports startups if they want to go to international conferences, exhibitions, investor meetings, etc. Similar to this, SMEs and startups can apply to get support for trade missions. Nonfinancial support is available in a form of contacts and network that LIAA has established over the years. LIAA also has an Innovation Voucher programme which support companies needing to develop their prototype, product design, get certification and/or patent rights.

Acceleration funds are not managed by LIAA, but by different VC funds. Three out of four accelerators programmes are financed with EU support, where each of the funds has five million to invest in startups. For companies working in the smart consumption sector, Buildit accelerator and Commercialization Reactor are the most suitable. Buildit works with hardware and IoT startups, while Reactor focuses on deeptech companies.

There is also the Central Finance and Contracting Agency (CFLA) programme, titled “Promoting efficient use of energy, reduction of energy consumption and transition to RES in the manufacturing sector”.

Poland

The ecosystem of organizations that support the development of smart consumption solutions in Poland is still developing.

One of such organizations with strong roots in the United Nations Environment Programme Poland is GRID Warsaw, in partnership with UN Environment. One of the dedicated investment funds is AgriTech Hub, the first Polish VC investing exclusively in the agritech sector. This VC invests mainly in PoC and PoP agrifood projects[37]. Another organization that supports the foodtech industry is FoodTech Accelerator[38].

The Climate Ministry offers a programme called GreenEvo which is a greentech accelerator that supports, amongst others, technologies focused on waste management. This ministry also runs a pilot for the circular economy projects, financed by the National Fund for Environmental Protection and Water Management, providing donations or loans.

Significant financial support comes from EU funds (such as Horizon 2020).

Russia

In Russia, crowdfunding market is considered a good way to investment in projects focused on society (impact startups). The Russian crowdfunding market is estimated to be worth about 11 billion Roubles (Central Bank data for 2017). The amount is mostly made up of high-risk investments, driven exclusively by profit-making and focused on buying stocks in a fundraising company. The monetization model of major platforms envisages a commission on collected funds (about 5-10%, excluding payment systems commissions). If donations do not reach a certain target or, in some cases, 50% of the target, pledges are returned to the funders.

[37] https://agritechhub.com
[38] https://foodtech.ac

Key platforms supporting startups:

- planeta.ru[39]

983 757 people, 735 campaigns, 282 445 000 RUB rewards

- BOOMSTARTER[40]

213 907 people,1 997 successful projects, 412 776 487 RUB attracted

Sweden

In Sweden, funding opportunities have not been the best. Incubators and science parks in Sweden are gathered in an organization called SISP[41]. Incubators and science parks have been helping companies to get public support. The Swedish business developer ALMI is one of them. There are also venture capitalists. Incubators and science parks, for example, Krinova[42], have started to work more with dynamic processes instead of linear and the cooperation at national and international level has increased. Krinova uses the following processes, which include, preincubation, incubation, acceleration, technology transfer and transnational sharing of skills/methods and ideas on international cooperation.

In terms of food, the infrastructure is large and built for a different purpose such as large-scale processing. At the same time, there are new solutions for customers who want to do things differently.

Actors and key players:

- Swedish Incubators and Science Parks (SISP)[43]
- University ventures such as GU Venture[44] and Chalmers Venture[45]
- Vinnova, the Swedish innovation agency[46]
- LRF, the Federation of Swedish Farmers[47]
- Norrsken House, the impact unicorn factory[48]
- COOP, part of the foodtech accelerator Bloomer[49]
- Livsmedelsföretagen, the Swedish Food Federation, is an employer and industry organization for companies that produce food and drink in Sweden. It has about 800 member companies[50]
- Livsmedelsacceleratorn, food accelerator, part of RISE, the Swedish Research Institute, funded by ERDF, Tillväxtverket (Swedish Agency for Economic and Regional Growth) and Västra Götalandsregionen[51]
- Skatteverket, the Swedish Tax Agency[52]
- Konsumentverket, the Swedish Consumer Agency[53]
- ALMI, offers loans to companies with growth potential and assist them in their business development[54]

[39] https://planeta.ru/
[40] https://boomstarter.ru/
[41] https://www.sisp.se/
[42] https://www.krinova.se/
[43] www.sisp.se
[44] www.ventures.gu.se
[45] www.chalmersventures.com
[46] www.vinnova.se
[47] www.lrf.se
[48] www.norrskenhouse.org
[49] https://pressrum.coop.se/nu-startar-foodtech-acceleratorn-bloomer/
[50] https://www.livsmedelsforetagen.se/
[51] https://livsmedelsacceleratorn.com/
[52] www.skatteverket.se
[53] www.konsumentverket.se
[54] www.almi.se

- Connect Sverige, a non-profit organization that matches entrepreneurs with skills and capital from the business community[55]
- Sellpy, second-hand online service for buying and selling[56]
- RISE, the Swedish Research Institute[57]
- Startup Sweden, bootcamp within the Swedish Agency for Economic and Regional Growth[58]
- The Swedish Agency for Economic and Regional Growth[59]
- The West Sweden Chamber of Commerce, a private, politically neutral organization working to strengthen the region's business community[60]

[55] www.connectsverige.se
[56] www.sellpy.se
[57] www.ri.se
[58] https://tillvaxtverket.se/4.7b2b44bc15a9374dc0e570ae.html
[59] www.tillvaxtverket.se
[60] www.vastsvenskahandelskammaren.se/en/

2.3 Market opportunities

Market trends in Smart Consumption – drivers and barriers, key players, business models

Estonia

Cleantech-specific drivers help promote market adoption of clean technologies, drive demand in the green economy and address any barriers to entering the industry. The government's contribution to cleantech innovation drivers is determined by the level of cleantech-supportive policy, the public R&D expenditure in the sector, and the country's market attractiveness for renewable energy investments. Measuring the level of startup access to private finance via cleantech funds and domestic investors serves as the private capital support assessment. The access to cleantech clusters and organisations, both public and private, provide an additional assessment of the interplay between these drivers.

Examples of smart consumption startups in Estonia:

- Click & Grow[61]
- Natufia Labs[62]
- Reverse Resources[63]
- Circup[64]
- Wastefox[65]
- Bugbox[66]
- Suckõrs[67]
- Compact[68]
- Local Offset[69]
- Gelatex[70]
- Natly[71]
- Ösel Birch[72]
- Nutriloop[73]
- Woola[74]
- Swampsmart[75]

Business models

Corporations and investors need to deal with, the uncertainty of technology's scalability or robustness, and the need for new business models that would allow them to estimate value of an investment. Therefore, cleantech companies must find new and unique ways to unlock the commercial potential of

[61] https://www.clickandgrow.com/
[62] https://www.natufia.com/
[63] https://reverseresources.net/
[64] https://circup.io/home/
[65] https://wastefox.ee/
[66] https://www.bugbox.ee/
[67] https://suckors.com/
[68] https://www.facebook.com/Compactestonia/
[69] https://localoffset.org/
[70] https://www.gelatex.com/
[71] https://www.facebook.com/natly.eu/
[72] https://oselbirch.com/
[73] https://nutriloop.org/
[74] https://www.facebook.com/woolapackage/
[75] https://www.smartswap.com/

their technologies. Five alternative business models that could enable companies to commercialize their innovations and scale them up to widespread market adoption are as follows:

1. Function-oriented business model
2. Savings-based business model
3. Leasing
4. Strategic Partnership
5. Local Joint Ventures

Instead of focusing on the existing markets, cleantech companies could create new markets for their technologies in emerging economies. One of the best ways for a small or medium cleantech company to enter an emerging market is as a joint venture with a local partner. Collaboration with the right foreign partner could allow a cleantech company to rapidly gain access to wider markets, increase sales and enhance its technological and operational abilities.

