

THE DEMOCRACY GAP

Citizen Science, Digital Skills, and Ireland's Missing Innovation Pathway

A Policy Dossier for Ireland's EU Council Presidency 2026

By Seán Lynch

Geographer & Founder, OpenLitterMap & LitterWeek

December 2025 & January 2026

A Note to the Historical Record

This document serves as a contribution to the evolving historical record of Ireland's **geographic information science** innovation ecosystem in the first quarter of the 21st century ahead of our EU presidency in 2026.

The people of Ireland fought colonial powers for nearly a millennium to secure our independence and establish a republic. The defining unit of a republic is the citizen—not merely as a voter or subject of administration, but as an active participant in public life, whose agency, knowledge, and contribution the republic exists to serve.

Citizen science in Ireland is not new. Coastwatch has engaged volunteers in coastal biodiversity monitoring since the 1970s and plastic bottle mapping since 1991. What is relatively new is the *technological capacity* for citizens to generate structured, geotagged, machine-readable environmental data at unprecedented scale—and the persistent *institutional failure* to recognise or support the development of this capacity.

The research underpinning this document began in 2008. OpenLitterMap has since been cited **98 times** in academic literature, including in three *Nature* publications and by the **World Bank**. OpenLitterMap has been recognised by the UN-endorsed **Digital Public Goods Alliance**, adopted in **110+ countries**, used by several Universities, non-profits and companies, and has enabled the crowdsourcing of more than **0.5m geotagged observations with 850k+ tags**—making it one of the largest, oldest, and most comprehensive datasets on litter & plastic pollution in the world.

Yet a gap persists: internationally funded researchers cite OpenLitterMap, contribute to, and use its data—but there is no pathway to recognise let alone support the development of this fundamental category-defining research and innovation in Ireland. This document examines why—documenting the structural conditions that enable and constrain citizen contributions to public knowledge. It is offered as a **primary source** for future researchers examining how citizen-originated platforms navigated institutional structures in the early 21st century.

Table of Contents

A Note to the Historical Record	2
Table of Contents	3
Executive Summary	7
Part I: Background	8
About the Author.....	8
The Plastic Pollution Crisis.....	8
The Scale of the Problem.....	9
Health Implications.....	9
Microplastics and Human Health.....	9
Climate Change Connection.....	9
Why Citizen-Generated Data Matters.....	10
The Global Plastics Treaty and Ireland's Role.....	10
The Screen-Based Childhood Crisis.....	11
Mental Health Impacts.....	11
Physical Health Impacts.....	11
The Irish Context: CyberSafeKids Research.....	11
These Are Not Phones.....	12
The Missing Strategy.....	12
Citizen Science: Better, Safer, & More Equitable.....	13
Part II: The Infrastructure	14
OpenLitterMap: From Ireland to the World.....	14
OpenStreetMap.....	14
From OSM to OLM.....	14
What OpenLitterMap Has Achieved.....	14
Technical Architecture.....	14
Data Quality and Verification.....	15
LitterWeek: Digital Skills Through Environmental Action.....	15
DrugLitter.info: Ethical Data Handling.....	15
Longevity, Academic Foundation, and Global Reach.....	15
International Funding Comparison.....	15
Part III: The Policy Gap	16
The Open Source IP Problem.....	16
The Funding Catch-22.....	16
No Citizen Science Strategy.....	16
Research Ireland: Inherited Structural Assumptions.....	17
Impact 2030: No Citizen-Originated Pathways.....	17
DTIF: Structural Barriers to Solo Founders & Startups.....	17
Ireland's Limited SBIR: Innovation on Demand, Not by Design.....	17
Local Enterprise Offices: Geographic Innovation Gap.....	18
The Missing Function: Who Should Be Doing This Job?.....	18
International Contrast: Countries That Have This Function.....	18
Global Recognition: The Copenhagen Framework on Citizen Data.....	19
OECD Recommendations (April 2025).....	19
The Resource Paradox: Well-Funded Departments, No Citizen Science.....	20

