

DEVELOPMENT OF ENTREPRENEURSHIP IN CIRCULAR CITIES AS CONSTITUENTS OF CIRCULAR WORLD ECONOMY

Marina KAIM⁷³, PhD Student
Zorina SISCAN⁷⁴, Prof., Dr. Hab.

Abstract: *The authors explore the development of the contemporary entrepreneurship in such a new form of cities as “circular city”. In doing so, they reveal various modes and approaches to the entrepreneurship. They also argue for the fact that the combination of a circular city with green and smart concepts, call forth the development of the sustainable entrepreneurship. Due to the development of the latter, the circular cities become the constituents of the future world economy. The authors combine analytical conceptual approach with international case studies in their research.*

Keywords: *circular economy, green economy, entrepreneurship, circular city, green city, smart city, circular business model, re-use, recycling, refurbishing*

JEL CLASSIFICATION: F0, Q0, Q5

1. Introduction

The purpose of the article is to explore and reveal the modes and forms of urban entrepreneurship development that allow the circular cities to become the constituents of future world economy.

Research methodology: for the given research we used analytical approach to circular cities and entrepreneurship, and a number of case studies worldwide in order to posit circular cities as the constituents of future world economy due to the sustainable entrepreneurship development.

Contemporary entrepreneurship develops in a new form which is claimed to be a “circular city” one. There does not exist a universal straightforward definition of a circular city, and it therefore requires analyzing the associated material and coming up with the vision on what it is. Based on Ellen Macarthur Foundation vision statement [1], a circular city embeds the principles of a circular economy across all its functions, establishing an urban system that is regenerative, accessible and abundant by design. Such cities aim to eliminate the concept of waste, keep assets at their highest value, and are enabled by digital technology. Ellen Macarthur Foundation also view a circular city as “... a socially, environmentally, and economically resilient city supported by circular economies...” [2]

Following the CityLoops, [3] “a circular city is one that promotes the transition from a linear to a circular economy in an integrated way across all its functions, in collaboration with citizens, businesses and the research community. It fosters business models and economic behavior which decouple resource use from economic activity by maintaining value and utility of for as long as possible, in order to close material loops and minimise harmful resource use and waste generation. Through this transition, cities seek to improve human wellbeing, reduce emissions, protect and enhance biodiversity, and promote social inclusion, in line with the Sustainable Development Goals.” Enel Group highlights that “...The concept of circular city emerged after (and, in some ways, stemmed from) that of smart city.” [4] Enlarging on the distinction between circular and smart cities, they posit that “the shift from smart cities to circular cities requires moving away from a point of view that is mainly focused on new technologies and their benefits, to one where

⁷³ Marina KAIM, Ph.D. Candidate, e-mail: mvkaim@yahoo.com

⁷⁴ Zorina SISCAN, e-mail: zorina_2005@yahoo.com

Academy of Economic Studies of Moldova, 59 Banulescu-Bodoni str., of. 711, MD-2005, Chisinau, Republic of Moldova

technology continues to play an important role but is integrated into a holistic vision with economic competitiveness, environmental sustainability and social inclusion goals.”

ICLEI, Local Governments for Sustainability, views a circular city as “a city that promotes the transition from a linear to a circular economy in an integrated way across all its functions in collaboration with citizens, businesses and the research community.” [5]. To that end, they highlight that, in practice, it deals with fostering business models and economic behavior which decouple resource use from economic activity by maintaining the value and utility of products, components, materials and nutrients for as long as possible in order to close material loops and minimize harmful resource use and waste generation. Their vision also underlines that through this transition, cities seek to improve human wellbeing, reduce emissions, protect and enhance biodiversity, and promote social justice, in line with the sustainable development goals.

