

Providing a network to drive action on the Circular Economy across the island of Ireland: Report on the perspectives of circular economy stakeholders

January 2023

Acknowledgements

We would like to thank the Irish Research Council for facilitating the Shared Island New Foundations grant that made this research project possible.

Our sincere gratitude to everyone who took the time to answer the survey, attend a workshop, meet with us, or come to the event in Belfast. This project relied on the input of hundreds of others, and without their insight and time, it would not have been possible.

Thank you to Martin Doherty and Kathryn Rogers of The Centre for Advanced Sustainable Energy (CASE) for hosting the All-Ireland Circular Economy Think Tank Scoping Event in Queen's University Belfast.

Finally, thank you to Dr. Amy Fahy for providing expertise and support.

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AMBER

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Executive Summary

This report forms part of a research project undertaken in 2022 in response to the Irish Research Council and Government of Ireland's 'New Foundations' Scheme, whereby AMBER Director Michael Morris aimed to foster a network that would promote the implementation of the circular economy across the island of Ireland. The research utilised mixed methods such as an online nationwide survey, informal one-on-one meetings, and data generation through public workshops. This report outlines the results from each relevant stage.

Key Findings

After desk research was conducted, a nation-wide survey was emailed to pre-identified circular economy actors in which they outlined the main barriers they perceived to the circular economy, and what supports they needed to drive the circular economy forward. The largest proportion of barriers identified were cultural. These barriers included a lack of awareness of the circular economy across all sectors, embedded linear business models and way of life, and a siloed approach to tackling environmental issues at government level. Regulatory barriers were also deemed important, particularly legislation around end-of-waste and the lack of clarity and cohesion in the policies being released by government in the Republic of Ireland. In Northern Ireland, the lack of policy and legislation around the circular economy was deemed a key barrier. 45% of the supports identified to drive action on the circular economy involved regulatory intervention. Possible supports included a national, cross-border body to oversee the implementation of the circular economy and provide expert advice and training where needed, and mandatory implementation of green public procurement policies. Emphasising to businesses the cost-saving aspects of the circular economy was also suggested to foster support for circular initiatives. For further information on the barriers and supports needed that were identified by survey respondents, please see Section 4.

The preliminary circular economy public engagement workshops revealed strong awareness of the circular economy amongst the under-18 cohort, with an acknowledgement that older generations might be more familiar with certain individual aspects of the circular economy such as repairing household appliances and purchasing locally sourced food. Many participants prioritised plastics and food waste as areas that need circular focus, whilst the government was allocated the responsibility of being both a producer and enforcer of circular policy, and as a facilitator of better collaboration between sectors. Please see Section 5 for further details.

Key Recommendations

Please see Section 7 for a table of areas in need of further collaborative work and focus.

- Further research into measuring material flows along supply chains.
- Creating greater knowledge of upcoming EU legislation amongst the business community.

- Identification of and collaboration on practical issues affecting organisations (civil society, government, and particularly industry) in Northern Ireland and the Republic of Ireland.
- Open collaboration and cooperation between government, industry, and research institutions to allow for accurate data on all aspects of the circular economy to emerge.

1 Introduction

1.1 Background

The circular economy is an economic system that replaces the current ‘take-make-dispose’ consumption pattern with reducing, reusing, recycling and recovering materials in order to keep them in the economy for as long as possible (Kirchherr et al., 2017). The system requires a whole-of-life view of a product which incorporates the design phase of every item- more so than its predecessor; the waste management hierarchy of “Reduce, Re-use, Recycle” (European Commission, 2022a). The circular economy is a contested term, perhaps due to its complexity and broad scope (see Calisto Friant et al., 2021; Cowell et al., 2020; de Römpf and Van Calster, 2018; Kirchherr et al., 2017; Lazarevic and Valve, 2017; Schulz et al., 2019).

Despite this complexity, the circular economy is an increasingly common term in policy across the island of Ireland. In recent years, comprehensive reports have been released which have assessed the progress, problems, and solutions in this area. Notable reports include the 2017 National Economic and Social Council’s (NESC) Report; *Moving Towards the Circular Economy in Ireland: A study for NESC by Dr Simon O’Rafferty*, and the more recent 2022 Organization for Economic Cooperation and Development (OECD) Report; *The Circular Economy in Ireland*. These reports contribute to a comprehensive picture of the circular economy in the Republic of Ireland. While these are useful, research that focuses on both Northern Ireland and the Republic, and the potential for collaboration between the two with the circular economy sphere, is scant.

1.2 Structure of the report

The Republic of Ireland’s government’s *Shared Island initiative* aims to improve cooperation and mutual understanding across the island of Ireland and engage with all communities and traditions to build consensus around a shared future. With funding from an Irish Research Council *Shared Island New Foundations* Grant, this report forms part of a wider project that aims to bring together a flourishing network of circular economy actors across the island of Ireland. This report will cover the policy context of the circular economy in the North and South of Ireland, the resources available for actors wishing to engage in circular economy projects, the challenges facing the implementation of the circular economy across Ireland, and key recommendations going forward.

This report is divided into 9 main sections. Section 1 provides the background. Section 2 presents a brief policy context for the circular economy in Northern Ireland and the Republic of Ireland. Section 3 details the methodology. Section 4 illustrates the results of the Circular Economy: Stakeholder Mapping Survey. Section 5 presents the findings from the exploratory Circular Economy Public Engagement Workshops. Section 6 outlines the All-Ireland Circular Economy Think Tank, and Section

7 provides some Key Recommendations. Finally, Section 8 concludes this research project and the learnings taken from it.

2 Policy Context

2.1 The European Union

The Seventh EU Environmental Action Plan of 2013 declared that prosperity and a healthy environment stemmed from an ‘innovative, circular economy where nothing is wasted’ (European Commission, 2022b; para.3). In 2015, the first *Circular Economy Action Plan* (CEAP) was published (European Commission, 2022c). This plan created concrete sub-goals and focus areas addressing priorities including plastics and waste. The CEAP was continued as the 2020 *New Circular Economy Action Plan* (NCEAP) under the 2019 *European Green Deal*, as all 54 actions outlined had been completed (European Commission, 2022c). The actions proposed by the NCEAP can be divided into supply-side actions and demand-side actions (Pantzar and Suljada, 2020). The Commission developed supply-side measures such as the eco-design of products. However, demand-side measures that effectively change consumer behaviour, such as taxation, have been difficult to implement due to the sovereignty and differing levels of activity and ambition between Member States (Pantzar and Suljada, 2020). The reduced VAT rate for repair in Sweden, for example, has not been repeated in France, where Extended Producer Responsibility (EPR) initiatives are more widespread (Pantzar and Suljada, 2020).

The Circular Economy has encountered numerous challenges in its implementation at EU, Member State, and Industry level, as illustrated in Figure 1. These issues include a lack of clarity spanning all tiers of governance, differing levels of transition towards a circular economy among Member States, and the prioritisation of incremental change over the systemic reform required by a Circular Economy. Within industry, there is a reliance on voluntary methods, perhaps due to the lack of clear legislation alongside traditionally ‘weak’ policy instruments being implemented at both EU and national level.

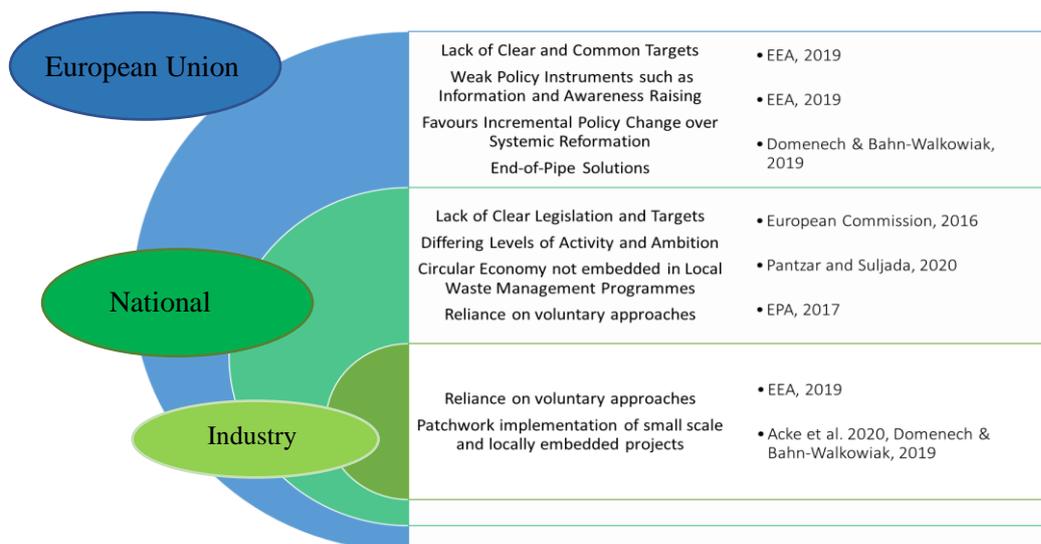


Figure 1 Key issues associated with implementation of the Circular Economy at EU and National level and its adoption by industry, and associated references

2.2 Northern Ireland

European Union (EU) policy and legislation was adopted by the United Kingdom (UK) up until the 31st January, 2020, when the UK exited the European Union. A transition period was maintained until 31st December 2020, where the UK was subject to EU laws but played no part in the making of new laws or other EU governing bodies (Gov.UK, 2022). Despite this departure, the UK stated that they would transpose the 2020 *New Circular Economy Action Plan* waste measures, as the country had already been implementing measures to move towards a circular economy and the majority of the measures required relatively minor technical changes in legislation (DAERA, 2022; Gov.UK, 2022).