Inside the Machine: 100s of Principal Officers, No Citizen Science.....	20
The 26-Year National Litter Monitoring System Without Maps, Open Data or Citizen Science.....	21
National Litter Monitoring vs OpenLitterMap: A Comparison.....	21
The Cost of Cleanups.....	23
The Oversight Gap.....	24
The Accountability Gap.....	24
OpenLitterMap Ireland: What Citizen Data Reveals.....	25
OpenLitterMap Ireland Statistics (April 2017 – December 2025):.....	25
A Note on Methodology.....	26
Academic Recommendations: Ignored.....	26
Part IV: The Reality of Geographic Education.....	28
The Geographic Tradition.....	28
A Global Abundance of Technology.....	28
The Education Gap.....	29
Geography & The Modern Problem-Solving Workforce.....	29
Educational Alignment.....	29
The Democratic Consequence.....	29
Part V: The Closed Loop—Industry Influence on Ireland's Knowledge Ecosystem.....	31
Stage 1: Childhood Education.....	31
Stage 2: Research and Innovation—The Catch-22.....	32
Stage 3: Environmental Monitoring—Outsource The Responsibility.....	32
Stage 4: Policy Development—For Who?.....	32
Stage 5: Innovation Recognition.....	33
The Closed Loop: A Complete System.....	33
The Question of Cui Bono.....	33
Citizen Actions.....	34
Part VI: What Litter Data Tells Us About Public & Democratic Health.....	35
The Obesity Epidemic.....	35
The Screen Crisis: A Parallel Epidemic.....	36
The Pattern We Teach Ourselves—But Cannot Practice.....	36
Democracy: One Vote Every Four Years, or Continuous Participation?.....	36
The Democratic Stakes.....	37
Part VII: Policy Alignment.....	38
Harnessing Digital – The Digital Ireland Framework (2022).....	38
Digital Strategy for Schools to 2027.....	38
Education for Sustainable Development to 2030.....	38
Climate Action Plan 2025.....	38
Shared Island Initiative.....	38
National AI Strategy.....	39
Programme for Government 2025.....	39
Online Health Taskforce Report (Published December 2025).....	39
Part VIII: International Comparison.....	41
National Citizen Science Frameworks.....	41
Global Citizen Science Platforms.....	42
Litter & Marine Debris Citizen Science.....	42
European Citizen Science Infrastructure.....	43

COST Action IC1203 ENERGIC (European Network for Advancing Geographic Information):.....	43
Case Study: Plastic Pirates – Go Europe! (€2M Horizon Europe).....	43
UNEA-7 Statement on Science (December 2025).....	44
What Success Looks Like.....	45
Part IX: Ireland’s EU Presidency.....	46
The Choice.....	46
The German Benchmark.....	46
Cork City: Home of OpenLitterMap—Hosts EU Mayors Summit on Climate & Health.....	46
European Maritime Day 2025: A Case Study in Institutional Blindness.....	47
The Boolean Paradox.....	47
The Austrian Contrast.....	47
The Question for EU Institutions.....	47
What Must Happen Before July 2026.....	48
Immediate Actions (January–March 2026).....	48
Presidency Period Actions (July–December 2026).....	48
Post-Presidency Structural Reforms.....	49
Research Infrastructure.....	49
Funding Reform.....	49
Academic Capacity.....	50
Presidency Legacy Outcome.....	51
The Stakes.....	51
Part X: The Cost of Inaction.....	52
The Cost of a Single Opportunity.....	52
1. No Smartphone Training.....	52
2. Weakened Digital Innovation Cluster.....	53
3. Wasted Taxpayer Contributions.....	53
4. Reputation.....	54
5. Lost Research Capacity.....	54
Part X-B: Signs of Progress (December 2025).....	55
Part XI: Recommendations.....	56
Tier 1: Immediate Actions (No Budgetary Requirement).....	56
1.1 Ministerial Acknowledgment.....	56
1.2 Departmental Coordination Lead.....	56
1.3 Interdepartmental Briefing.....	56
Tier 2: Pilot Implementation Measures.....	57
2.1 Local Authority Pilots.....	57
2.2 ETB Digital Skills Integration.....	57
2.3 Combined Investment.....	57
2.4 Data-Sharing Framework.....	57
Tier 3: Structural Reform Measures.....	58
3.1 National Citizen Science Strategy.....	58
3.2 Research Ireland Citizen Innovator Pathway.....	58
3.3 Irish SBIR Equivalent.....	58
3.4 Geographic Innovation Support.....	59
Tier 4: Presidency-Level Actions (July–December 2026).....	59