Following the Collaborating Centre on Sustainable Consumption and Production (CSCP), [6] a circular city promotes the transition from a linear to a circular economy in an integrated and inclusive way by collaborating with municipalities, utility companies, citizens, businesses, and the research community to develop and test business models that decouple resource use from economic growth. Their vision also highlights that a circular city “improves human wellbeing, reduces emissions and pollution, protects our environment and enhances biodiversity, while leaving no one behind—in line with the bigger goals and strategies we want to achieve: the EU Green Deal and the Sustainable Development Goals (SDGs).” In our research, we also highlight the interlinkages between the circular economy and UN SDGs, particularly focusing on SDG 8 (Decent work and economic growth), SDG 11 (Sustainable cities and communities, highlighting on making cities inclusive, safe, resilient and sustainable), SDG 12 (responsible consumption and production), SDG 13 (Climate action), SDG 15 (Life on land) etc.

As our research shows, circular cities turn out to be the most perspective for contemporary entrepreneurship, in their combination/mix with green and smart elements/concepts. Such a combination, in our opinion, tends to be most fruitful and efficient for entrepreneurship development, contributing thereby to the development of a new form of entrepreneurship, i.e. sustainable entrepreneurship.

2. Circular cities success stories

Supporting the mode of combining green and smart elements in circular cities format, below a number of case studies based on this combination is provided.

#1: *CIRCULAR GLASGOW (series)*

Facing the question on the role cities can/ should play in accelerating their transition to circular economy, Glasgow Chamber of Commerce, in collaboration with the founding partners, Zero Waste Scotland, Circle Economy and Glasgow City Council, established *Circular Glasgow* via which a vision for Glasgow to become a leading circular city was set out. *Circular Glasgow* work with Glasgow businesses, backed up by the engagement with like-minded leaders in circular economy from the Netherlands, London and across the globe, its global reach currently exceeding 39 million. Going in line with the highlighted above collaboration/partnership/public private partnership pattern/element, *Circular Glasgow* work closely with business, academia and public sector, as well as identify and build on potential collaborative industry partners ready to share their lessons learnt, best practices, and organizations with potential to offer their funding and business support options/resources. Given its global (out)reach and activities implemented so far, including those that led to its unique citizen brand, innovation resources, and reputation on globally momentous problems, Glasgow has been chosen for hosting COP26, the United Nations Climate Change Conference (November 1-12, 2021).

The main ambition of Circular Glasgow, “in collaboration with Zero Waste Scotland, Glasgow City Council and Circle Economy, is to inspire businesses to adopt innovation, design

thinking and circular economy business models.”⁷⁵ Aiming to encourage Glasgow organizations to innovate through new circular design strategies, involves a program of activity aimed at SMEs to provide support, tools and expert knowledge, *Circle Glasgow* developed knowledge hub which offers Circle Assessment and City Insights on Circularity. Circle Glasgow also showcases the main circular accomplishments through the Circle Glasgow platform Stories rubric, the latter being designed by a company profile/ area of activity, i.e. Manufacturing, Skills Development, Construction, Low Carbon & Renewables, Food & Drink, Events, Creative Industries, Retail, Textiles & Fashion, Tourism & Hospitality, Education, and Research.

#1a: *Spruce Carpets*

Spruce Carpets (SC), a floor covering re-use and recycling social enterprise with charitable status, a reliable flooring supplier to the Scotland Excel framework, creates new products from carpet off-cuts, thereby minimizing the need for waste to otherwise go to landfill. Following a circular business model, Spruce Carpets ensures that less gets into the waste stream. The company works directly with other businesses, uses the donations of material from private-sector donors who recognize the environmental, social and financial benefits of offering their unwanted residual stocks. SC’s activities go in line with creating greener environment through, among others, (i) assisting in the direct diversion of saleable floor coverings by uplifting these materials from commercial donors, (ii) reclaiming, refurbishing and re-using carpet tiles by commercial on-selling and the sale of ‘end of roll’ carpets. The applied re-use strategies coupled with reducing the waste of viable material, SC contribute to reducing, in turn, energy consumption.