In Northern Ireland (NI), the departure of the UK from the EU has caused issues among the Assembly. The Northern Irish Assembly is composed of 90 political representatives, required to identify themselves as ‘Unionist’, ‘Nationalist’, or ‘Other’, and is where these representatives debate and pass local laws related to NI (nidirect, 2022). The NI Executive committee runs the government on behalf of the Assembly and is composed of the First Minister, deputy First Minister, and eight other ministers—seven of which are nominated by the political parties in the Assembly, and an additional Minister of Justice who is appointed through a cross-community vote in the Assembly (nidirect, 2022). As of December 2022, the Democratic Unionist Party refuses to take part in a power-sharing government due to concerns it has over an Irish/UK sea border for customs and controls, and how this undermines the status of NI within the UK (Carroll, 2022; Edgington, 2022). This is the second time in five years that NI has been without a political government (The BBC, 2020). According to the law, a re-election has to be called within 6 months of an election if a government is not formed (Torrance, 2022). However, NI Secretary Chris Heaton-Harris introduced the NI (Executive Formation etc) Bill which defers calling an election by a further three months (Kearney, 2022).

Civil servants remain active, however, and the Department of Agriculture, Environment, and Rural Affairs (DAERA) developed the *Environment Strategy for Northern Ireland*, its first environmental strategy, which will outline the key long-term environmental priorities for NI. However, Minister Edwin Poots MLA stated in March that although he had approved the strategy, “it will also have to be formally approved by an incoming Executive before it can be published” (DAERA Press Office, 2022, para.3). To date, this strategy has not been published.

Alongside this upcoming strategy, the Department for the Economy have been tasked with working with the Strategic Investment Board and DAERA to develop a Circular Economy Strategic Framework for NI (Department for the Economy, 2023). The *Draft Circular Economy Strategy for Northern Ireland* was launched for public consultation in January 2023 (Department for the Economy, 2023).

In 2017, the consultation firm Eunomia was commissioned by Business in the Community Northern Ireland and WRAP Northern Ireland to produce *The Case for a Circular Economy Strategy for Northern Ireland* (Hogg et al., 2017). This report set out the scale of the opportunities offered by a NI shift to a

circular economy and the ways in which different sectors could engage with the transition. A larger report was undertaken in 2021. Commissioned by the Department for the Economy, a circular economy consultation company, Circle Economy, produced *The Circularity Gap Report: Northern Ireland*. This report broadly assessed the circularity of Northern Ireland using a metric created by the company and found it to be 7.9% circular- leaving a Circularity Gap of more than 92% (Conde et al., 2022). The report also measured material flows within NI and found that it consumes 16.6 tonnes of materials per capita, per annum. NI extracts 14.6 tonnes of resources per capita per annum within its borders, contributing to its high material footprint that exceeds the UK average, which sits at 5.5 tonnes per capita. Crucially, this report lays out guidelines for how NI can drive its circularity from 7.9% to 16.1%, through, inter alia, creating a circular food system, fostering a resource-efficient built environment, improving green public procurement, and providing strong leadership and guidance for industry and the public (Conde et al., 2022). Barriers to this transition were briefly touched upon, such as the tension between certain key economic practices in NI (such as intensive animal agriculture) and the need for a shift towards circular or sustainable practices (such as a cultural shift to a plant-based diet) (Conde et al., 2022).

2.3 Republic of Ireland

The Republic of Ireland (ROI), under the direction of the European Union (EU), is transitioning away from its previous waste management system of the waste management hierarchy (Reduce, Reuse, Recycle) and towards the circular economy. This is evident in the strategies, policies, and legislation that have been released by the ROI government over the course of the previous two years.

Following the EU's First Circular Economy Action Plan in 2015, and subsequent New Circular Economy Action Plan, the policy document *A Waste Action Plan for a Circular Economy- Ireland's National Waste Policy 2020-2025* was published in 2020. This document was developed with the involvement of an advisory board of key stakeholders- a different approach from preceding waste management policy documents which involved almost exclusively one engineering consultancy company (Boyle, 2003; DECC, 2020). This action plan notes that the EU's New Circular Economy Action Plan (2020), is a key guiding document for the circular economy policy in the ROI. Out of the 16 circular economy actions outlined in *A Waste Action Plan for a Circular Economy- Ireland's National Waste Policy 2020-2025*, 3 have been completed and 5 actions are underway (DECC, 2021).

A Whole of Government Circular Economy Strategy: 2021-2022. Living More, Using Less was also produced to facilitate the transition to a circular economy on an interdepartmental basis and included 20 concrete targets such as establishing an interdepartmental circular economy working group under the auspices of the Department of the Environment, Climate and Communications (DECC), and reconfiguring the existing *National Waste Prevention Programme* as *The Circular Economy Programme 2021-2027: The Driving Force for Ireland's Move to a Circular Economy* (DECC, 2021).

Responsibility for the Circular Economy Programme lies with the Board of Directors of the Environmental Protection Agency (EPA), who maintain an oversight and approval role for the programme's activities and budget whilst working alongside DECC (DECC, 2020). Alongside this, the ROI government launched a Circular Economy Innovation Grant Scheme, with funding for projects ranging from €10,000 to €50,000.

The OECD's *The Circular Economy in Ireland* outlines several challenges that the ROI faces in the move towards a circular economy. According to the report, the ROI retains a sectoral and disjointed approach to implementing the circular economy, particularly focussing on waste, rather than the holistic approach needed. Within the waste sector, ROI government policy targets recycling and recovery rather than the equally, if not more, important areas of preventing waste, repairing goods, and reusing resources. The report also identifies a challenge that has long plagued Irish waste governance- a lack of consideration for local, place-based issues. There is a worry that the upcoming "single National Waste Management Plan for a Circular Economy may fail to account for local specificities, such as differences in income, population density and access to services" (OECD, 2022, p.11).

The Circular Economy in Ireland report also noted regulatory issues in the a) lengthy and unreliable licensing processes for waste management organisations, b) absence of clarity in Green Public Procurement, and c) limited government oversight of the waste sector (OECD, 2022). It is worth noting that Green Public Procurement, Waste Enforcement, and End-of-waste/By-products are all priorities areas addressed in the policy document *A Waste Action Plan for a Circular Economy: Ireland's National Waste Policy 2020-2025* (DECC, 2020). Funding the circular economy presents challenges from both the lack of a funding structure that considers private investment, and the minimal use of price-based incentives.

Implementing the circular economy across the country remains difficult due to a lack of technical expertise and human resources within both national and local government departments and agencies (OECD, 2022). Irish Small to Medium-Sized Enterprises, of which there are roughly 250,000 in the ROI, lack the capacity for rolling out circular practices and applying for funding (ISME, 2022; OECD, 2022). Implementing circular practices is also hampered by limited collaboration between knowledge institutions and policymakers. The final challenge outlined by the report is the patchy awareness and understanding of the circular economy as a concept and the costs and benefits it entails. This challenge is present across all facets of Irish society, in particular industry and civil society (OECD, 2022).

The findings of *The Circular Economy in Ireland* report were broadly in line with research presented in the 2017 *Moving Towards the Circular Economy in Ireland: A study for NESC by Dr Simon O'Rafferty* (O'Rafferty, 2017). This report concluded with four broad reflections: that there was momentum in circular economy practices in Ireland but action was needed to build on the early advantage; the full potential of the circular economy for Ireland had yet to be identified; the meaning

and nature of the circular economy needed to be understood more widely; and the development of circular activity requires a holistic and strategic policy approach so as to maximise opportunities (O’Rafferty, 2017).

2.4 Policy differences

As shown above, policies and legislation in the ROI and NI differ in terms of targets, timelines, and extent. Aside from the differing extranational influences, NI has released considerably fewer policy documents and has no laws in place to give the circular economy a legal footing. As seen in Appendix A, there are no funding or grants available in NI specifically for the circular economy, unlike in the ROI. However, the *Draft Circular Economy Strategy for Northern Ireland* does indicate that there may be funding available in the future. Another key difference between NI and the ROI is that the NI government has commissioned and published a circularity gap report.

3 Methodology

3.1 Literature Review

Circular economy actors were identified in an extensive literature review that examined the contributors to previous reports on the circular economy, relevant government departments and authorities, civil society organisations involved, and businesses that form a part of the circular economy ecosystem across the island of Ireland.

3.2 Research Instruments

Based on the extensive literature review, a survey instrument was developed to capture circular economy actors' views on the barriers to, supports needed for, and their overall perception of, the circular economy in Ireland.

In order to develop a circular economy network, unstructured interviews were organised with 9 actors spanning across the island of Ireland who are involved in various circular economy activities. These conversations led to the initiation of the All-Ireland Circular Economy Think Tank. Interviewees also provided insights into specific barriers the circular economy faces across Ireland.

Several circular economy engagement workshops for the public were conducted, with the aim of including the full range of stakeholders. Given the creation of the All-Ireland Circular Economy Think Tank, and the presumption of future involvement in both policy and research, these workshops were based on the concept of *Engaged Research* and involved the general public, university students, and post-primary school students. *Engaged Research* is where there is a “collaborative engagement with the community and aim to improve, understand or investigate an issue of public interest or concern, including societal challenges” (Campus Engage, 2016, p.4). The participants were asked about their awareness of the circular economy, what the areas of priority should be, and who should be responsible for implementing the circular economy in Ireland. These workshops were limited to the Republic of Ireland, although some participants were from Northern Ireland.