The business models in the food industry include cooperative farming, social cooking, smart systems for growing food, no waste cooking, recycling of nutrients and substitution of ingredients to name a few. More competition is coming to this specific field with the introduction of different insect-based sources of protein (e.g. startup Bugbox in Estonia), and even if eating insects might be a little bit culturally challenging, it is legal in some European countries and it is expected that the rest of the EU will follow in the next few years. Another value creation model gaining popularity is the emergence of different sharing platforms for a variety of consumer goods. Upcycling and refurbishment of goods are also trending in the fields of clothing and related materials as well as modular consumer electronics.

Finland

Consumer research differentiated seven profile groups within the Finnish consumers, showing different motivators and barriers for smart consumption, as well as particular attitudes towards products and services within this market that need to be considered carefully when aiming to enter the Finnish market[76]. An overview of the profiles is showcased in the graph below.

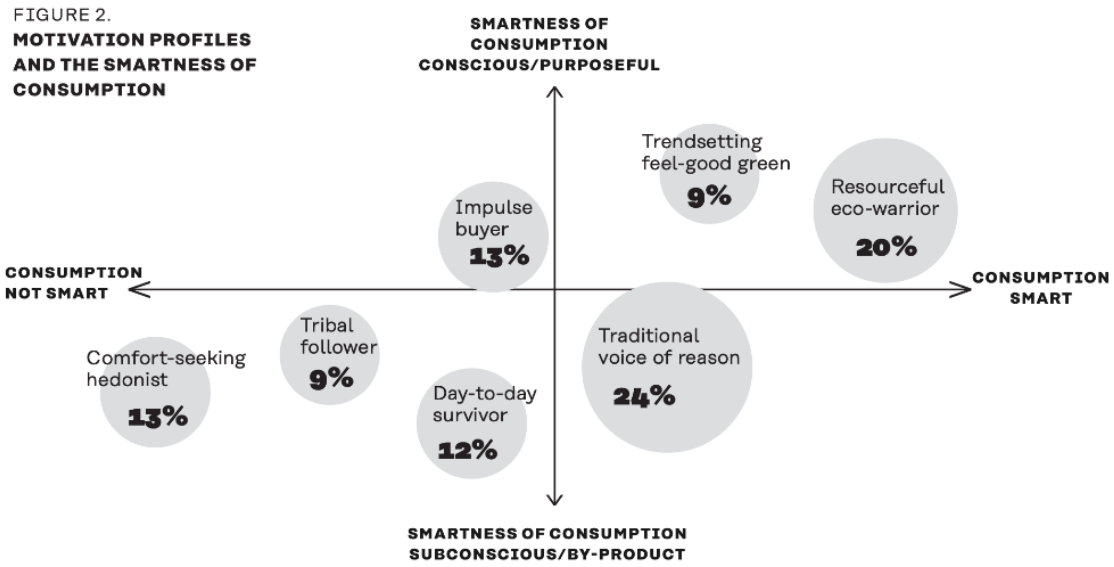

Figure 3[77]. An overview of the consumption profiles

[76] Huumo, E., Kaitosalmi, K., Tuomisto, T., Kavenius, N. and Tikkanen, S., 2019.
[77] Huumo, E., Kaitosalmi, K., Tuomisto, T., Kavenius, N. and Tikkanen, S., 2019.

The Finnish smart consumption market's main characteristic is its dynamism regarding embracing change, technology and innovation. The consumers are tech-savvy and internationally oriented[78] but the actors in the field clearly want to position Finland as a key player in sustainable systems, both in clothing and food, that creates new economic growth opportunities.

Overall, the consumers and markets are eager to try new things. This is especially true when branding and communication emphasise climate friendliness and health benefits both of which attract public attention. Engaging, user-friendly and reasonable alternatives[79] to products or services seen as unsustainable are in demand. Furthermore, consumers expect a good value proposition from food smartups, a special and novel product or service that at the same time feels familiar to the user but that presents itself as a sustainable alternative capable of maintaining interest in the market and that adds value without being expensive[80]. Example of this is Helsieni, a Finnish innovative startup, offering highly efficient low-tech solutions for cultivating mushrooms on waste, e.g. used coffee grounds, agroindustrial by-products, or other unutilized nutrient streams.

When it comes to food smartups, there are several core drivers. First, there is an increased interest from consumers for new and innovative organic products, particularly from families with children, but increasingly also amongst single people and young couples[81]. Second, there is an emphasis on research on sustainable food systems, particularly on how new technological developments impact agriculture and food technology in the near future (foodtech) – this trend is seen in Finland and Europe, and it aims to transform the food economy[82]. For instance, the potential to harness Photonics in agriculture and food processing (foodtech) is being explored.

Regarding clothes smartups, the market is small and has a lot of potential for development. The most prominent trends are enabling second-hand markets and improving and innovating the recycling of textile fibres. The main characteristic of the second-hand market is its accessibility and attractiveness due to many items discarded from the fast fashion industry. The second-hand clothes business is already lucrative, and the rental clothes business is seen as a small addition to the core business[83].

One of the main obstacles to overcome in the smart consumption sector is that even though there is a lot of discussion in Finland on consumption and sustainability, sustainability still does not seem to be the main driver of purchasing decisions. Many factors influence Finnish consumers' daily choices, but these choices are not underpinned by environmental considerations[84].

There is a strong need to facilitate identification of sustainable choices within the clothing industry as well as to promote a drastic change in the consumers' behaviour who favour fast fashion. It is challenging to raise awareness and to criticise current ideas in fashion. However, opening this discussion will contribute to promoting new business models such as clothing rentals – an idea that currently lack social traction (i.e. referrals from family, friends and influencers)[85].

Finland is an evolving market and ecosystem with a huge untapped potential in terms of its proven expertise in technology development. Additionally, there are many ongoing research projects and there is a lot of interest in developing technology[86] that could bring more sustainability to food and clothing smartups. For example, there are eight food ecosystems and networks in Finland doing research, technology development and testing smart products (like Heart is the TestEat), vertical farming, berry and milk sustainable production, and reshaping the food value chain to boost innovation and impact[87].

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[78] Retail Facts Finland, 2009.
[79] Huumo, E., Kaitosalmi, K., Tuomisto, T., Kavenius, N. and Tikkanen, S., 2019.
[80] J. Saarikko, personal communication, February 19, 2020.
[81] Proluomu, 2019.
[82] Poutanen, K., Nordlund, E., Paasi, J., Vehmas, K. and Åkerman, M., 2017.
[83] A. Nurmi, personal communication, February 24, 2020.
[84] Huumo, E., Kaitosalmi, K., Tuomisto, T., Kavenius, N. and Tikkanen, S., 2019.
[85] A. Nurmi, personal communication, February 24, 2020.
[86] Business Finland.
[87] Norlund, 2019.

When it comes to clothes, there have been developments in wood-based fibres for use in the textile industry with high commercial potential.

There is huge expertise in global wearable technology development and the range of products available is wide, including fitness trackers, smartwatches, augmented reality glasses, wrist-mounted screens and smart contact lenses to smart jewellery, smart clothes and smart fabrics[88]. This proves the eagerness of Finnish consumers for smart, innovative, sustainable and tech-oriented solutions, products and services.

Due to these market characteristics, entering can be relatively obstacle-free, if the business understands the dynamics, the customers, the right players and develops a strategy focused on making partnerships that can help throughout this process. What is key, is to clearly identify gaps in the market, test the solutions on a small scale and get feedback from customers about the product or service[89].

Key players

Food key players

S Group, Finland's leading retailer, and Vailo, Finland's leading dairy manufacturer. Grocery retail market is heavily dominated by two domestic operators K Group and S Group, but German Lidl has increased its market share. Additionally, Fazer Group which operates a bakery, confectionery and lunches market**,** and also has a strong presence in catering and runs cafes.

- Large: Altia, Atria, HKScan, Paulig
- SMEs and Startups: Finsect, Biovaaka Oy, Fiksuruoka, Restaurant Loop, OatKitchen, ResQ Club, Helsieni, Froodly, Foodduck, Jospak Oy

Clothing key players

The largest fashion companies in Finland are Lindex, L-Fashion Group and Seppälä[90]. And the retail company with the largest share of the market and a turnover of 191 million euros in 2018 was the Swedish H&M[91].