4.1 Citizen-Generated Data Standards.....	59
4.2 Citizen Science Presidency Showcase.....	59
4.3 European Mayors' Summit Integration (Cork, October 2026).....	60
4.4 OECD Policy Review.....	60
4.5 Participatory Research Leadership.....	60
Part XII: Documented Effort (2008–2025).....	61
Stage 1: Fundamental Research & Concept Development.....	61
Stage 2: Literature Review & Methodology Development.....	61
Stage 3: Self-Taught Software Engineering & Platform Launch.....	61
Stage 4: Continuous Development & Structural Obstacles.....	62
Stage 5: The Death of GeoTech Innovations Ltd & Birth of LitterWeek.....	62
Academic Impact (2018–2025).....	62
Case Study: Engine Lease Finance (2021).....	63
Recent Activity (2024–2025).....	63
Platform Scale (28th December 2025 10.30pm GMT+1).....	63
Cumulative Record.....	64
Conclusion.....	64
Part XIII: Accountability & Progress.....	65
Final Note: The Historical Record.....	66
Contact & Resources.....	67
Appendices.....	67

Executive Summary

Citizen science is democratic infrastructure. This determines who gets to participate in society and generate knowledge. With plastic pollution infiltrating human bodies and digital content augmenting our relationship with reality—enabling & training citizens to contribute meaningfully to legitimate public knowledge is not merely desirable—it is essential for democratic vitality and public health.

Ireland possesses significant citizen science infrastructure and capacity. As of December 2025, OpenLitterMap—recognised by the Digital Public Goods Alliance (a UN-endorsed initiative)—has enabled citizens in 100+ countries to crowdsource more than **500k+ geotagged environmental observations and 800k+ individual tags**—creating one of the largest, oldest, and most comprehensive databases of tagged litter photos in the world. Inspired by OpenStreetMap, all of the code and data is available open source allowing anyone interested to participate in any aspect of the research and innovation—data collection, software engineering, analysis, etc. LitterWeek extends this with a more compelling narrative and teaches these digital skills through a structured training programme.

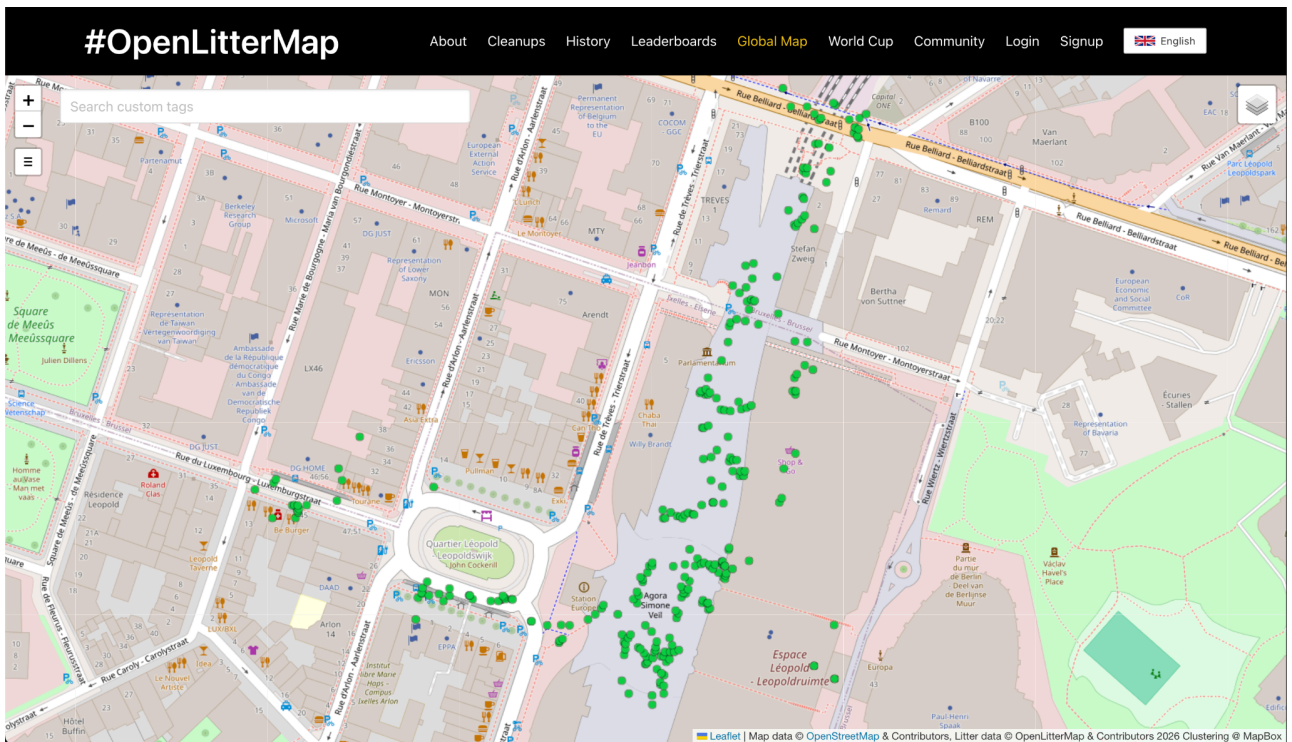
Ireland's innovation architecture is not designed to recognise citizen (incl. postgraduate) innovation. Citizen science for **biodiversity** receives *some* institutional-led support (e.g., Shared Island invasive species programme, National Biodiversity Data Centre), but citizen science for **litter and plastic pollution**—which can create links to political & industrial accountability—has no pathway. This is not accidental.