3.3 Data Collection

The research was carried out between June and October 2022. The primary method of completing the survey was on-line, using Survey Monkey. The public workshops were conducted both online and in-person.

A pilot study was conducted with 18 circular economy actors completing the survey and providing recommendations for its enhancement. An additional circular economy category was added following feedback received. The survey link was then emailed to over 150 potential actors identified in the literature review and was promoted on social media platforms.

A call was put out on social media that AMBER were seeking to connect with actors within the circular economy across the island of Ireland, and various organisations and people were referred to us through this, pre-existing connections, and the literature review, for the one-on-one meetings.

For the workshops, environmental groups were identified throughout the country and emailed with details of an online workshop. An in-person event was hosted for university students, with relevant clubs and societies emailed and asked to promote the workshop. An in-person event was also held for post-primary Transition Year students who were taking part in AMBER’s “TY Week Placements”. Participants were required to complete a pre- and post-survey on their knowledge of the circular economy, how they viewed government communication and collaboration around it, and their views on the workshop itself.

3.4 Data Analysis

Analyses of the survey and workshops involved descriptive statistics and thematic analysis. For instance, regarding survey data, descriptive statistics were used to explore the areas of a circular economy that participants’ fell under. Thematic analysis was carried out on the open-comment survey responses and the group responses to the workshop questions. This allowed for precise qualitative analysis and key themes to emerge.

4 Circular Economy: Stakeholder Mapping Survey

4.1 Response Rate

The survey link was then sent out to over 150 potential respondents, out of which 73 responded. Respondents were predominantly from the Republic of Ireland, with 14 being based in Northern Ireland.

4.2 Breakdown of the sample

As seen in Figure 2, of the 73 respondents of the survey, 14% were in Academia, 11% worked in Civil Society, 37% worked in some area of government, 35% worked for Industry, and 3% were involved in multiple spheres of governance.

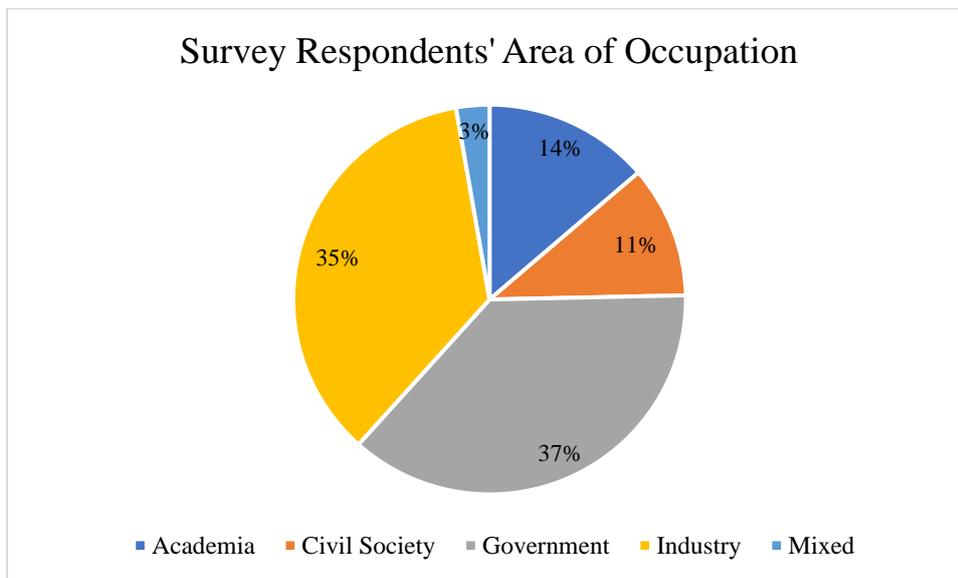


Figure 2 Circular Economy survey- Respondents' area of occupation

The survey required respondents to ascribe their organisation with one or more of circular economy categories. These categories were created based on the value chain of the circular economy and the format utilised by the Sustainable Business Network's (New Zealand) Circular Economy Directory: The first business-to-business directory dedicated to creating a circular economy in Aotearoa New Zealand.

As seen in Figure 3, roughly 60% of the respondents considered themselves to be involved in raising awareness or educating on the circular economy. Approximately 56% of respondents are involved in aiding in circular economy policymaking, and 52% advised on circular economy practices in some form. In contrast, roughly 11% of respondents are involved in the sale of a product arising from the circular economy and 13% are involved in the substitution of products or services.

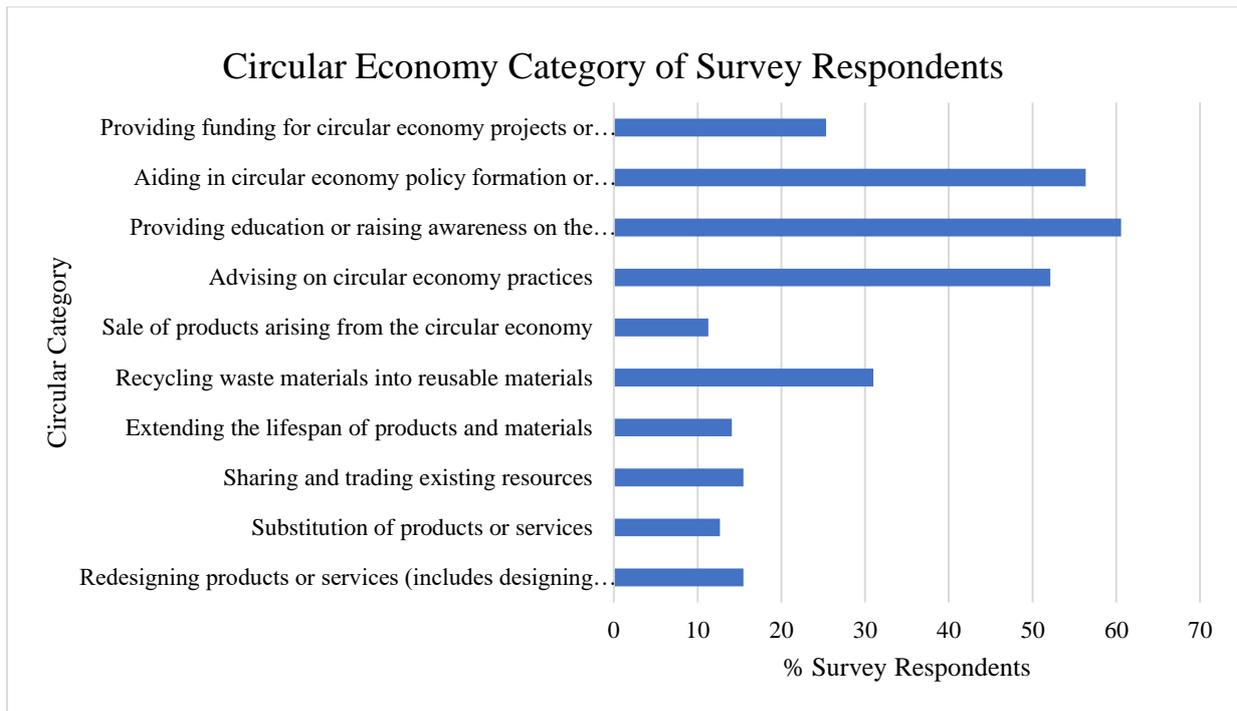


Figure 3 Circular economy categorisations of survey respondents

The survey respondents were then asked the following questions:

- a) What are the key barriers to the implementation of a circular economy in Ireland?
- b) What might be appropriate supports to drive action on the circular economy, for your organisation or across Ireland?

4.3 Key barriers to the implementation of a circular economy in Ireland

Barriers were categorised following the coding framework established in Kirchherr et al.'s (2018) N-study on barriers to the circular economy in the EU. These barriers are Cultural, Market, Regulatory, and Technological. Over the course of analysis and coding, Other Barriers emerged outside of those categorisations. The breakdown of the barriers noted are depicted in Figure 3. Cultural barriers were mentioned as critical in 38% of the responses, followed by Regulatory barriers at 26%, and Market barriers consisted of 17% of the barriers outline. Interestingly, Technological barriers accounted for only 7% of the barriers to a circular economy in Ireland, which is in line with the findings of Kirchherr et al. (2018) in which technical barriers did not emerge as core barriers.

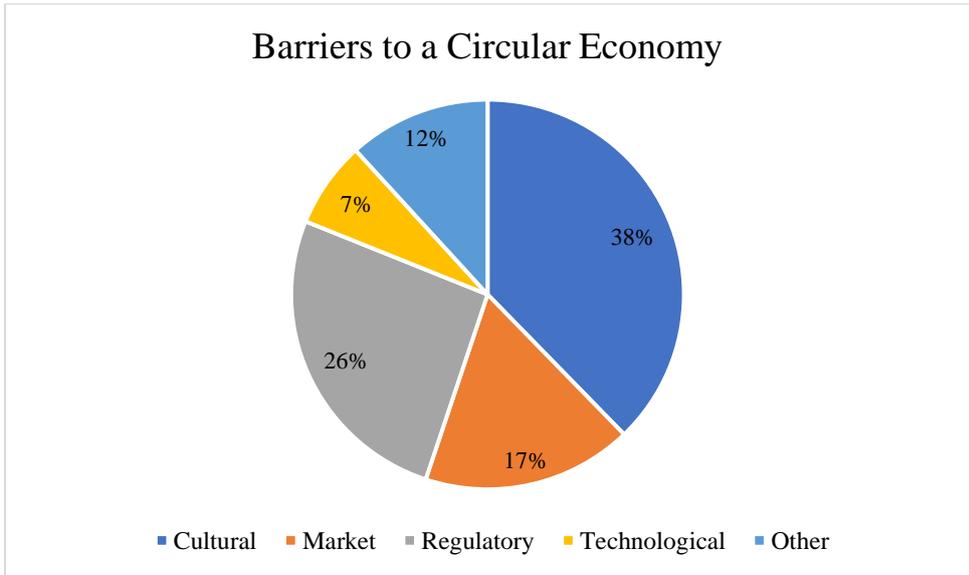


Figure 4 Barriers to a circular economy across the island of Ireland

Within each category, there were several sub-categories that defined the barriers. For example, a Lack of Awareness featured prominently in Cultural Barriers, whereas issues around Materials were the most-cited barriers within Market barriers. Please see Table 1 for a comprehensive list of the various barriers identified. As was noted in Kirchherr et al.’s 2018 study, barriers have multiple complex interactions, the authors suggested that breaking down critical market barriers may lead to a reduction in cultural barriers such as company hesitancy. Similarly in this research, it is possible that an increase in awareness and understanding (ostensibly cultural barriers) among government will improve regulatory competence and funding.