- Large: Pure waste, Myontec, Clothing Plus, UFF, Recco.
- Startups: Infinited Fiber, Costo Oy, Happy Textiles, Lovia, Vaaterekki, Vaatepuu.

Other smart consumption key players

- Large: Kekkilä, Tori.fi.
- SMEs and startups: Swappie, Sulapac.

Business models and solutions

The list below presents an overview of the most relevant business models regarding smart consumption of food and clothing in Finland.

- **Food**: cooperative farming, social cooking, smart systems for growing food, no waste cooking, recycling of nutrients, and substitution of ingredients. The most developed and competitive

[88] Business Finland.
[89] A. Nurmi, personal communication, February 24, 2020.
[90] Fashion United, 2020.
[91] Statista Research Department, 2019.

sectors seem to be ingredient substitution, in most cases replacing animal proteins with vegetable sources[92].

- **Clothes**: second-hand shops online and physical, renting clothes platforms, smart textiles, smart wearables, although most of them are on a small scale[93].

Germany

Germany is a large e-commerce market, particularly in its capital city, Berlin. Germany has many buyers who are smart, savvy and well acquainted with online shopping. It is a mature marketplace, showing slowing growth, yet its size, infrastructure and advanced state of e-commerce are still attracting sellers.

Digitalization and networking through ICT/IoT have significantly shaped consumption patterns, and both the opportunities and risks of digitalisation and big data for sustainable consumption are closely interlinked. Consumer increased awareness of sustainability and carbon footprint, and their search for sustainable, alternative products and practices, are apparent. Digitalisation and IoT – i.e. smart production of goods – allow for more environment-friendly production processes as well as more energy-efficient methods.

Globalization, international trade and foreign direct investment, are megatrends relevant to sustainable consumption[36]. As sustainable consumption relates to an entire consumer products value chain, starting with the raw material collection and transportation of goods, etc., raw material sourcing is a major issue to be considered.

Germany belongs to the top e-commerce markets in Europe, and as such, should be considered by growth-minded trendsetters in the consumer cleantech sector. The market has its challenges, such as maturity, high return rates, and the ever-demanding consumers, yet its total purchasing power presents big opportunities for innovative solutions in smart consumption.

Latvia

In Latvia, it is complicated to determine the size of the market, as it is very diverse. The experts emphasize that people want to be smart consumers but not enough to significantly change their behaviour to fight climate change. Key customers in smart consumption are individuals, business companies and other organizations – anybody who buys and consumes goods, i.e. consumers.

In the recycling business, the main players are waste recycling companies, state and municipalities as well as house management companies. Waste collection companies emphasize the need for better support from the government to create a common system in a city or, the ideal solution, for the entire country.

The same problem is mentioned about the introduction of smart meters for heat, electricity and water – the experts mentioned that smart meters are installed in 550 000 households in Latvia. Smart meters serve as an effective decision support tool for controlling electricity consumption, reducing consumption and introducing new efficient electricity consuming equipment. Riga city enterprises and institutions are an important target group for electricity consumers.

Considering efficiency and energy-saving measures, which are based on-information about electricity consumption, it is possible to cut costs and reduce CO_2 emissions at the same time.

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[92] Ritola, M., Annala, M., Hulkkonen, S., Lahtinen, V., Lätti, R., Noponen, E., Mäkelä, K., Mizera, R., Neuvonen, A. and Hietaniemi, J., 2015.
[93] A. Nurmi, personal communication, February 24, 2020.

Barriers:

- Lack of information and knowledge on the benefits of implementing measures for consumers.
- Lack of consumer motivation; there is still no plan for certain types of waste (for instance, building waste) recycling. In most cases, building waste is dumped in forests. The market's main motivation is using, e.g., by using a particular waste sorting machine people will get PINS points which could be used for buying train tickets, coffee or other goods.

Poland

Market trends in Smart Consumption – drivers and barriers

The idea of switching from current business models of the economy (linear models) can bring savings and reduce the negative impact on the natural environment. The linear models are, almost, solely responsible for the change towards sustainable development. According to some researchers, the transition to a circular economy entails four fundamental building blocks: 1) materials and product design, 2) new business models, 3) global reverse networks, and 4) enabling conditions. The shift towards a circular economy depends on policymakers and their decisions, as well as on introducing the idea into business models by businesses[94].

In Poland, the direction of change is still unknown – it is hard to tell which industry will transform into a circular economy – however, a roadmap has been outlined in the document "Designing the Business Models for Circular Economy – Towards the Conceptual Framework"[95]. Still, there are no instruments that would support the shift towards a circular economy. Also, not all business guidelines were included in the document. The framework stipulates a creation of a catalogue of anthropogenic raw materials with a list of companies interested in such materials, the use of aggregates, e.g. in the construction industry, actions regarding legislative changes in this area[96].

Implementing a circular economy in Polish enterprises is key in this transformation. However, it is a process that requires a lot of time and engagement as well as investments. Some companies decide to go with public support in order to implement changes in some technological production lines. Some examples of such activities are eco-innovations in the waste management systems (RotoSteril) or cleaning sewers (Prote-Mos), as well as initiatives that support waste management (glass bottles by Carlsberg Poland, oil by McDonald's Poland) or running workshops (Ikea).

As already mentioned, the smart consumption market focuses mainly on waste management, and this sector has great growth potential.

[94] M. Lewandowski, "Designing the Business Models for Circular Economy – Towards the Conceptual Framework", Sustainability 2016, 8(1) 2015.
[95] Ibid.
[96] T. Jaworski, S. Grochowska, "*Circular Economy – the criteria for achieving and the prospect of implementation in Poland"*, Archives of Waste Management and Environmental Protection, 19(4), 2017.

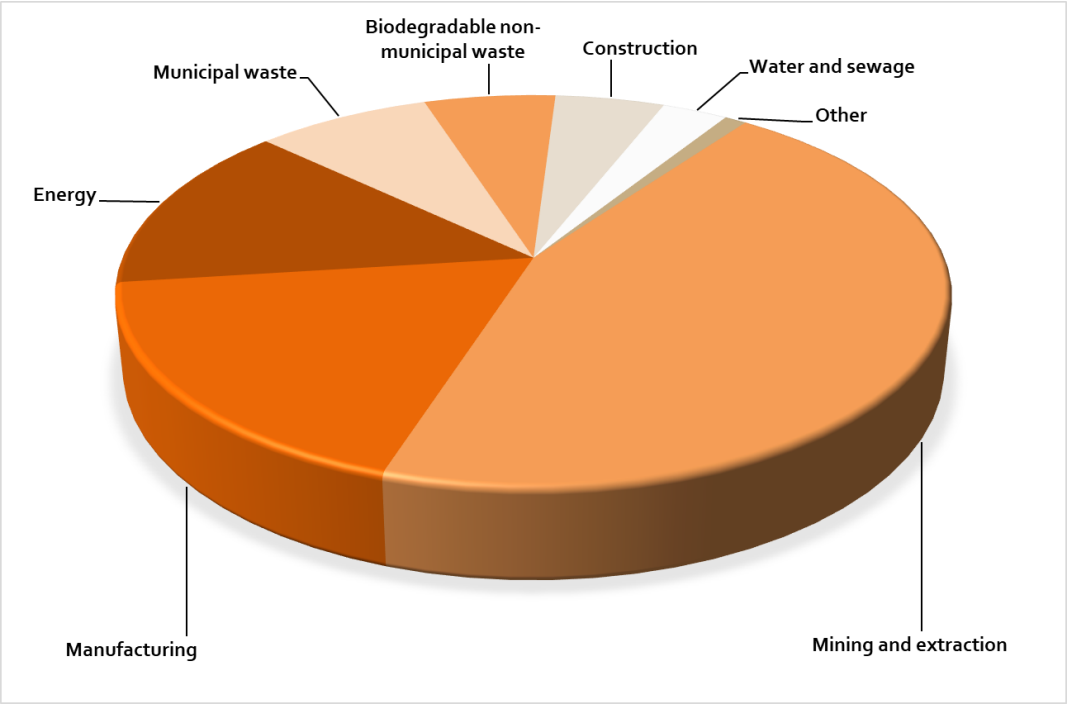

Figure 4. The structure of waste in Poland. Source: Statistics Poland (GUS)