Ireland's EU Council Presidency (July–December 2026) offers a strategic window to address this gap by creating pathways that recognise & evaluate citizen-originated platforms ability to contribute to national & international priorities and obligations. During Germany's EU Presidency in 2020, the Federal Ministry of Education and Research championed and scaled the Plastic Pirates – Go Europe! citizen science programme which was supported by €2M+ in EU funding who collected 93,700 items across 13 countries before ending in May 2025.

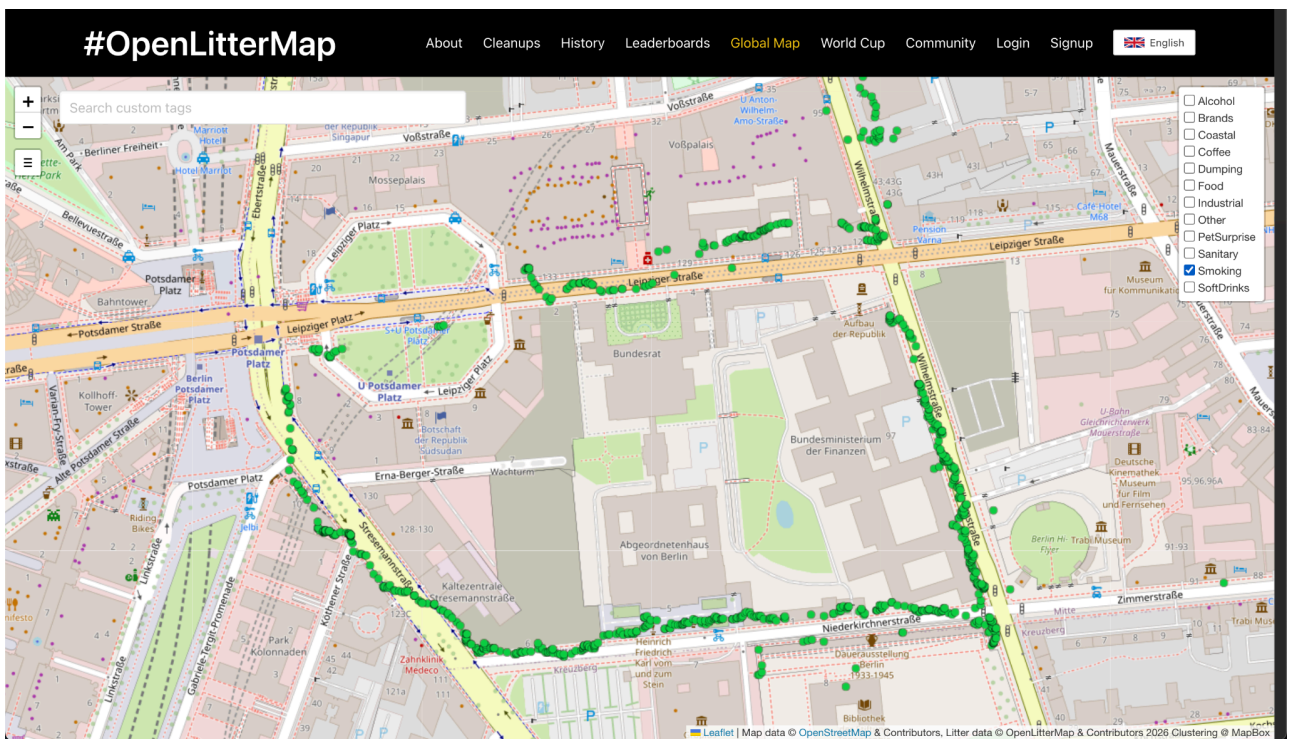
If we are going to give society access to highly advanced supercomputers we need to teach and demonstrate to people how and why to use them safely & appropriately i.e. as scientists and citizens—not just as passive consumers.