Table 1 Barriers and sub-barriers to the circular economy in Ireland

Category	Sub-Category	Illustrative Quotes from Participants
Cultural Barriers	Consumer Culture	<i>“modern throwaway society, overly focused on convenience”</i>
	Education	<i>“I think expertise in repair and rebuilding etc. needs improvement”</i>
	Government culture	<i>“Lack of leadership, vision and necessary funding from government”</i>
	Industry Culture	<i>“embedded linear business models”</i>
	Lack of Awareness	<i>“lack of public awareness”</i>
	Lack of Buy-In	<i>“resistance from industry & businesses”</i>
	Lack of Knowledge	<i>“Knowledge on how-to is a key barrier”</i>
	Lack of Motivation	<i>“people are too busy to care”</i>
	Lack of Understanding	<i>“Understanding (at every level, from local to national/political)”</i>

	Siloed Approach	<i>“Lack of collaboration - in order for this to work there has to be more sharing of information and formulation of solutions together”</i>
	Status Quo	<i>“Business as usual is embedded into everything we do and the way we think and behave”</i>
Market Barriers	Cost Implications	<i>“upfront cost is a big factor”</i>
	Economy	<i>“The production of goods and services is traditionally a linear process with negative environmental and climate impacts”</i>
	Ireland as an island	<i>“In Ireland scale may also be an issue for many products. The market in Ireland may be too small to support a circular economy for many products”</i>
	Materials	<i>“While virgin materials are cheaper and easier to use there is a lack of incentive for industry to source regenerative materials”</i>
	Pricing	<i>“consumer pricing”</i>
	Private finance	<i>“Private finance/investment”</i>
	Resources Needed	<i>“Financial, intellectual and human resources”</i>
	Size of the Market	<i>“The scale of businesses currently functioning within Ireland to handle waste in a circular fashion has not yet caught up with the demand”</i>
	Structure of the Market	<i>“dispersed global supply chains”</i>
Regulatory Barriers	Bioeconomy	<i>“Agri food regulation limit opportunities in the bio economy”</i>
	Cohesion with EU and UK	<i>“Legislation in Ireland is currently not in line with other EU countries and UK”</i>
	Competence	<i>“Regulatory Coherence”</i>
	Delays	<i>“Regulatory regime bottlenecks”</i>
	Funding of Fossil Fuels	<i>“Massive support from government to create the fossil-based energy systems over generations - not matched in renewables”</i>
	Incentives	<i>“lack of effort/ incentives in the reuse sector”</i>
	Lack of Funding	<i>“lack of funding for innovation and infrastructure”</i>
	Legislation	<i>“The waste regulatory framework and waste classifications currently impede the circularity of materials”</i>
	Loopholes	<i>“Greenwashing by brands & retailers”</i>
	NI-Specific	<i>“lack of policy & legislation delivering a CE in NI”</i>
	Policy	<i>“policies that advocate environmental damaging materials”</i>

		<i>“More clarity needed on regulation and policy and supports for businesses”</i>
	Public Procurement	<i>“need for implementation of some of the key changes eg Green Procurement”</i>
	Standards	<i>“Product standards which restrict product innovation”</i>
	Tax	<i>“No tax on virgin materials when there is a suitable non-virgin alternative”</i>
	Waste Licensing	<i>“Delays in planning and, in particular, EPA licensing processes”</i>
Technological Barriers	Product Design	<i>“Many products are not designed with circularity in mind and are thus difficult and/or costly to recover”</i>
	Data Collection	<i>“Lack of transparency around recycling rates in Ireland”</i>
	Scaling up the CE	<i>“It seems to be fairly embryonic, with various small scale initiatives or projects”</i>
Other Barriers	Conceptual	<i>“Lack of agreement on what constitutes the Circular Economy and Circular Economy practices”</i>
	Infrastructure	<i>“Current lack of necessary infrastructure to deal with processing of resources on island”</i>

4.4 Appropriate supports to drive action on the circular economy

Of the 73 survey respondents, 9 did not answer the question “What might be appropriate supports to drive action on the circular economy, for your organisation or across Ireland?”.

Given the relatedness of barriers to the circular economy and the supports needed in order to essentially overcome the barriers, survey answers on appropriate supports to drive action on the circular economy were also categorised following the coding framework established in Kirchherr et al.’s (2018) N-study on barriers to the circular economy in the EU. Supports fall under Cultural, Market, Regulatory, and Technological. Over the course of analysis and coding, Other Supports emerged outside of those categorisations. The breakdown of Supports is noted in Figure 5. Regulatory supports featured in 45% of the answers, and Cultural supports were also seen as important in 33% of the responses. Market supports featured as 12% of responses, whereas Technological supports were mentioned as 6% of responses, and Other supports featured in 4% of responses.

Within these supports categories, suggestions were made to remove VAT on second-hand products (regulatory support), invest in education and training in circular skills (cultural support), and better measure the data on consumption patterns, material flows, and waste. Please see Table 2 for further supports needed, as outlined by survey participants.

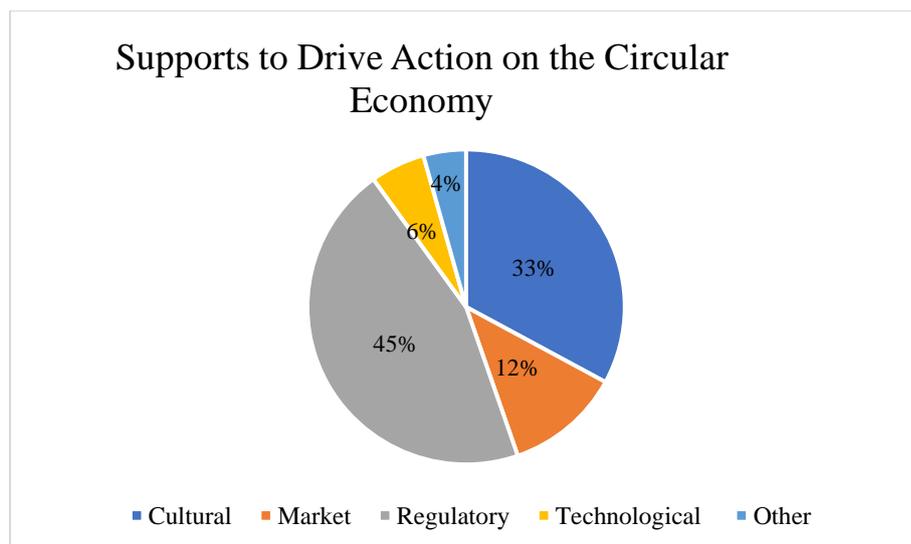


Figure 5 Supports Needed to Drive Action on the Circular Economy on the island of Ireland

Table 2 Supports needed to drive action on the circular economy across the island of Ireland

Support Category	Sub-Category	Illustrative Quotes from participants
Cultural Action	Whole of Society Approach	<i>“Clean alignment of circular economy to government, business, civil society”</i>
	Messaging	<i>“Circular Economy promoted as a necessary disruptive paradigm shift”</i>
	Awareness	<i>“Everyone on the island needs to understand what circular economy means and how patterns of consumption and production methods/supply chains will have to change to lessen waste - the linear economy will continue to grow as long as people want stuff and have purchasing power to drive it - this will outweigh climate worries. Education is vital first step allowing us to reconnect with natural environment and our effect on it. We need to be clever in utilisation of social media - as it drives so much of messaging now”.</i>
	Education	<i>“Investment in training and upskilling to produce circular mechanics of the future”</i>
	Long-term Thinking	<i>“An appreciation that we’re in a period of transition [which may last decades] and that this will require investment in facilities and technologies which will be supplanted in due course - but they are a necessary bridge to get from today to tomorrow.”</i>
	Roles and Responsibilities	<i>“Currently the onus is on the consumer to dispose and recycle. This should be placed on the seller, making it easier for people to recycle or repurpose their goods.”</i>