Following the circular algorithm, SC sends for recycling any re-used materials that are unsuitable for re-use. The implemented SC rug-making operation ensures that small off-cuts are put to good use. Those off-cuts that turn out to be too small for most rooms of carpet are bound on-site and sold in both company Glasgow showroom and at 15 supply outlets run by charity partners all over Scotland. [7] The latter practices applied limit waste and add value to carpet off-cuts giving them the second chance/life, thereby preventing them from ending up in landfill. By adopting a Circular Business Model, SC’s activity diverts over 100 tons of floor coverings from being sent to landfill annually. [7]

#1b: *CuanTec: Transforming shellfish waste into innovative packaging*

Cuan Tec (CT), an innovative Scottish biotech company, which uses the waste products of the shellfish industry changing the packaging industry, started its activity in 2017 with 3 people in a lab outside Glasgow, and now operates successfully in a team of 14 staff members in Glasgow and additional lab facility at the European Centre for Marine Biotechnology in Oban. CT partners with Sky Ocean Ventures, Scottish Enterprise, the Scottish Investment Bank, Waitrose & Partners. Versus the common/conventional packaging, the CT’s circular methods do not leave lasting damage or chemical traces for future generations to face with.

The applied technologies ensure extending the shelf life of fresh seafood, allowing fresh food to last longer, as well as save tons of greenhouse gas emissions due to the use of raw materials that would otherwise be incinerated. CT designed their methods to be a zero waste circular process using waste from another industry as their raw material and ensuring any by-products are repurposed. To that end, CT: (i) takes waste langoustine shells created from seafood processing to make a natural polymer - which can then be turned into a flexible film; (ii) extracts a natural compound (chitin) from the waste shells of the fishing industry and transforms it into a product that degrades back into its natural components; (iii) generates chitosan (antimicrobial properties) and mix it with other natural biopolymers to create the world’s first home-compostable food packaging, using chitosan’s antimicrobial properties to extend the shelf-life of food wrapped in it

⁷⁵ Alison McRae, Senior Director, Circular Glasgow

by 40%, i.e. preventing food waste; (iv) redesigned chitin extraction process so that the main by-product from extraction, a high protein ‘soup’, is formulated into a feed for salmon, i.e. getting back into nature vs. creating a waste stream. [8]. As a result of Cuan Tec’s activity, the product comes from nature and goes back to it, which is consistent with the circular and sustainable model.

#1c: *Mud Jeans*

Mud Jeans (MJ) company launched their Lease-a-jeans (or Product-as-a-service) model in 2013, in that way shifted to implementing circular economy practices in every area of its business model. MJ uses organic cotton (60-75% of their product), supplementing the rest using recycled cotton which minimizes the need for the water and energy needed to grow new cotton, and puts the goal for 2025 to get this up to 100%. Given the recycled denim is used, old jeans are given a new lease on life and are prevented from getting to landfill resulting in 20,000 pairs of jeans saved so far. [9] Due to the rethought business model, the applied Lease-a-jeans/or Product-as-a-service one allows to save on the cost of virgin textile materials, as well as benefit from carbon and landfill savings available through the reused and recycled denim material.

MJ managed to use laser to replace the conventional use of sandpaper and chemical potassium permanganate to create a worn effect on the jeans. This new technique, as a result, reduces the damage to the fabric, and eliminates dangerous manual labor and harmful chemicals use. The e-flow used by MJ leads to cutting down on water, chemicals and energy, achieving a lighter washing effect in some of the denim. As a result of replacing the conservative process by nano bubbles that consist of air, water and natural chemicals, the wanted effect is achieved with just 5% of the water, 10% of the chemicals and 40% of the electricity used, and the chemicals can be recycled after use. The water filtration system used by MJ operates on rainwater, with 95% of this water being recycled and 5% evaporating. In addition, to contribute to wider recyclability, MJ uses printed labels instead of leather patches and keep the use of synthetic materials under 4%, to achieve monomaterial structure. In the last 4 years MJ managed to avoid 1 million kilos of CO₂, save 533 million liters of water, and 20,000 jeans from landfill and incineration, and set up a goal to design the first jeans made from 100% post-consumer recycled cotton.