There is a common misconception that citizen science is an environmental volunteering charity. It is not. This is about democratic inclusion: who has a right to participate in society and generate knowledge?

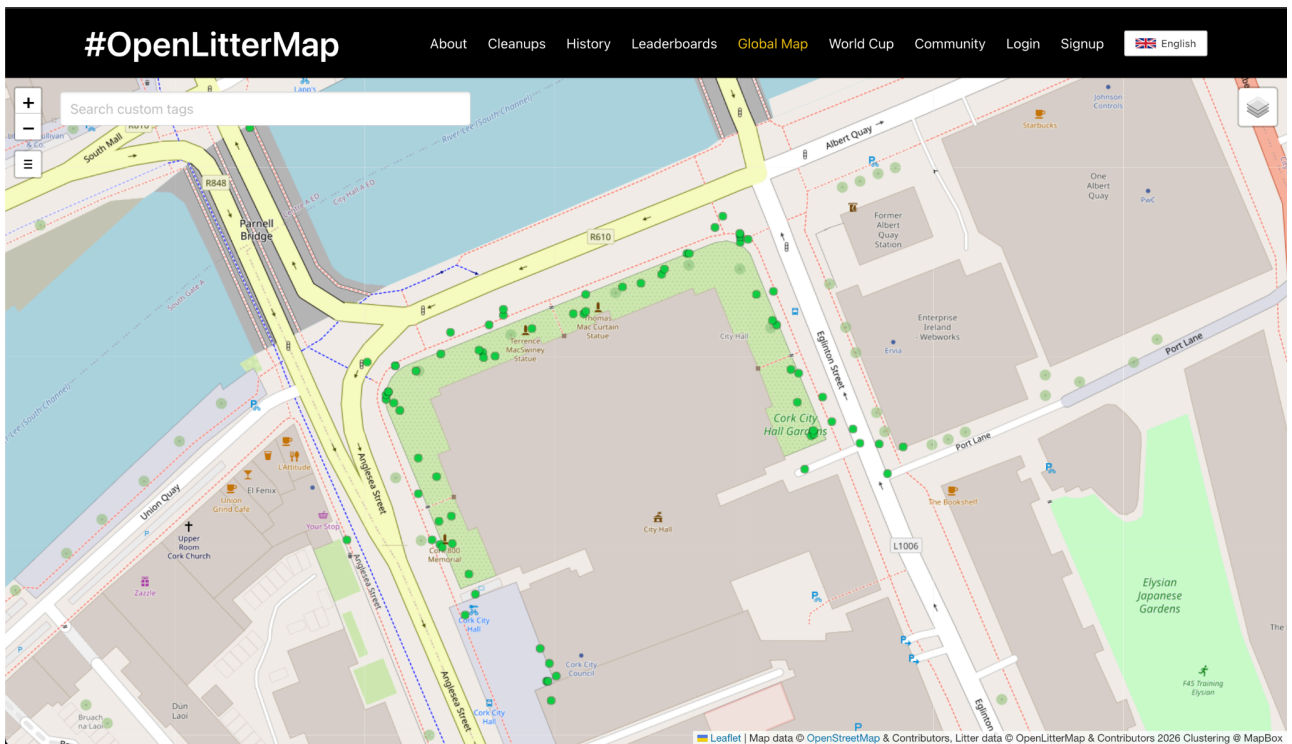
Recent engagement in December 2025 with Cork City Council, Tyndall EDIH, and school leaders demonstrates that when pathways open, progress follows.