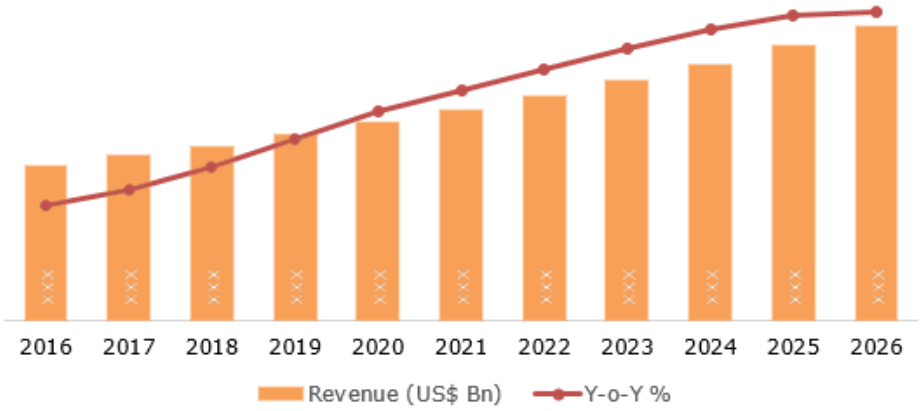

Figure 5. Global Waste Management Market Value and Growth 2016-2026

There are certain drivers and barriers that define market opportunities. Certainly, the circular economy idea will cause changes in the Polish market. However, this is something to be considered in the future, especially in such areas as consumption, use and reuse, repairs or recycling. Not enough is known about how to deal with new business models (how to monetize business ideas that support sustainability issues), there is only limited access to new technologies and information about what is currently going on abroad (e.g. in the foodtech industry).

To reduce the barriers, policymakers should, firstly, assess the conditions of different areas of a circular economy and secondly, adjust the particular instruments.

Financial resources are needed to overcome the barriers. But also attitude changes (education), social acceptance of such change and further legal regulations are needed. The key to success is the cooperation between all entities business, public administration and consumers – they need to change their attitudes towards sharing economy, which will shift towards more environmentally friendly life cycle of products.

Habits and consumption patterns of developing countries are not fully sustainable. Additionally, as experience shows, with the GDP per capita growth, the level of consumption grows as well. This trend is also seen in Poland, and the amount of waste reflects that as well. For example, currently, only 10% of 78 million tons of plastic packaging in the market every year is recycled, 40% ends up in landfills, and 32% is released into environment[97].

This shows the capacity of the market – there is still room for new technologies to support solutions to this problem.

Key players

There are organizations (including companies) that play an important role in the Polish market. One such organization is the Waste Economy Employers Association. Examples of companies in the waste industry are ATF, Abrys, Agora1, AG-Complex, ALBA, ASTWA, BFE Polska, Clean World, Bin-e.

In the agritech sector: Plantalux, NapiFeryn BioTech, Natural Machines, Foodini Food, Usarya Polska, Wilmar-Oils Group.

In the foodtech industry[98], the following startups can be found Polish Greens, Youish, Roślinny Qrczak, Hempiness, Frens, Tribe Natural Energy, Vertigo Farms, KuMin.Sys, MultiSpec.

These are the key players in the clothing sector: LPP SA, Big Star Limited, Etos SA, CCC SA – some of them adjusting their strategies to the sustainability challenges. Also, startups such as GeekGoesChic.

Business models and solutions

The roadmap to a circular economy proposed by the government should not be too detailed. The focus should be on individual activities undertaken within the framework of a circular economy. Nevertheless, some elements should be taken into account by the public authorities. For example, moving of all activities related to ensuring greater producer responsibility or financing of a circular economy of R&D within the National Intelligent Specialisation of a circular economy (combination of waste, raw materials and water specialisation). The Ministry of Science and Technology also wants to measure the effects of the implementation of a circular economy[99].

So far, there are no specific business models that function at an advanced level, as the market players (producers, and consumers) are still in the learning process.

Russia

In Russia, Smart Consumption market is growing:

- In 2017 it was 392 billion RUB
- In 2018 it was 511 billion RUB (+30%)
- In 2019 it was 769,5 billion RUB (+50%)

[97] https://energia.rp.pl/akcje-specjalne/climate-battle/14826-poland-is-looking-for-a-way-towards-a-closed-loop-economy
[98] https://foodtech.ac
[99] https://www.regeringen.se/49550d/contentassets/e9365a9801944aa2adce6ed3a85f0f38/fran-vardekejda-till-vardecykel-2017_22.pdf

Transaction volume per CE sectors:

Name	2017 (billion RUB)	2018 (billion RUB)	2019 (billion RUB)
C2C sales of things	295	370	566
On labour exchange (P2P service)	73	98	140
Carsharing	5,1	13	20,5
Carpooling	8,1	13,7	17,8
Short-term property rental	5,8	9,8	15,6
Office sharing	4,3	5,7	8,5
Personal mobility	-	-	0,46
Crowdfunding	0,3	0,4	0,43
Rental	-	-	0,22

C2C-commerce

- Increase in goods flow due to international delivery.
- Geographical changes:
- an increase in sales share in the regions (from 14 to 28%)
- a decrease in sales in Moscow and St. Petersburg (from 37% in 2017 to 24% in 2019)
- The number of C2C sellers increases faster than the number of buyers.
- Online labour exchange (P2P services).
- Contractors actively switch to professional income tax (self-employment taxation).

Property

The flow of clients from over-regulated hostels to rooms and apartments (flats). An increase of tourism from outside the country is expected due to e-visas.

- Office sharing: big launch of WeWork on the Russian market (fourth place in terms of size i.e. a number of coworking spaces per m^2).

Crowdfunding

Crowdfunding is stagnating as is crowd financing, in general. In crowd financing:

- Decrease of volume and P2P-credits
- Positive like-for-like dynamic in P2B-credits

Food sharing

- 17 million tonnes of food waste equals 1,6 trillion RUB.
- Development of commercial and non-commercial services. With its help, 7 000 tons of food was saved in a year.

Examples of the smart consumption market

- **Carsharing** – as with the rest of the world, shared cars in Russia are mostly provided by companies that own fleets and allow users to leave a car anywhere within a designated zone. In 2018, the number of players in the Moscow market reached 15, which, judging by the global

experience, might be considered excessive. In the coming years, market consolidation is expected in Moscow. Beyond Moscow, mass adoption of carsharing is yet to happen. It is usual for a Russian city to have one or two operators with small fleets. The only exception is St Petersburg with five operators. People pick carshare to save money (in comparison to owing a personal car and riding in taxis), privacy and a sense of security in comparison to the public transportation or taxis, mobility and freedom when combining carsharing with the public transportation and taxis (it is not always easy to find a place to park). Today in Russia, 25 carsharing companies are operating in 20 cities. Approximately 25 000 vehicles are used in the process. The P2P model (when a private car owner allows others to use their vehicle) has not gained popularity so far. Key operators in this market are Yandex Drive[100], BELKA Car[101], Delimobil[102].