		<i>“We need business champions who will encourage their industry to take the lead.”</i>
	Buy-in	<i>“We’re living in an emergency and our response need to recognise that and act accordingly, from the top down.”</i>
Market Action	Product Labelling	<i>“Product labelling that is clear the amount of environmental damage a product makes.”</i>
	Circular Markets	<i>“Markets for products and services delivered this way.”</i>
Regulatory Action	Certification	<i>“Greater pressure on companies to be certified Circular Economy by 2030 or equivalent.”</i>
	Legislation	<i>“Progressive ramping up of mandatory use of recycled materials.”</i>
		<i>“Streamlined planning and licensing processes.”</i>
		<i>“Actively amend regulations to support rather than hinder materials reuse.”</i>
		<i>“Established Circular Economy framework to allow sustainable reuse of products from anaerobic digestion process that currently must be discarded as waste.”</i>
	Finance and Funding	<i>“Specifically, switch investment incentives from linear to circular.”</i>
		<i>“Cut all funding of fossil fuels.”</i>
	Supports	<i>“There’s the opportunity for sectors to work with their members to consider and address what the Circular Economy means for their areas of work. If possible, this could be supported by outreach from universities research programmes and funding from appropriate Government agencies. This should be programmed over years [decades]”</i>
		<i>“Funded company audits to determine baselines and present opportunities.”</i>
		<i>“More incentives and supports for indigenous industries and start ups to attract entrepreneurs and allow them to market their services and products locally at competitive and sustainable prices”</i>
		<i>“Additionally, while Circular Economy needs to be supported, the improvement of the underlying efficiency within businesses cannot be overlooked - this is what will resonate more with businesses as it directly impacts their bottom line in the short term. Through supporting such actions then trust can be developed in the 'system' and then more circular approaches will be more likely to take hold.”</i>
	Policies	<i>“Mandatory implementation of Green Public Procurement policies, with a specific target for Circular Procurement.”</i>
		<i>“Co-ordination of policy and legislation which drives the circular economy in the Republic of Ireland and Northern Ireland”</i>
		<i>“Policy drivers to keep important resources like textiles and WEEE in local systems for reuse rather than collection for export.”</i>
	Targets	<i>“STOP having national targets for recycling! this is stupid and makes people just throw stuff away”</i>

		<i>"We need greater ambition from Government through setting targets for reuse (in the pipeline) and other targets that focus on the key issue of overconsumption."</i>
		<i>"A cast-iron commitment to targets within a set timeframe across all Government departments should follow as a direct result of departmental audits conducted to identify deficiencies re. circular economy"</i>
	Tax	<i>"Remove VAT from second hand products of any sort."</i>
		<i>"Financially penalize products that are not easily recyclable"</i>
		<i>"Financial disincentives for placing products on the market that do not serve the Circular Economy"</i>
Technological Action	Construction	<i>"Development of alternative (reduced fossil dependence) road making materials"</i>
		<i>"Recycling of C&D waste materials"</i>
	Design	<i>"Of course, the ultimate system also needs to be joined up, but design is a critical phase."</i>
	Innovation	<i>"Incentivising innovation in this area is key and should be supported by government if possible"</i>
		<i>"Maybe a wider reach for the solutions or Flexibility in regards to change."</i>
Other	Sharing economy	<i>"For example the Irish circular economy strategy talks about tool libraries, I have never heard of these in most provincial towns?"</i>
	Measurement	<i>"We need a better way to understand our role in the circular economy and to measure progress - identify barriers –"</i>
		<i>"Data - material flow studies on a sector by sector or industry by industry basis to help understand the current patterns of consumption, production and waste, and identify where interventions would be most effective, and inform the types of intervention needed."</i>
	Infrastructure	<i>"Create greater incentives for indigenous 'recycling' in Ireland, current mechanisms strongly favour collection and sorting of material with very limited funding for actually processing material."</i>
		<i>"The more we invest in recycling/reusing/repurposing the more common it will become making it the cheaper option in the long run. We are taking valuable resources from the earth we should strive to reuse this as much as possible."</i>
		<i>"Facilitating exchange of products in a way that keeps materials local would be ideal - minimises transport but also generates local connections, momentum and possibility. However, these type of supports need sustained financial backing."</i>
	EU-wide Approach	<i>"Adaption of appropriate best practice across Europe and the implement of that in a robust fashion – e.g., on the go waste recycling,"</i>
	Name and Shame	<i>"The publication of enforcement against groups, businesses and individuals,"</i>

5 Exploratory Circular Economy Public Engagement Workshops

5.1 Breakdown of the sample

The workshop ran for approximately an hour and a half and had up to a maximum of 20 participants. They were carried out in September and October 2022. As seen in Figure 5, almost half of the participants in these exploratory workshops were under 18 and none were between the ages of 35 and 44.

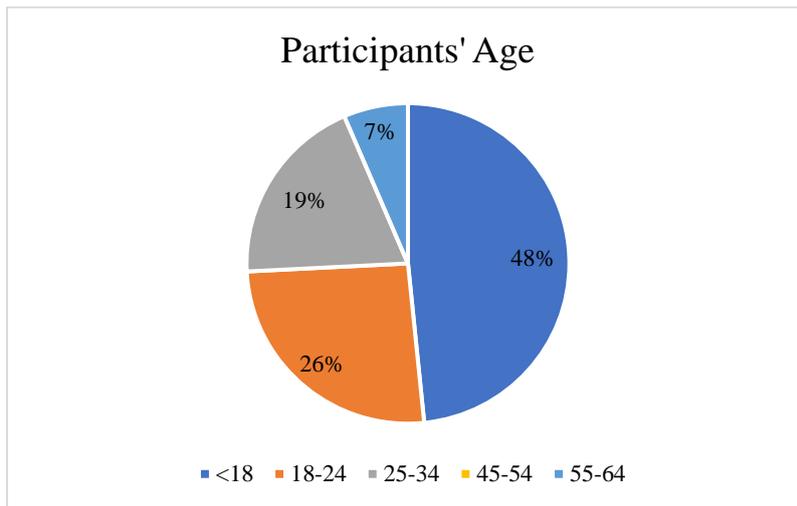


Figure 6 Circular Economy Public Engagement Workshops- Participants' Age

As seen in Figure 6, 65% of the participants identified as female.

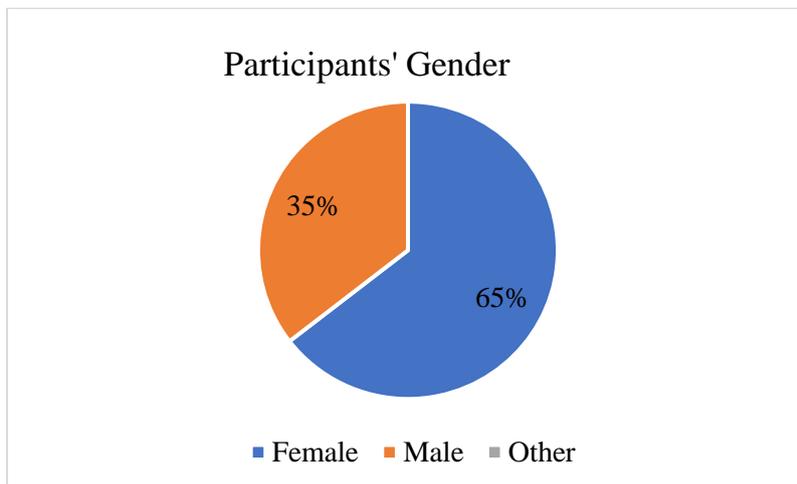


Figure 7 Circular Economy Public Engagement Workshops- Participants' Genders

Participants were asked to complete a pre-workshop survey providing their details and an estimate of their own awareness of the circular economy. Participants were also asked to complete a post-workshop survey in order to evaluate whether their knowledge of the circular economy had improved, their experience of the workshop, and their experience of consultation and communication with the

government around circular economy policymaking. Over the course of the workshop, workshop participants were asked the questions in Table 3.

Table 3 Questions asked of circular economy public engagement workshop attendees

Theme	Discussion Question
Awareness	Q1. Are people aware of the circular economy in Ireland?
Context-building	Q2. Can you think of examples of the circular economy already in action in your community?
Context-building	Q3. What are the biggest areas of material waste or consumption in your life?
Context-building	Q4. What might be the biggest areas of material waste or consumption across the country?
Areas of Priority for the Circular Economy	Q5. What are your top 4 areas of circular economy priority? Why?- Can you think of any other areas that seem more important?
Roles and Responsibilities in the Circular Economy	Q6. Who should be responsible for implementing your top 2 priorities? In what way? Why?

5.2 Circular economy awareness amongst participants

Prior to completing the workshop, as seen in Figure 8, roughly 30% of participants did not feel that they had an understanding of what the circular economy is. Almost 40% of participants did not have an opinion on what the main priorities for the circular economy should be, and a further 32% were neutral. When considering who the main stakeholders should be in enacting the circular economy, 26% of stakeholders had an opinion. It is worth noting that participants over the age of 18 actively signed up for the circular economy workshop, and therefore may have had a higher initial awareness of the circular economy than a random sample of the general public.