#1d: *King Size Recycling Ltd.: Environmentally Friendly Mattress Recycling*

King Size Recycling (KSR) is the only one family run bed and mattress recycling company in Scotland which manually deconstructs mattresses, with the aim to recycle 100% of the mattresses they receive, thereby supporting a full circular economy. Rethinking the resources, KSR recovers waste to ensure a fully circular product life cycle for mattresses that would otherwise be discarded. KSR close the loop by deconstructing waste into raw materials which can be utilized by other industries.

The process applied by KSR meets the principles of a full circular economy, i.e. involves hand stripping the mattress, layer by layer, and separating the materials which they bale and distribute into other industries who re-manufacture by the following processes: (i) mattress foam is chipped and made into underlay and insulation; (ii) polyester, shoddy, wool, and other insulators are sent to be needled, which is a cleaning process, and made into new rolls which can be used for stuffing, padding or flooring underlay; (iii) wood is chipped for kitchen units, worktops, laminate flooring etc.; (iv) springs are scrap metal and the outer skins of a mattress can be shredded and used for biofuel, solid recovered fuel.

#2: *Nordic Innovation Programs/ Projects*

Countries in the Nordic region have a strong reputation for sustainability: Denmark, Sweden, and Finland take up the top three spots of the Sustainable Development Goals Index (SDG-Index), followed by Norway (ranked 8) and Iceland (ranked 14). Nordic Innovation, an organization under the Nordic Council of Ministers, aims to make the Nordics a pioneering region for sustainable

growth and works to promote entrepreneurship, innovation and competitiveness in Nordic businesses, supporting programs and projects that contribute to fulfilling the goals of the Cooperation Program for Innovation and Business 2018-2021 and the eight initiatives DKK 250 million to a Greener Post-COVID-19 Business Sector 2021-2024.[10] Nordic Innovation contributes to the circular transition in the Nordics by bringing together Nordic companies, public authorities, industries, NGOs and other stakeholders.

Nordic Sustainable Business Transformation is one of three most the main three comprehensive programs developed by the Nordic Innovation as their main priorities for the period 2018-2021. Through *Nordic Sustainable Business Transformation (NSBT)* program, Nordic Innovation supports new ecosystems, piloting of new circular economy solutions, and works to increase competence and improve circularity in cities and regions through Nordic projects. The focus is on strong link between circular economy, entrepreneurship, innovation, and competitiveness. Among the circular projects now in progress through the Nordic Sustainable Business Transformation program, are LOOP Ventures, Circular Business Models in the Nordic Manufacturing Industry, and Nordic Circular Hotspot.

LOOP Ventures project stimulates the uptake of new circular business ideas by organizing collaborative pilots. To that end, larger companies are matched with start-ups in order to test, pilot, and scale-up a new circular business idea in 8 to 12 weeks. The LOOP Ventures project is based on collaboration with Avanto Ventures and Sitra. A new edition of the LOOP Ventures project is ongoing, adding new partners from Denmark, Norway and Sweden who assist companies explore appropriate circular solutions and help to pilot them. Within the LOOP Ventures project, *Reima*, a clothing company for children, developed a circular ‘product-as-a-service’ model. By subscribing to the service, parents receive a box with children clothing for every season and, once no longer in use, the clothes can be returned to Reima for reuse, recycling or remanufacturing.

Nordic Circular Hotspot is a web-based platform, which helps to provide broad access to the Nordic circular ecosystem that Nordic Innovation is developing with its stakeholders and partners. Governments, businesses, as well as knowledge institutes are invited to connect and share information. The platform also helps to identify the needs and opportunities for circular projects in the Nordics. A map of the Nordic region placed at the platform which illustrates the locations of organisations, individuals and initiatives working on the circular economy, enables the stakeholders to connect with like-minded organisations. The platform uses a collaboration with Circular Norway, Lifestyle & Design Cluster, RI.SE , and Cradlenet .