- **Carpooling** – carpooling (ridesharing) platforms are mainly focused on long-distance rides, which complement trains and buses. Today Russia is the largest carpooling market in Europe: the Russian carpooling community includes 16 million members and about 100,000 Russians use carpooling daily. Carpooling has not been integrated into in-city rides. The practice of shared daily commutes is chiefly based on long-term offline arrangements between neighbours and colleagues. However, platform solutions for short-distance ridesharing are being tested in various countries. Different monetization models exist for carpooling platforms, the most popular ones are commission on transactions and subscription for access to platforms. The key operator is BlaBlaCar[103].
- **Real estate rentals** – sharing accommodation (shared rooms, private rooms and apartments) has grown rapidly in the last years (55% of the Compound Annual Growth Rate in 2014-2017). In 2018, the growth rate was expected to be 70%, which was linked to the FIFA World Cup. The practice of lodging at locals' apartments during global events reduces environmental impact, as this means there is no need to build new hotels. This practice also facilitates intercultural dialogue. Russia is characterized by a high share of domestic tourism in short-term rentals. Airbnb, that specializes in international audience, noted that in 2017, 63% of property bookings in Russia were domestic, not international. Platforms for renting residential properties usually monetize through commissions on transactions, paid listing or promotion of ads. The key platforms are Avito[104] and CIAN.ru[105].
- **Office sharing** – in terms of commercial real estate, there are two collaborative consumption: coworking and office as a service (OaaS). These models can be found on the Office Sharing and Place for Work platforms. Users of OaaS include startups, SMEs and project teams. Coworking users are freelancers, remote employees and creative professionals. The number of coworking spaces by region as of 2020 is as follows[106]: Moscow, 241; Saint Petersburg, 75; Yekaterinburg, 25; Novosibirsk, 20; Samara, 16. Key OaaS players: Regus[107], SOK[108]. Key coworking network is COWORKING START https://coworking-start.ru/
- **C2C sales** – in Russia, every year approximately 8 million people become sellers and 10 million people become buyers on C2C platforms. About 10% of buyers account for almost 50% of sales. Just 18% of sellers sell goods on C2C platforms regularly. C2C commerce platforms in Russia usually make money by providing additional services, mainly paid promotion of listings, instead

[100] https://yandex.ru/drive/msk/
[101] https://belkacar.ru/
[102] https://delimobil.ru/
[103] https://www.blablacar.ru/
[104] https://www.avito.ru/
[105] https://www.cian.ru/
[106] https://www.kovorkingi.ru/
[107] https://www.regus.ru/
[108] https://sok.works/ru, Деловой https://www.delovoy.su/

of charging commissions on all deals. The main categories are electronics, furniture, children's products and fashion. The key platforms are AVITO[109] and YOULA[110].

- **Item rentals** – development of the P2P item rentals market is at an initial stage. Whereas in C2C commerce, mass products dominate, on P2P rental platforms premium and niche goods are more likely to enjoy high demand. The key platforms are Avito[111], RENT MANIA[112] and NEXT2U.ru[113]
- **P2Pservices** – one of the sharing economy's signs is the gig economy – a labour market characterized by temporary and/or part-time employment. Estimates of the number of self-employed citizens in Russia varies between 13 and 20 million people. However, only a minority of them use sharing platforms. According to the Federal Tax Service, the number of self-employed workers using online freelance marketplaces to find orders is about 2.5 mln people, and for about half of them, online orders are not their primary income. Flexible opportunities to make extra money, aided by the internet, reduce the actual unemployment and are especially useful to students and parents of small children. Freelance marketplaces are usually monetized by offering premium options for listings or commissions on transactions. The key platforms are Avito[114], ЮЛА[115] and you DO[116].
- **Food sharing in Russia** – the way to save up to a million tonnes of food every year is by providing food to 1.3 million in need, by doing business with food with expired use by date worth total of 85 billion Roubles, and by preventing 143,000 tonnes of methane emissions.

Sweden

Market trends in Smart Consumption – drivers and barriers

Digitalization and sustainability are drivers that create opportunities for new market entries. The gathered data show that there is a potential to create better services and products that benefit consumers and producers This is the case in the food industry, which releases enormous emissions. When a tech startup and environmental interests come together, great things can happen.

The number of barriers and obstacles have been reduced. But in hindsight, Sweden was rather slow in developing the food sector; it was a late adopter of stock automatization, offering online services, etc. Sweden has had a few actors with large shares of the market and with faithful customers – all of this stagnated R&D.

Sweden is not a forerunner in the food sector, even more so when it comes to working with open innovation. The foodtech sector has grown substantially in the last few years and appears to have caught up with other countries.

The food company COOP (COOP has had a tough last decade because it has lost its market share as well as its momentum) has joined forces with the help of a unicorn factory, Norrsken House and Sweden Foodtech. They have created the foodtech accelerator Bloomer. These kinds of partnerships are becoming more common. COOP looked at Norrsken and IKEA for inspiration on how to support startups, and at Electrolux's approach to open innovation. Other role models are Unilever, A-hold and Carrefour.

In the clothing industry, efforts regarding circular thinking can be seen, for example, in HM and MQ, both of which have initiatives aimed at promoting smart consumption and sustainability.

[109] https://www.avito.ru/
[110] https://youla.ru/
[111] https://www.avito.ru/
[112] https://rentmania.com/
[113] https://next2u.ru/
[114] https://www.avito.ru/
[115] https://youla.ru/
[116] https://youdo.com/

2.4 Two perspectives: Experts and smartups

2.4.1 Methodology

Two groups of respondents were studies, 1) startups/SMEs and 2) experts from legal regulations, support system and business development fields.

Startups completed an online questionnaire and experts were interviewed by the representatives of each country taking part in the project.

The questionnaire for startups/SMEs consisted of four parts:

1. Company's profile and product/service details (how it is financed, how advanced is the product/service, is it making money, customer profile, etc.).
2. Smart consumption legislation (starting a business, ease of doing business, financial solutions/instruments available, employment regulations, etc.).
3. Support system (the most efficient support instruments, the expected support outcome).
4. Business development (market and customers, level of market share, competition, participation in entrepreneurial networks and events, expectations towards accelerators).

Semi-structured in-depth interviews were carried out with the experts.

1. Legal regulations
   - basic smart consumption regulations
   - critical conditions for doing business in the smart consumption sector (stimulating, inhibiting)
2. Support system
   - support conditions for startups and SMEs
   - support processes and instruments (preincubation, incubation, acceleration, technology transfer)
   - funding sources
3. Business development
   - market trends in the smart consumption sector (drivers and barriers)
   - market opportunities for startups and SMEs (size and structure of the market, key customers and players, business models and solutions, investment trends)

In the results section, an overview of each country is provided.

2.4.2 Results

Estonia

Smartups

According to the startups, the biggest barriers for business activity in the smart consumption sector are the general lack of awareness about climate and environmental issues, small market and its maturity, regulations (e.g. biowaste regulations restrict innovative solutions) and funds. The unique value proposition is mostly the quality of products and unique technology.

Technology parks, incubators, accelerators and universities were seen as organisations with the most efficient support instruments for startups because they provide mentors/investors network, different activities (e.g. programmes, boot camps), office space, scientific infrastructure and cleantech community. The startups stated that they need support in the areas of export and sales, business development and strategy, network, science. The startups also noted that they need help accessing talent, labs and testing facilities as well as needing support when dealing with legal issues and fundraising. In terms of global development of their companies, international industry contacts, supported access to trade fairs and big events as well as funds for scaling up were seen as the most valuable. If the startups want to expand into other countries, they will look for different business support institutions outside of their home country – with the view of finding new clients/partners and expanding their networks.

In terms of legal regulations, startups, wanting to start and run a business in the smart consumption sector, knowing more about entering markets with new products/services, banning single-use plastic, reed harvesting, certifications, sales channels, financial solutions/instruments, medical regulations, IP protection and taxation are the most important legal aspects to know.

When it comes to considering changing legal regulations in Estonia, the startups indicated lowering taxes for small/starting companies but also mentioned the so-called “startup social tax” (a smaller social tax on personal income as this increases the chances of survival). The same principle could be applied to cleantech and impact startups – if a startup matches certain criteria proving that it is has a positive impact on the environment, it should be eligible for a tax discount during a growth phase. There should also be more financial instruments available for science-based and greentech businesses.