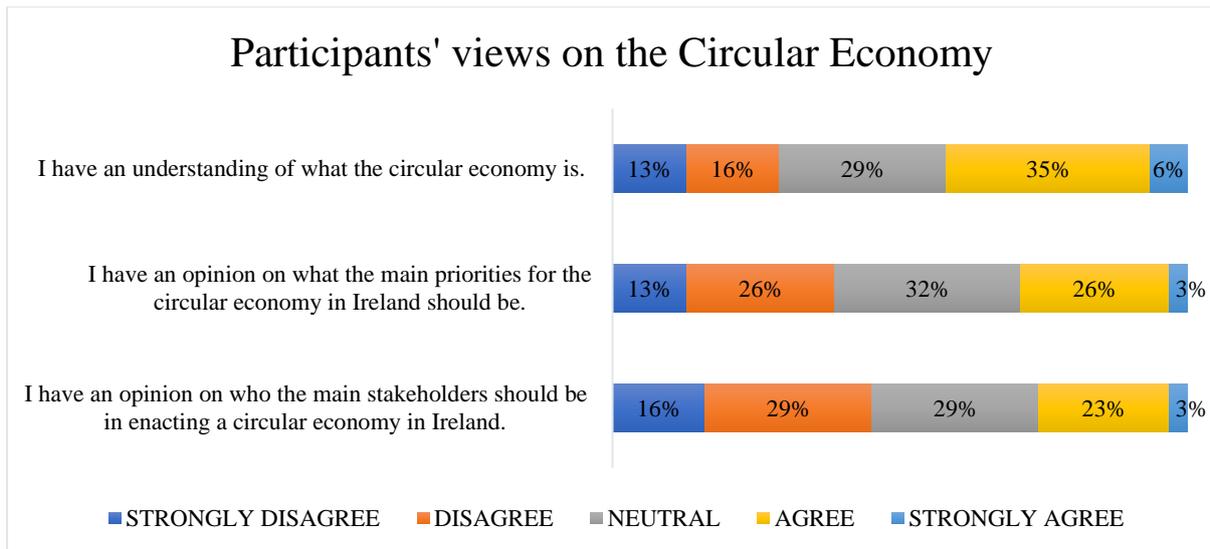


Figure 8 Circular Economy Public Engagement Workshops- Participants' views on the Circular Economy Pre-Workshop

Following the workshop, every participant had an understanding of what the circular economy is (see Figure 9). 96% of participants had an opinion of what the main priorities for the circular economy in Ireland should be, and almost 90% had an opinion on who the main stakeholders enacting the circular economy should be.

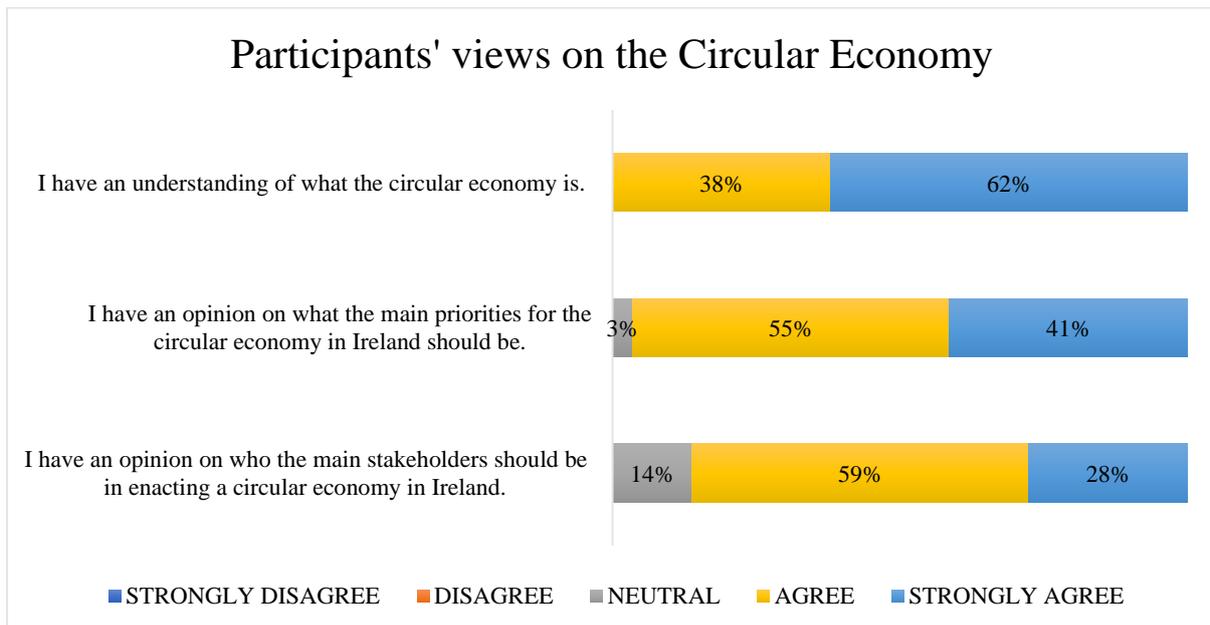


Figure 9 Circular Economy Public Engagement Workshops- Participants' views on the Circular Economy Post-Workshop

5.3 Awareness of the circular economy in Ireland

Despite roughly 30% of the participants feeling that they had an understanding of the circular economy, when asked “Are people aware of the circular economy in Ireland?”, not one person answered in the affirmative. However, approximately 25% of participants felt that students and younger people had a

better awareness and understanding of the circular economy than the older public. Many of the students had learned about the circular economy in some capacity, as illustrated in the quote below:

“In my school in science class we learned about the circular cycle in the wild but not how it is present in our economies in Ireland”

Illustrative Quote

25% of participants felt that people had heard of the concept of the circular economy, but didn't know exactly what it involved, whilst 25% of participants also felt that people are aware of certain aspects of the circular economy, but not necessarily the term itself.

“Not aware, small amount of people are. They may know some of the ideas recycling, upcycling etc.”

Illustrative Quote

5.4 Areas of priority for the circular economy in Ireland

When asked, “What are your top 4 areas of circular economy priority? Why?”, participants were asked to select four out of the sixteen circular economy priorities areas identified in *A Waste Action Plan for a Circular Economy- Ireland's National Waste Policy 2020-2025*. Plastic and Packaging Waste was prioritised in 64% of responses, as one participant wrote, “because it's everywhere!”. Food Waste was a priority for the country in 40% of responses, as was Extended Producer Responsibility, as seen in the quote below. Finally, Single Use Plastic was deemed a priority area for making circular in 36% of responses.

“Extended Producer Responsibility- need to create change within producers themselves. Making this change would mean more circular solutions by design”

Illustrative Quote

5.5 Roles and responsibilities for the implementation of the circular economy in Ireland

Finally, workshop participants were asked to discuss “Who should be responsible for implementing your top 2 priorities? In what way? Why?”. They were requested to think of the particular roles of Industry, Government, The Individual, and Research Institutions.

Research Institutions featured in 12% of responses, and were mostly assigned the role of creating technological solutions to waste issues, as is illustrated in the quote below. They were often assigned the a collaborative role with industry or government in creating these solutions. Two responses outlined how Research Institutions could study behavioural change to influence the public in being more sustainable.

“they can develop new, less-waste-making materials in construction and supermarkets... based on research”

Illustrative Quote

The Individual featured in 17% of responses, the majority of which referred the individual’s ability to manage their own Single Use Plastic, Plastic and Packaging Waste, and Food Waste within the household.

“Individuals to minimise household waste by reducing food waste, single use products and packaging”

Illustrative Quote

Industry featured in 33% of responses, with almost half of those referring to Single Use Plastic and Plastic and Packaging Waste. When participants chose to write an explanation of their choice of the role of Industry, they frequently expressed the importance of Industry action under government guidance, as illustrated in the quote below.

“[Industry can] advertise green/circular products upfront. Most of this depends on government initiatives, but entire industries could act together to change standards”

Illustrative Quote

This brings us on to the final stakeholder, Government, which was mentioned in 37% of responses. Of these responses discussing the role of Government, 75% wrote of the importance of enforcing legislation and financial incentives and disincentives. However, some approaches saw Government in a facilitator and collaborative-type role.

“The best actor to motivate industries and research institutions is to work together and improve sustainability is the government. Government must work together with research institutions to understand and develop realistic goals and standards/legislation for achieving a circular economy”

Illustrative Quote

5.6 Consultation and Communication with government and government bodies

In the Post-Workshop survey, participants were asked to read three statements and select the response that best reflects their experience of communication with government agencies such as government departments and Science Foundation Ireland. As seen in Figure 10, 64% of participants were almost never or seldom clear about the circular economy decision-making process in Ireland. 75% of participants did not feel adequately yup-to-date on important circular economy issues in Ireland, and

60% felt that they almost never or seldom heard enough about how the circular economy is running in Ireland.

Participants were then asked to read four statements and select the response that best reflects their experience of consultation about the circular economy with government agencies such as government departments and Science Foundation Ireland. As seen in Figure 11, 93% of participants did not feel that they were consulted by governmental agencies before decisions were made on the circular economy, nor that their voices were often heard when they were actually consulted on governmental decisions relating to the circular economy, nor that they have an outlet to give an opinion that differs from government. 15%, however, felt that they were often given a reason as to why changes had occurred in the circular economy agenda.