Among the main lessons learnt of the *Nordic Sustainable Business Transformation (NSBT)* program so far the following ones are highlighted:

- Businesses are interested in understanding the economic rationale of the circular economy, at the same time being sometimes hesitant to apply circular changes, especially large ones as changing a production model affects a company cash flow. The project demonstrated that supporting businesses in circular transition, it is important to explain what economic impacts are to be expected and to provide tangible examples of successful businesses, showcasing the way of achieving efficiency, new revenue streams or productivity gains.
- Sharing experiences and lessons learnt are to be actively promoted and “pushed” via concrete examples. Nordic Innovation has concluded that creating networks and encourage cooperation requires active support by a facilitator. Companies get more chances to be involved and get lessons learnt from each other, as well as to gain larger impact via successfully implementing more significant projects with strong facilitation.
- Collaboration with different experts to help a company in its efforts towards circular transition is crucial. The project showed that it is not obligatory to get all the expertise needed within your own organization or company, as establishing collaborations with other experts is a great tool which works. Some of success stories linking to Sitra providing

knowledge on circular experiments to the LOOP Ventures pilot project, and Avanto Ventures on venture development.

#2: *IKEA circular projects/initiatives: Resale Hub Concept for Secondhand Furniture*

As part of the Swedish home furnishing retail giant’s goal to go fully circular by 2030, IKEA has launched its secondhand furniture program around the world. IKEA, which positions itself as the one whose goal is to become a “climate positive” company, aims to become a completely circular business within the next 10 years. Its secondhand furniture program is based on IKEA’s buy-back and resale scheme to divert its fast furniture waste from going to landfills, and applies its sustainable Circular Hub concept. The initiative, even though with pandemic-related delays was launched in May 2021, is now available in a number of markets, including in the U.K. and Europe, South Korea and Japan, and is due to launch in 26 other countries where IKEA operates its business activities.

The involved stores have separate Circular Hub areas where IKEA customers can buy secondhand items at discounted prices, as well as return old IKEA items in exchange for vouchers to spend in stores. In addition to Resale Circular Hubs within the stores, IKEA also can sell second-hand products via the online marketplace through its new partnership with Gumtree. IKEA introduced its buy-back and resale scheme following on a number of successful trials/pilots, including its first-ever secondhand concept applied in Eskilstuna, Stockholm region in Sweden (Re Tuna Recycling Mall) in 2020, followed by other places, e.g. Sydney, Lisbon, Edinburgh and Glasgow.

In order to extend its furniture lifespan, and to contribute to reducing greenhouse emissions and waste, the company thought through its rental services. About 71% of the waste has been recycled within IKEA stores operated by its parent company Inka Group, thereby giving a second life to about 7 million products due to refurbishing. [11] Through its new concept stores, IKEA moves towards its goal to inspire more people to live a more sustainable life, and works to have a positive social impact, striving to use more renewable and recycled materials, eliminate waste in its operations, and change the way of designing its products and services to prolong the products life. It goes in line with the company sustainability activities aimed at having all its products designed on the basis of circular principles and from renewable and recycled materials within 10 years, at the same time making it easier for customers to extend the life of their furniture and products.

#3: *ReTuna Recycling Mall*

ReTuna in Eskilstuna, Sweden, presents the world’s first recycling shopping mall, where only the items that have been used before are sold and turned into an international success story. ReTuna managed to reach 11.7 million Swedish kronas (SEK) in sales for pre-owned products in 2018. [12] It also led to generating 50 new jobs in Eskilstuna, the city facing high unemployment rates and young people drain. The ReTuna case study can be viewed as an illustrative example of the city of Eskilstuna acting as a circular catalyst. The ReTuna recycling mall initiated by the local government, the municipality of Eskilstuna, and implemented by its publicly-owned subsidiary Eskilstuna Energi och Miljö (EEM) put in life the efforts that contributed to creating a local circular ecosystem that allows product life extension for consumer goods and textiles.