Experts

The experts agreed that support services for startups are very good in Estonia. It is important not to overwhelm startups with information, but to create a functional and systematic structure, as well as instil in startups habits of being proactive and taking responsibility. For support organisations, it is important to work in sprints. Startups get workshops followed by sprints (e.g. product, design) and goals must be reached in each section. The aim is to put learning into practice and get results. Practice equals results. It is also important for support organisations to provide added value.

The European Commission is moving towards making manufacturers responsible for environmental pollution. Businesses must think about making their production cycle more environmentally friendly. For example, there are regulations that stipulate the durability of household appliances. It is also planned to implement a tracking system of the environmental footprint of products and/or services. The objective of the product/organisation environmental footprint is to strengthen the reliability of environmental claims in a B2C and in B2B context, and thereby to boost the market of green and circular products. The use of raw materials, setting requirements for the composition of raw materials so that they can be safely reused are also envisaged. It also looks like biowaste will be reused, e.g. in energy production, as fertilizer and processed into animal feed, etc.

Creating demand through creating new regulations does not lead to change. It is important to keep a balance between over- and under-regulation. It is difficult to know all the regulations when starting a business in any field.

Finland

Smartups

The startups said that for greentech startups to grow, they need funding, especially when they want to expand. The startups also mentioned that dedicated events for the sharing economy startups are important as such events would help them grow their network.

When it comes to legal regulations, rental contracts for users make a big difference. This means that users have to accept before the transaction goes through and this led to users having more trust, but also led to decreasing the number of people who want to bypass the system and rent/hire without intermediaries. One way of improving this further would be to write the contract in simple language so it is easy to understand.

Experts[117]

In terms of legal regulations, in general, there is not an overarching regulatory framework in Finland that is built specifically for smart consumption. The applicable regulations depend significantly on the type of company, the business model, the type of product or service provided within, and the particular aspects that might be a source of risk either for the company or for the consumer. It is best to understand the context and seek advice on a case by case basis with a competent authority that specializes in the subject matter. Another option is to ask advice directly from a lawyer; however, this requires considerably higher financial resources than the first alternative, which in the case of public institutions comes without a cost.

The Finnish regulatory framework is in line with the one at the EU level which provides a guide for external actors regarding issues to consider when entering the Finnish market. Besides the Finnish regulatory system is strict and tends to “play by the rules” which provides stability, security, confidence and a sense of reliability for consumers and companies alike.

First, it is necessary to determine the type of company one wishes to start and the level of responsibility one is willing to take. Second, one needs to identify the particular aspects of the business model that might represent a higher risk for a startup – it can be of data protection, intellectual property, or the use of particular materials or technology. It is important to safeguard these sensitive materials from aggressive competitors who might play dirty.

When looking at consumers’ attitudes, it appears that people are more aware of sustainability, but this is not reflected in their behaviour as consumers. For instance, people are used to buying fast and unsustainable fashion. Sustainable consumption in fashion is perceived by people as difficult because it is difficult to identify what is sustainable in a market flooded with brands that use the environmentally friendly narrative, even if it does not correspond with their business practices. Most fashion companies now are aiming to use sustainable materials and local production.

Small changes in the consumption habits of people are reflected in the numbers of second-hand shops and flea markets online. Although these shops operate on a small scale and/or as a side business, there is a need to make the rental business popular, provide good services and attractive solutions. It is important to provide products or services that people want to use not only because it is smart or environmentally friendly. Entering the Finnish market is easier if one has local partners that can help with gathering and answering information about it.

The Finnish food ecosystem is characterized by its focus on innovation as well as strict regulations of it that aim to ensure cleanness and minimize health risks. Scaling up startups is difficult in the food industry because most of the solutions do not relate to software, and it is not easy to secure funding. Market entry is fast for a valuable solution and key partners to spread the message about the product or

[117] Interviewees: Annina Nurmi, Sustainable Fashion Consultant and Counsellor from Vihreät Vaatteet; Emilia Hodge from the Finnish Fashion Law Association; Jaane Saarikko from the Finnish Founder Institute.

service. In general, the Finnish market and consumers generally are interested in new things and get excited easily. However, if the product fails to bring value in daily life, the interest quickly disappears. The strength of the Finnish market is doing research, producing data and academic knowledge on food innovation but it lacks expertise in commercializing innovation.

In terms of funding and other support, it is not easy to find funding opportunities for clothing startups. However, including technology makes the investor audience wider. Crowdfunding is a well-known and well-used alternative to fund these initiatives. There are angel investors who are not restricted to smart businesses but there seems to be a lot of interest within the smart consumption sector. This channel includes between 12 and 20 investors.

Public and private institutions provide support to some extent, for instance, Business Finland, regional funds and Suomen Tekstiili & Muoti, however, generally, there is not much support available, particularly for small companies.

Latvia

Smartups

Startups mostly look for opportunities regarding their international operations, funding, network expansion and increasing the number of clients. Additionally, many startups noted that it is useful to take part in interdisciplinary events and not those focused on one sector, as nowadays all industries need digital solutions, and this is a common platform to join forces.

Experts

In the waste sorting area, the experts see the need for common guidelines for waste collection and the sorting industry in Latvia – at least in the cities, and preferably in the whole country**.** There is a huge need for the modernization of waste sorting in Latvia. Another meaningful recommendation for supporting business is the creation programmes supporting smart consumption by governmental agencies. They underlined that the authorities should consider the business sector needs as well. Otherwise, companies find it very difficult to receive EU funding and to compete.

Another barrier is the digital waste (an area that is growing exponentially). Each day people generate more data – billions of photos and video, e-mails, etc. – this requires a lot of server space and energy. People are excited about being part of the virtual revolution in the digital age but very rarely, if ever, think about their digital footprints.

Poland[118]

Smartups

Startups that operate in the field of smart consumption in Poland are mostly looking for funding, recognition and support to find and gain customers – this is because the market is at an early stage of development and society is still learning about environmental issues.

The access to support institutions such as accelerators is provided, and companies do take advantage of that in order to develop their businesses. Startups usually expect from accelerators to teach them and give access to potential investors and business partners.

[118] Interviewees: Piotr Grabowski, Co-founder of foodtech.acc, Business Development and Partnerships Manager of HubHub Warsaw; Kamil Wyszkowski, Representative and President of the Board at Global Compact Network Poland; Karolina Piądłowska-Firlej, CEE Design Lead, Outreach, Climate KIC Holding Poland.

Startups very often cooperate with diverse organizations (both national and international) that have the same mission/goals – this way the startups expand their network, which in turn helps them grow. They also participate in international competitions, fairs and events, so they build their visibility and learn about other markets – Polish startups are rather open to scaling globally.

Experts

The European Green Deal Investment Plan has profoundly shaped the societal understanding of climate issues. Finally, environmental protection is gradually becoming a megatrend, also in developing economies. However, there is still quite a gap between Western and Eastern Europe. Some of the economies are still dependent on coal (for some of them using coal remains profitable). Nevertheless, transformation is coming, individuals are more aware of environmental issues, there is more environmental education and the media is positively engaged[119].

Nowadays, the biggest challenge for smart consumption in Poland is access to capital and knowledge. One of the examples is the foodtech sector – which is at a very early stage of development. There are no dedicated projects, as there is no dedicated financial support. This stems from a lack of knowledge and access to best practice. It is very important to be learning, to be able to look for interesting solutions that can be implemented on the national market – this knowledge usually comes from more mature ecosystems (startups, investors, corporations).

There is no easy access to funding as there is still not enough smart money in this sector in Poland (foodtech, or other smart consumption solutions). It is the question of time – entrepreneurs must learn how to create, build and develop such companies, it needs to be structured.

Trust is also needed because it is essential for cooperation. In order to build great businesses based on innovative ideas, people have to collaborate. Luckily, people who are 30 years old or younger are more open to cooperation and to high-risk projects. Also, the society knows more about the smart consumption issues – the expectations are changing, and this change is accelerating. Because of the public debate, public policies are also changing towards more environment-friendly solutions. Currently, there is not a single political party that does not have climate agenda in their manifestos. The same transformation is happening with businesses – an increasing number of them are ecologically aware and interested in supporting eco-friendly projects (especially family businesses)[120].