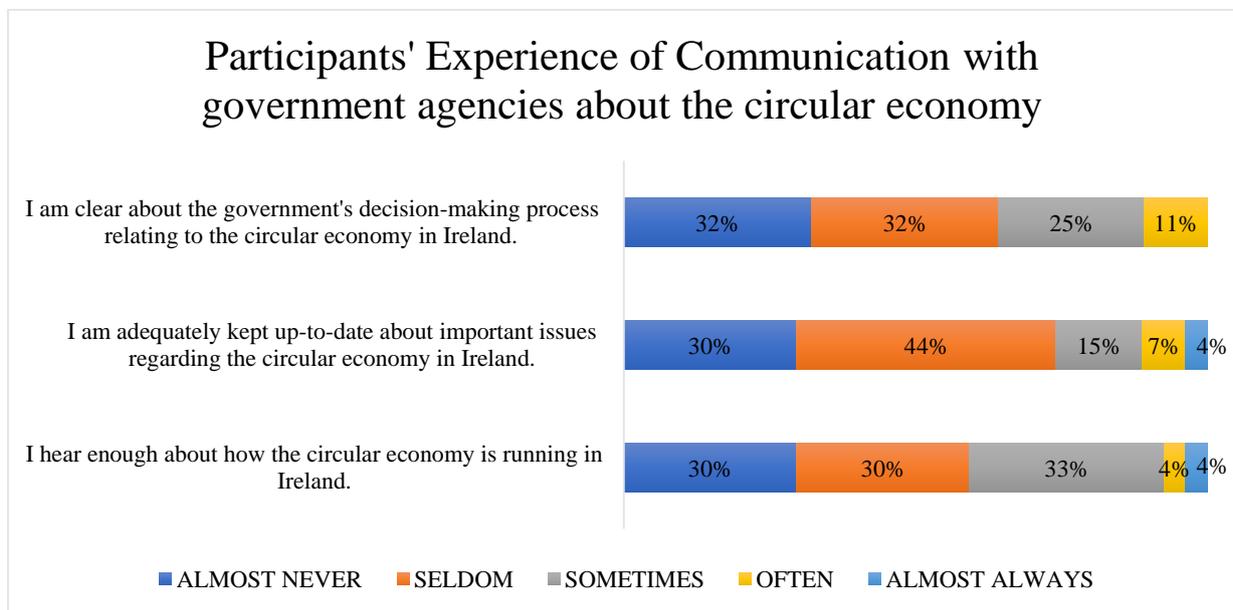


Figure 10 Circular Economy Public Engagement Workshops- Post-Workshop Survey on Publics' perception of communication with government and government bodies

Participants' Experience of Consultation with government agencies about the circular economy

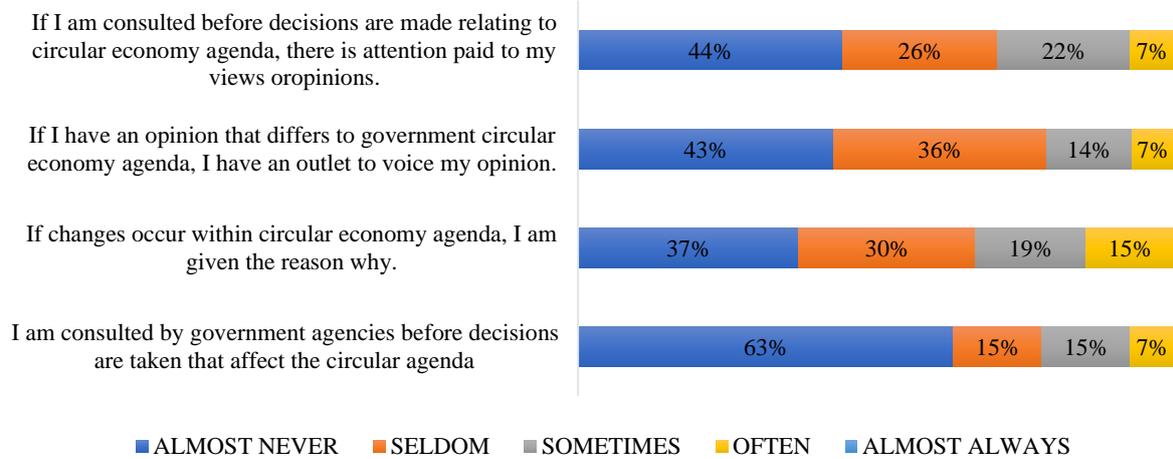


Figure 11 Circular Economy Public Engagement Workshops- Post-Workshop Survey on Publics' perception of consultation with government and government bodies

6 All-Ireland Circular Economy Think Tank: A Network of Circular Economy Actors

6.1 Description

An All-Ireland Circular Economy Think Tank Initial Scoping Event was held as a culmination of the connections fostered throughout this research project. The network involved in this Think Tank was established through pre-existing connections and the one-on-one meetings. It culminated in an initial scoping event on November 4th, 2022, in Queen's University Belfast. It was chaired by Professor Mick Morris of AMBER, the SFI Research Centre for Advanced Materials and BioEngineering Research; and Martin Doherty of The Centre for Advanced Sustainable Energy (CASE).

6.2 Agenda

- Introductory Presentations (Preliminary Research Findings)
- Discussion on Challenges of the Circular Economy
- Discussion on Need for an All-Ireland Think Tank and Priorities/Aims
- Summary

6.3 Attendees

Alan McVicker (Strategic Investment Board), Claire Downey (The Rediscovery Centre), Daniel Knapper (AMBER), Deirdre Caden (AMBER), Geraldine Brennan (Irish Manufacturing Research), Jamie Delargy (Enirgy), Jelena Vlajic (Queen's University Belfast), Jennifer McKinley (Queen's University Belfast), John Barry (Queen's University Belfast), Heidi Clarke (Strategic Investment Board), Kevin Maher (IBEC), Klaudia Dudzinska (Irish Business and Employers Confederation), Mary-Lee Rhodes (Trinity College Dublin), Melanie Thrush (Arup), Nick Holden (UCD School of Biosystems and Food Engineering and BiOrbic Bioeconomy, SFI Research Centre), Sadhbh Crean (AMBER).

6.4 Presentations

1. Introduction to challenges in the circular economy and the need for a new approach- Professor Michael Morris.
2. Public Engagement Workshops on the Circular Economy- Sadhbh Crean.

In keeping with the practices of *Engaged Research* (Campus Engage, 2016), key findings from the Circular Economy Public Engagement Workshops were presented at this initial meeting, so as to involve the voice of the public from the initial stages of this network. It is hoped that this sets a precedent for future dialogic events between stakeholders such as industry, the public, researchers, government, and civil society.

6.5 Summary

An engaging and productive conversation was had. Key issues in bringing the circular economy to the island of Ireland were discussed and attendees' priorities were outlined. Commonalities and differences were found between Northern Ireland and the Republic of Ireland's approach to the circular economy.

This network could be used in the following ways: a) for information-sharing through in-person meetups or an online form of communication, b) to generate ideas and divert funds already available to the members into research projects, c) split into working groups that tackle key issues, with funds being found from internal or external sources, d) as a way to communicate the research already being done to the public and government stakeholders, and e) as a mixture of any of the above.

Going forward, attendees were invited to think on the network structure they would benefit from the most, and the extent of their involvement in the future. Attendees were encouraged to think of who should be at the table going forward.

Another meeting was agreed on for February 2023.

7 Recommendations

In addition to the recommendations outlined in the OECD's 2022 *The Circular Economy in Ireland* report, and the *Draft Circular Economy Strategy for Northern Ireland*, this research project has found several areas that need to be targeted if the circular economy is to be successfully implemented across Ireland.

7.1 Working Groups

Through assessing the survey results, the informal one-on-one meetings, the workshops, and the topics discussed at the Think Tank event, it is clear that there are currently gaps and issues in certain areas that require further research and a collaborative approach to tackling. Working groups around the topics outlined in Table 4 could be formed to address the gaps in knowledge. These groups could be initiated by industry, government, research institutions, or civil society. Each working group should be cognisant of the research that has already gone into the topic area.

Table 4 Issues within circular economy implementation that require focussed research

No.	Theme	No.	Specific Area
1	Business	1	Supply chain mapping- How to measure material flows along a supply chain?
		2	Small to Medium sized enterprises- How can they be supported in adapting to a green transition without suffering from huge costs?
2	Carbon Emissions	3	How are the circular economy and carbon emissions tied across the island of Ireland?
		4	Behavioural Economics- How to bring the circular economy to the public?
3	Economics	5	Employment- What jobs will arise from the circular economy and how will people be trained in the appropriate skills for these?
		6	Economic forecasting- What are the implications of the choices being made (e.g., on trade)?
		7	Metrics of success- Should GDP be the only measurement of the success of a circular country? Are there alternative, optimum metrics?
4	Education	8	Tertiary education- How to integrate circular thinking into tertiary-level courses throughout the island of Ireland?
		9	Current oversight- Do circular economy projects, both public and private, have expert oversight?
5	Expertise	10	Centre of expertise- Is there a need for a centre of circular economy experts across product design, material science, social sciences, etc.?
		11	Current funding overview- Are there sufficient funds being given to circular economy innovation both in Northern Ireland and the Republic of Ireland? Are existing funding schemes reinforcing positive environmental outcomes?
6	Funding	12	Funding timelines- Has funding been allocated short-term, medium-term, and long-term? Is there an awareness of the transition period we are in?
		13	Sector specific roadmaps- What does the circular economy mean in practice for each sector?
7	Guidance	14	EU- What EU trends and legislation are coming down the line?
8	Legislation		

		15	Current legislation overview- Is the circular economy legislation across the island of Ireland doing enough to accelerate change? Is there legislation that hinders a circular change?
9	Policy	16	Current policies overview- What national, EU, and international policies aid or obstruct the adoption of the circular economy in Ireland? Is there the opportunity to improve these policies in the global and national arenas so that they actively support the development of a circular economy in Ireland?
10	Product Design	17	Data- Do companies share product information in a way that minimises waste and allows for national standards to emerge? Are there mechanisms to improve these channels of communication?
		18	Materials- How are material flows being measured and what measurements are appropriate to assess how circular they are?
11	Scale	19	Scale- How to scale up the successful circular economy projects throughout the country?
12	Stakeholders	20	Politicians- Are politicians (north and south) aware of the circular economy and is there sufficient high-level buy in?
		21	Value networks- the importance of developing value networks to realise business opportunities
13	Waste	22	Infrastructure- How can infrastructure be strategically provided across the island of Ireland? (e.g., in reprocessing, capacity, treatment north and south)
		23	Value of waste- How to ascertain the value of waste?