ReTuna successfully attracted businesses and consumers, enabling the latter to do all their circular shopping in one place, and to be exposed to a diverse range of products, such as sportswear, furniture, fashion items, and toys vs. traditional second-hand shops. It makes sustainable shopping much easier and less time-consuming. Considering the importance of aesthetics, avoiding the flea market image, and a café lead to enhancing the sustainable customer’s shopping experience.

ReTuna proved to be successful in developing a self-sustaining system at local level. Both the goods sold in the stores and ReTuna staff members of ReTuna are sourced within the region. Being located next to Eskilstuna’s recycling center, allows to perform at the center the initial selection of what is usable and what is not by the staff from AMA (the resource unit of the municipality for Activity, Motivation and Work), and to further transport the goods to the mall to be sorted out and distributed to proper shops by the mall’s staff members. The received products match the stores enabling the supply and demand balance, as a result of the retailers’ own business plans development and establishing their shops’ offer, brand and profile. A number of shops have at their disposal a workshop corner used for renovating and/ or upgrading the used items before sale.

As all circular city success stories, ReTuna is based on collaboration/ partnership mode/model/approach. It owes its initial investments to the local government of Eskilstuna who bought the building and made it financially attractive for retailers using a 50% discount on the rent during the first two years, followed by 30% in the third year. Having proved successful, ReTuna rent for retailers operates without subsidies starting from 2018. [12] Along with the financial support, the municipal

In addition to the financial support, the municipal possession facilitates the transport and management of waste, while the publicly-owned EEM runs competitive operations in the energy and environmental area that deliver optimal benefits to customers and residents with minimal environmental impact. Within EEM five business areas, ReTuna is part of the ‘Recycling’ one. In this way, ReTuna is acknowledged as a waste company that is legally licenced to collect and transport waste. ReTuna, in turn, provides the municipality with a means to educate the citizens about waste prevention and circular economy, offering the support and guiding the citizens coming to the Eskilstuna recycling center to discard products that can get a second life, helping them with the information on how to better decide on products’ “status”, i.e. to judge responsibly whether certain products have enough value to be re-used, repaired, or recycled, ending up in proper containers available at the Eskilstuna recycling center. In addition, ReTuna organizes different events, workshops, lectures etc. and other awareness raising activities at the mall focusing on sustainability.

Among the lessons learnt, the following below are worth mentioning and should be considered for other similar programs/ projects:

- It is important to keep in mind that the shopping environment and the aesthetics of pre-owned products matter and influence the consumers’ behavior and actions
- Branding secondary products and putting efforts in how the store and its products look is of importance
- There is a need for educating citizens on the value of waste materials and products.
- A city government plays a crucial role in the initiation and facilitation of circular initiatives.
- ReTuna demonstrates how re-using, repairing and upcycling of discarded items can be effectively organized and facilitated to attract consumers at a local level and simultaneously stimulate local business development and generate new jobs.

3. Conclusion

The applied analytical approach to circular cities and entrepreneurship, and examined case studies, contributed to our argument for circular cities to become the constituents of future world economy due to the sustainable entrepreneurship development. The research also demonstrated that circular cities are characterized by the following:

- They have common elements with of green and smart, and combining them, are tailored to sustainability;
- Circular cities can be also smart and use green policy, technologies, approaches (e.g. RRRs etc.);

- They follow the pattern/ mechanism which unites green, smart, circular, sustainable cities via common platforms/ projects, or programs;
- All circular cities rely on collaborations/partnerships (e.g. PPP), innovation (research, technologies, think tanks etc.), and social welfare.

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