Another barrier is the fact that such endeavours (in the techfood industry) require long-term investments (5-10 years). Hence, it is highly recommended to look for impact investors who are truly interested in helping such businesses to grow. Development of such investments needs patience, money and a willingness to make a positive, impactful change, for the environment and societies. Money is not the only factor here.

In Poland, there are not enough production labs where new solutions can be tested and where prototypes can be created. The low production volume is rather problematic for big companies equipped with the necessary production lines – they are not interested in innovative solutions and prefer to produce products which they can simply sell today (and the market for their traditional products, produced traditionally, remains huge).

What supports the growth of the smart consumption ecosystem are international events, providing access to knowledge, solutions, potential investors and distribution channels. There are some organizations in Poland that support companies in accessing such international fairs, conferences – e.g. Polish Investment and Trade Agency (PAIH), Polish Development Fund (PFR) or some municipalities (e.g. Centrum Przedsiębiorczości Smolna in Warsaw)[121].

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[119] Karolina Piądłowska-Firlej, CEE Design Lead, Outreach, Climate KIC Holding Poland.
[120] Kamil Wyszkowski, Representative and President of the Board, Global Compact Network Poland.
[121] Piotr Grabowski, Co-founder of foodtech.acc, Business Development and Partnerships Manager, HubHub Warsaw.

The most favourable conditions for sustainable development (including smart consumption solutions) in Poland are:

- strong startup ecosystem and openness to search for innovations
- access to EU financial support
- many support organizations: accelerators, incubators, programmes
- changing trends, moving towards eco-solutions
- sharing economy

What is still needed:

- Changes in education about environmental issues
- More effective cooperation networks in Europe and beyond
- Smarter systems and methods of supporting startups (international cooperation, co-creation, etc.)[122]

Russia[123]

Smartups

The smartups said that the most efficient instruments of support are provided by technological parks, business incubators and accelerators. Because of their scientific infrastructure, network and office space or preferential conditions to start a business. Most of the companies also participate in startup events, where they look for new contacts and opportunities for business development.

The startups said that they expect support in accessing potential clients and investors, marketing strategy or sales. They also look for legal support, especially in the field of IP protection, taxation, contracting or customers' rights and obligations.

One of the barriers is the lack of state support, especially when it comes to funds.

Experts

In Russia, the idea of rational consumption is quite new, and mainly enthusiasts work in this field, often without a serious business education or entrepreneurial background. In addition, there is no dedicated state support developing and growing businesses in smart consumption. Accelerators, business incubators and technology parks – these are organizations that promote growth and development, including smart consumption projects.

In terms of financial support, such projects mostly finance themselves. Subsidies for SMEs in the initial stages of development do not meet the needs of companies. Thus, as a rule, the initial financing is the seed investment of a project initiators and startup founders.

When it comes to smart consumption regulations, it is important to know that these are at a very early stage of development. At the end of 2019, there was the Student and Graduate Students Conference "Legal Regulation of Reasonable Consumption" (in Kazan, Republic of Tatarstan). The purpose of the

[122] Karolina Piądłowska-Firlej, CEE Design Lead, Outreach, Climate KIC Holding Poland.
[123] Interviewees: Tatyana Loginova, Co-chairman, ASI Expert Group on monitoring the implementation of targeted models to increase the investment attractiveness of St. Petersburg and Deputy Head, Working Group "Improving Investment Activities", Headquarters for improving business environment under the Governor of St. Petersburg; Andreyev Andrey, Deputy Director General for Jurisprudence and Internal Control (Audit), Holding "REG"; Dr Elena Oparina, Marketing Director, ENVIRO LLC, green engineering and smart consumption.

conference was to put forward new ideas and search for solutions related to legal regulation of smart consumption. The event looked at best practice for conferences, summer schools, scientific forums and round tables.

The lack of state support, difficulties with crowdfunding and crowd investing stemming from legal regulations of projects and businesses leave a mark on the development of smart consumption.

Nowadays, there are no large companies in the field of smart consumption. The market is promising and growing, but it is still in its infancy. Therefore, there are certain difficulties with introducing new products and services within the remit of current legislation. The capacity of the market for smart consumption is about 800 billion Roubles, this market is mostly for second-hand products, joint travel services, car-sharing, rental and exchange of products.

Sweden

Smartups

Smartups are often developed in order to make life easier, to teach customers how to do things correctly and to change behaviour. But these are often technical solutions made by engineers and they lack the customer point of view. Startups tend to have engineering rather than entrepreneurial or economic backgrounds. Skills in these areas are in short supply in startups – incubators and support organizations also reported this. There are many contacts and ways to get assistance, advice and aid, but because so much is going on that it is vital for the smartups to prioritize them. The smartups know a lot about technical development but need more help regarding legislation. The customers are aware of sustainable solutions and are well educated in this field, especially in larger cities with medium to large income.

Experts

A common perception is that Sweden has been rather late in opening for innovation in smart consumption. The legal system is up to date, but the incubation processes has been linear instead of dynamic, and larger corporations have major shares of the market – all these factors reduce the speed of innovation. Lately, there have been some changes and Sweden anticipates a fast acceleration because legislation and regulations have been simplified. In the last three or four years, there has been more collaboration between startups and large-scale industry, especially in the textile industry, and in the furniture and food industry.

2.5 Digitalization

Estonia

The food sector “demands” full digitalization. There are many questions about how to digitalize food safety as it is required that all food sold in shops, markets and restaurants has to be safe. Hence, every food operator, accordingly to the European regulations on food safety, has to provide a food journey certificate (food journey from a supplier to the plate). This information must be retained in official documents – The Food Safety Plan – and presented to the authorities. Digitalization can make this work easier.

Food sellers/handlers do not have an easy life in Estonia, as creating and managing food safety systems requires specific skills, is time-consuming, needs tracking of legal regulations, which keep changing constantly, and the whole system has to be in the Estonian language. In order to open a food handling facility, in addition to the Food Safety Plan, one has to apply for an activity licence, which takes time and know-how. Additionally, if the Food Safety Plan is printed out, there is no record of food safety at different food handling locations. However, Estonia already has innovative solutions for this problem. For example, a digital food safety dashboard – created in cooperation with the Estonian Ministry of Rural Affairs and the Estonian Veterinary and Food Board[124]. It is worth mentioning that the Estonian digital transformation model is not a direct template for universal application. It is, however, an excellent case study on setting a bold vision for creating strong ecosystems and an agile culture[125].

Finland

One of the sectors that can be boosted by digitalization in Finland is clothing – digitalization might transform the textile industry from the shopping experience to recycling.

Nowadays, only a small percentage of clothes and textiles is reused or recycled, which is done mostly via donations. To solve this problem, the industry needs a complete set of digitalization tools. It starts with shopping methods that help consumers pick and buy clothes that fit. At the end of the cycle, clothes need different ways of recycling or reusing the materials. This circular ecosystem needs to digitalize the whole infrastructure: manufacturing, buying, collection, sorting, recycling and utilization of fabrics.

Hence, in Finland, VTT (Technical Research Centre of Finland) is looking for solutions that will support this cycle. The project is called Telaketju, it involves startups and other Finnish stakeholders as well as funders that aim to co-create a circular ecosystem for textiles. This ecosystem is based on a distributed operation with shared quality standards for defined applications and viable solutions and sorting. Within the project, VTT is modelling the future ecosystem for the whole textile industry. The goal is to reduce waste at the end point. When the whole industry participates, there is a chance of creating a sustainable circular economy system[126].

Germany

Germany’s greatest innovations are found in its fields and on its farms: self-driving high-tech tractors, milking robots, feeding machines are already the standard equipment for many farmers. Smart farming is the future of agriculture, with digital technologies enabling efficient and resource-saving farming.