7.2 International Examples and Collaboration

Numerous survey respondents and interviewees stated the need for a centre of excellence and expertise for the circular economy. A possible route to follow, from a national government perspective, is that of the United Kingdom (UK). In 2020, the UK government announced their intention to open UK Research and Innovation interdisciplinary circular economy centres to help to move the UK towards an evidence-based and resilient circular economy (UK Research and Innovation, 2022). Each centre will work with different materials, such as textiles, construction materials, chemicals, technology materials, or metal, with the overall goals of using fewer resources and recovering the materials that are already in circulation (UK Research and Innovation, 2022). These five centres will be coordinated by the National Interdisciplinary Circular Economy Research Hub, which bring together academics, industry practitioners, policy makers and civic society (CE-HUB, 2022).

As a small open economy, the Republic of Ireland is heavily reliant on international trade and markets (European Commission, 2022d). This in turn leads to lengthy supply chains. In the ROI, 84% of the 1.1 million tonnes of packaging waste generated in Ireland in 2019 was exported to be recycled (EPA, 2021). Northern Ireland is less open than the ROI, but they still have a total import footprint of 21.5 million tonnes (Conde et al., 2022). Given this high interaction with other states, the standards and data collection methods in both NI and the ROI should align with the standards in other countries globally. International cooperation is needed for this.

7.3 Future of the All-Ireland Circular Economy Network

The aim of this research project was to catalyse a network of circular economy actors across the island of Ireland, and whilst this network was initiated, the momentum created should be continued to ensure future collaboration within the circular economy sphere. The following measures could form part of the continuation of the engagement with all stakeholders.

- Further exploratory Circular Economy Public Engagement Workshops in Northern Ireland
- Multistakeholder engagement in the designing of a nationwide Circular Economy Survey
- Communication of results to varying stakeholders. For example, youth groups; community groups; governments
- Cross-border roll out of workshops
- Formalisation and funding of All-Ireland Circular Economy Think Tank

Appendices

Appendix A

Financial supports available for circular economy projects on the island of Ireland

It is worth noting that there are numerous grants and funds available at EU, UK, national, and local level that focus on outreach, education, and sustainability that an organisation or community group may avail of. This Appendix looks at circular economy-specific supports.

The *Draft Circular Economy Strategy for Northern Ireland (2023)* proposed a Circular Economy funding programme. More financial supports may be made available in NI when the strategy is enacted.

Table 5 Financial supports available to ROI circular economy activities and organisations

Name of Support	Details	Eligible Recipients
Circular Economy Innovation Grants Scheme (Government of Ireland, 2022)	A Government of Ireland initiative led by DECC. This grant scheme, established in 2021, aims to provide support to projects which work in the Circular Economy space, with the aim of advancing the Circular Economy in Ireland and raising awareness of the need to transition to a Circular Economy.	Social enterprises, voluntary and community organisations, small/medium businesses (those with less than 50 employees)
CIRCULÉIRE Innovation Fund (CIRCULÉIRE, 2022)	CIRCULÉIRE operates a €1.5 million innovation fund that is ringfenced for large scale innovation. CIRCULÉIRE's overarching objective between 2020-2022 is to source, test, finance, and scale, circular manufacturing systems, supply chains and circular business models. This is hoped to reduce both CO2 emissions and waste across their membership cohort.	Manufacturing industry members
EPA Green Enterprise: Innovation for a Circular Economy (EPA, 2022)	Having begun in 2020, the EPA's Green Enterprise: Innovation for a Circular Economy is an annual funding call to support innovators in Ireland to develop, demonstrate and implement circular economy approaches in their business models. Funding ranges from €50k-€100k, to support Irish businesses to develop circular solutions in product and service design, production, distribution and use of resources (including resources and raw materials).	Organisation/ Company with a business-ready innovative project targeting the area of food, plastic, construction & demolition, or resources and raw materials.

Appendix B

Education and Training Resources available for the circular economy on the island of Ireland

From the circular economy public engagement workshops, it appears that the circular economy is taught in some secondary schools, however the extent and standard of this post-primary education warrants further research. At tertiary level, many universities have modules either partially or wholly on the circular economy, such as this University College Dublin (UCD) module [Zero Waste Circular Economy](#).

Once again, there are numerous environmental supports available for organisations and this report focuses specifically on the circular economy-specific reports.

Table 6 Education and Training Resources available for ROI circular economy activities and organisations

Name	Details
Climate Action Voucher	The Climate Action Voucher is available to eligible companies to access up to 2 days independent technical or advisory services support related to the current and future operations of their business. The voucher may be used to obtain services from approved providers (directory link available below). Eligible Projects must include one or more of the following activities: <i>Resource Efficiency Assessment</i> , Renewable Energy Potential, Introduction to Corporate Sustainability, <i>Introduction to Circular Economy Thinking</i> .
GreenStart	The aim of the GreenStart assignment is to improve environmental performance through greater resource efficiency helping companies achieve competitive advantage and greater market share through enhanced credentials and cost savings. Companies can apply for grant support towards the cost of hiring a Green consultant/trainer to undertake a short in-company assignment. Eligible assignments may include: Guidance with Life Cycle Assessment, Guidance with Circular Economy thinking and transition to circular economy business models.
Skillnet Ireland	Skillnet Ireland is a business support agency of the Government of Ireland, responsible for advancing the competitiveness, productivity and innovation of businesses operating in Ireland through enterprise-led workforce development. They run a 'Climate Ready Academy- Waste and Circular Economy Leaders Programme', which aims to support businesses to improve their waste management policies and develop a detailed action plan for their business anchored in Ireland's Waste Action Plan for a Circular Economy.

Table 7 Education and Training Resources available for NI circular economy activities and organisations

Name	Details
Invest Northern Ireland: Reduce Waste and Save Energy	Customers of Invest Northern Ireland (some eligibility criteria: Reach a turnover of £250K per annum within 5 years; and Achieve at least 25% of those sales outside of Northern Ireland) can avail of tailored advice, support and funding to help their business operate more efficiently, minimise waste, reduce costs and improve their impact on the environment.

Table 8 Education and Training Resources available in Northern Ireland and the Republic of Ireland

Name	Details
Certificate in Circular Economy (Munster Technological University)	This Certificate in Circular Economy will provide participants with state-of-the-art knowledge on the circular economy model versus traditional linear business/economic models, outlining how the circular economic model can achieve the sustainability goals of a business. Applicants must hold a minimum NFQ level 7 degree in science, business, management, engineering, or a relevant degree area.
Certificate in Sustainability and the Circular Economy (Griffith College)	Business professionals must have the insight, knowledge and skills required to operate successfully in the new sustainable circular economy, this Level 8, 5 ECTS programme (will help you do just that).
Circular Economy Academy (The Rediscovery Centre)	The Circular Economy Academy is a free mentoring and support programme run by the Rediscovery Centre, the National Centre for the Circular Economy. It assists social enterprises and community organisations in any part of Ireland to move their activities towards sustainability and embrace the circular economy.
Circular Economy and Recycling Technologies (P.Grad.Dip) (Trinity College Dublin)	This course will provide students with core knowledge of the Circular Economy concept as well as the relevant technologies used in the recycling area. Through a blended delivery of modules, this programme will explore topics such as life cycle assessment (LCA), waste management, waste rock reclamation, waters, and sludge treatment as well as recycling, reprocessing, and remanufacturing. It will allow students to develop a unique perspective of the design process to enable the recovery and reuse of materials. This programme is suitable for graduates who have achieved an upper second-class honours degree (at 2.1 or above) or the international equivalent in either science or engineering. Those with an equivalent professional qualification are also encouraged to apply.
Circular Economy in the Built Environment Course Mail (Irish Green Building Council)	This Course Mail Series is delivered in four emails. After signing up you will receive an automatic email from IGBC as confirmation. You will then receive the first Course Mail in the series and the next every week for four weeks. This series will take you through the basics in Circular Economy in the Built Environment with key principles and the latest research, covering four themed mailings: By completing the knowledge tests after each module (4 in total) you will be awarded 1 CPD hour. Certificates will be issued after successful completion of the tests. Available to anyone .
Circular Economy Skills Initiative (Fastrack into Information Technology)	FIT, WEEE Ireland, and the White Goods Association have come together to create a curriculum and formal career pathway for field service technicians to attract new entrants and create a steady supply into the sector to address a growing requirement with regard to maintenance, repair and recycling of white goods.
Ellen MacArthur Foundation Circular Economy Courses	A variety of learning opportunities and also recommend circular economy courses from other institutions, available to anyone .
Five Tools Teachers Can Use To Teach A Circular Economy (The Rediscovery Centre)	Five engaging resources teachers can use to introduce the circular economy to their students.
ME Manufacturing Engineering Zero Defect Manufacture for a Circular Economy (University College Dublin)	This masters merges manufacturing technical and technological aspects with innovation and entrepreneurship teaching, in the context of the global societal challenges, such as circular economy, industrial innovation and sustainability. Applicants must have completed a Bachelor's degree encompassing a minimum of 180 ECTS credits. Accepted bachelors degrees include: B.Sc. degree in Mechanical Engineering, Manufacturing Engineering, Computational Engineering,



	Mechatronics, Industrial Engineering or equivalent degrees. Students should have basic competence in engineering analysis, production operations, and mathematics including calculus, algebra, and mathematical statistics.
Pathways to the Circular Economy: Designing for Circularity to Unlock Opportunity (Engineers Ireland)	This full-day workshop is of benefit to a wide range of engineers and managers from various sectors and industries, including business owners, project managers, and site supervisors . It provides participants with a practical understanding of the circular economy, the barriers, challenges, opportunities, and impacts. In addition, to understanding the strategies to design practically for circularity before solutions are built. Ultimately, developing growth opportunities and reflecting on the responsibility we all play as designers in a rapidly changing ecosystem.

Appendix C

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