“The Crop Watch” project at the University of Bonn is developing new data management systems to analyse plant growth, using cameras attached to drones and tractors to record plant populations in the

[124] https://e-estonia.com/digitize-food-safety-plan/
[125] https://gritdaily.com/digital-lessons-from-estonia-how-this-tiny-baltic-country-leads-the-world-in-digital-government/
[126] https://makingoftomorrow.com/digitalization-boost-circulation-clothes/

fields. The image data are compared and analysed, then combined with information on weather and soil conditions to provide farmers with useful information. Computer algorithms then assess how many plants cover the area, their health and the optimum time for harvesting.

Digitalization brings consumers and farmers closer together. The extensive information available on plants and animals makes farming more transparent to consumers. For example, consumers can establish precisely where the fruit of particular seed batch was grown and treated. Possible scenarios include a direct webcam feed from the stables or feedback from consumers to farmers. In the long run, smart farming will affect agricultural production: animals can be better cared for and fields can be treated in ways that are more friendly to plants and the environment as a whole [127].

Latvia

Latvia has the potential to seize greater benefits from digital technologies, but this requires addressing the lags in uptake and adoption among firms and reinforcing the innovation ecosystem to better harness transformative technologies across the private and public sectors. The country is starting from a relatively good position with respect to its digital infrastructure – it has one of the highest shares of fibre in its fixed networks (over 60%), which offers individuals and businesses access to high-speed, high-quality services that are essential to support data analytics, data-driven innovation and data-powered advances in production processes [128].

Latvia is part of the Green ICT Development Project (GIVE) – which is part of the European Strategic Cluster Partnership in the field of smart green technologies, the general objective of the partnership is to build strong collaboration and to support cluster development as tools for SME internationalization and market access [129]. Within the project, there are B2B events – one of them, organized in Latvia, was about the 5G future potential, and the role of the Digital Innovation Centres in the digitalization process.

Poland

“For Poland, the potential economic and development benefits of digitalization can reach up to 64 billion EUR in the additional gross domestic product (GDP) by 2025. This would lead to increased global competitiveness and prosperity for the country’s 38 million people and allow Poland to join the most digitally advanced economies in Europe.” [130]

Nowadays, Poland is looking for a way towards a circular (closed-loop) economy, and the key to success is the cooperation of business representatives, public administration and consumers.

“Creation of infrastructure supporting waste segregation and recycling, as well as places where rarely used products are exchanged or shared must begin to function in our consciousness not only as an idea but also as a daily practice. Manufacturers, in turn, should think about every stage of the product’s lifecycle and start designing it with this in mind.” [131]

The experts are convinced that companies will meet the requirements and goals of the circular economy if they can base their business plans on a stable legislative ecosystem. Currently, the extended producer responsibility system is not effective and needs to be adapted to the EU directives. The basis is the

[127] http://4liberty.eu/germanys-smart-farm-digital-technology-in-agriculture/
[128] https://www.oecd.org/policy-briefs/Latvia-digitalisation.pdf
[129] https://masit.org.mk/en/projects/green-ict-development-give/
[130] https://digitalchallengers.mckinsey.com/files/Rise_of_Digital_Challengers_Perspective_Poland.pdf
[131] Anna Sapota, vice-president of CP Recycling Packaging Recovery Organization, https://energia.rp.pl/akcje-specjalne/climate-battle/14826-poland-is-looking-for-a-way-towards-a-closed-loop-economy.

creation of a fully operational waste database and digitalization of the process [132], as digitalization might be one of the most important enablers of a circular economy.

Russia

Nowadays, the digital economy in Russia is developing actively and rapidly. The government's goal is to triple the size of digital economy by 2025. Russian digital economy has received a significant development impetus over the past few years. When private companies succeeded, the labour market is being transformed, unprecedented infrastructure projects are being implemented with direct government support that increases the overall level of various digital service accessibility for citizens and business – the Internet, mobile and broadband communication are widely used. Despite this, there is still a lag in key digital economic indicators in comparison to leading digital countries, in particular from the EU [133].

Russia is just starting to become a circular and green economy. The development of an efficient national waste management system is a prerequisite for a circular economy. Russian companies are already moving towards adopting more circular business models as these have proven to be sound business strategy. Such strategy facilitates access to new markets, drives innovative solutions and saves production costs. The digitalization of the process is of great importance.

There are schemes of waste management – electronic maps, which mark all official container sites and facilities – landfills, marshalling yards and processing plants. Control over the export of waste has been moved to an electronic platform; waste disposal vehicles are to be equipped with trackers, rubbish is to be weighed at sorting landfills, and contracts and payment for these are made electronically. The government's new waste management includes:

- Municipal Solid Waste (MSW) management based on closed-cycle economy
- Stimulate production from secondary material resources
- Implement a separate collection of MSW
- Develop eco-industrial parks
- Create a unified state information system for waste accounting
- Educating people, raising their ecological awareness [134]

Sweden

Digitalization of the industrial sector's production, products and capacity to transform enormous quantities of data into a new business is vital to the sector's future competitiveness. However, the vision needs to be wider – as ever greater demands are simultaneously being placed on the long-term sustainability of production and the utilization of resources. That is why Sweden's strategy for new industrialization is about creation of a connected industry and finding ways of dealing with the sustainability of demand which is required by the industry [135].

Sweden is a world leader in digitalization [136]. Currently, the Swedish industrial sector is facing challenges. Digitalization is pushing the transformation of the industrial sector even further, paving the way for new business models while making other models redundant. Swedish industrial companies are

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[132] Ibid.
[133] http://www.revistaespacios.com/a20v41n05/a20v41n05p26.pdf
[134] O. Fedotkina, E. Gorbashko, N. Vatolkina, Circular Economy in Russia: Drivers and Barriers for Waste Management Development, Sustainability, MDPI, 21.10.2019.
[135]https://www.government.se/498615/contentassets/3be3b6421c034b038dae4a7ad75f2f54/nist_statsformat_160420_eng_webb.pdf
[136] https://read.oecd-ilibrary.org/science-and-technology/oecd-reviews-of-digital-transformation-going-digital-in-sweden_9789264302259-en#page179

adopting smarter practices to reduce time to market and increase responsiveness, make considerable cost savings, cut material waste, stipulate concepts and accelerate innovation.

The government's strategy for new industrialization, with its strong focus on digitalization, is to strengthen companies' capacity for change and competitiveness, with four focus areas:

- Industry 4.0 – companies in the Swedish industrial sector are to be leaders of the digital transformation and in exploiting the potential of digitalization
- Sustainable production – increased resources efficiency, environmental considerations and more sustainable production
- Industrial skills boost – the system for supplying skills is to meet the industrial sector's needs and promote its long-term development
- Testbed Sweden – Sweden is to lead research in areas that contribute to strengthening the industrial production of goods and services in Sweden.

3. Conclusion

The growing demand for green products and services has provided entrepreneurial opportunities for new business ventures in developing and applying technologies that are cleaner and conserve more energy and resources. As more products and services with technological breakthroughs and customer-centric design enter markets, the next big wave of consumer demand for sustainable solutions can be expected. Current societal consumption patterns, its awareness as consumers and its behaviour patterns set examples for future consumers.

The smart consumption sector includes a wide range of products, services and solutions that aim to transform the core of everyday life, so life can be easier, cheaper and, in a sense, better for the planet. It aims to reduce the dependency and use of natural resources to ultimately reduce the footprint of how people move, eat and consume energy and enable smarter ways of living.

Smart consumption should help people understand the fact that there are no planet B and that the choices people make every day also affect the environment. At the same time, it is a practical issue about our daily choices. It is imperative to think about producing less waste (by, for example, not using plastic straws and bags), companies could buy more greentech, and smart consumptions should be promoted. What needs to be understood is that today's consumers are diverse, in terms of their needs, tastes and preferences. Consumer behaviour should shift towards smart consumption, in order to significantly reduce harmful impact on the environment.