Litter mapped outside the EU Parliament in Brussels, August 29th 2024.
<https://openlittermap.com/global?lat=50.83982882748275&lon=4.373890225172331&zoom=17.81>

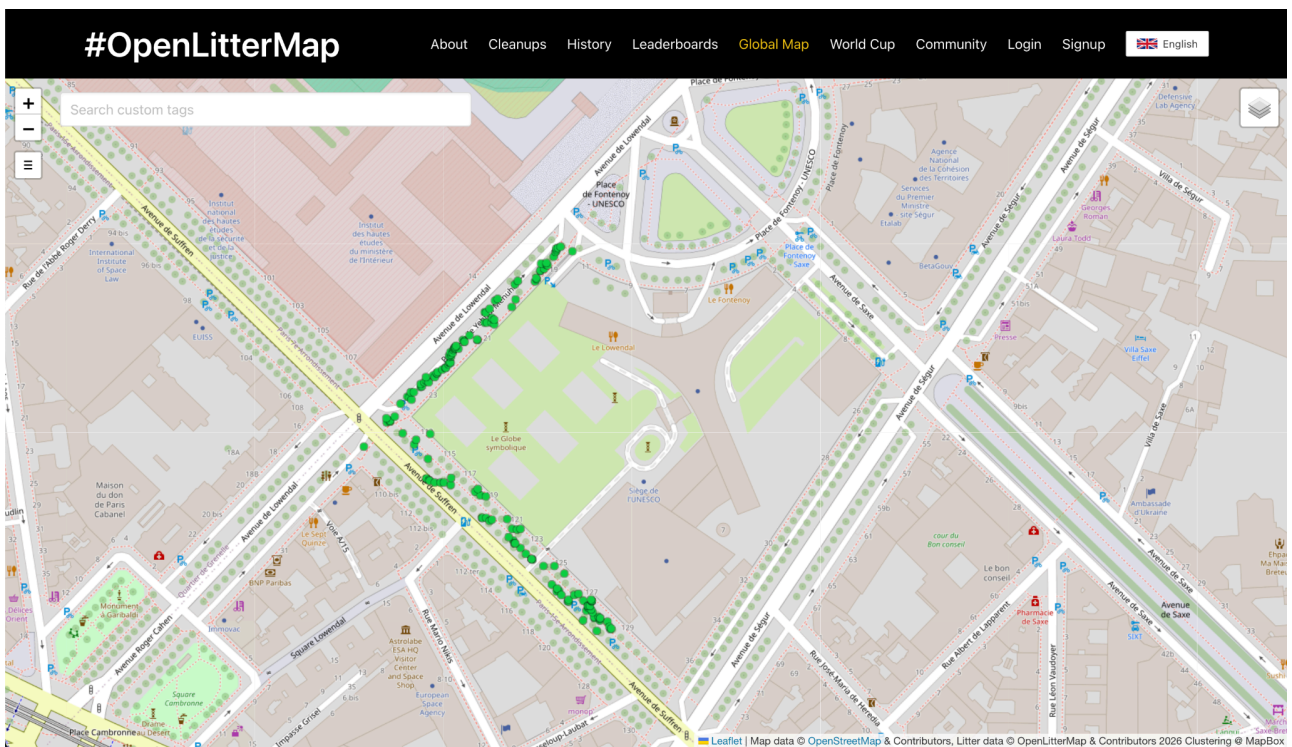


Smoking related litter outside the Bundesrat, the Federal Government Buildings of Germany
<https://openlittermap.com/global?lat=50.83982882748275&lon=4.373890225172331&zoom=17.81>



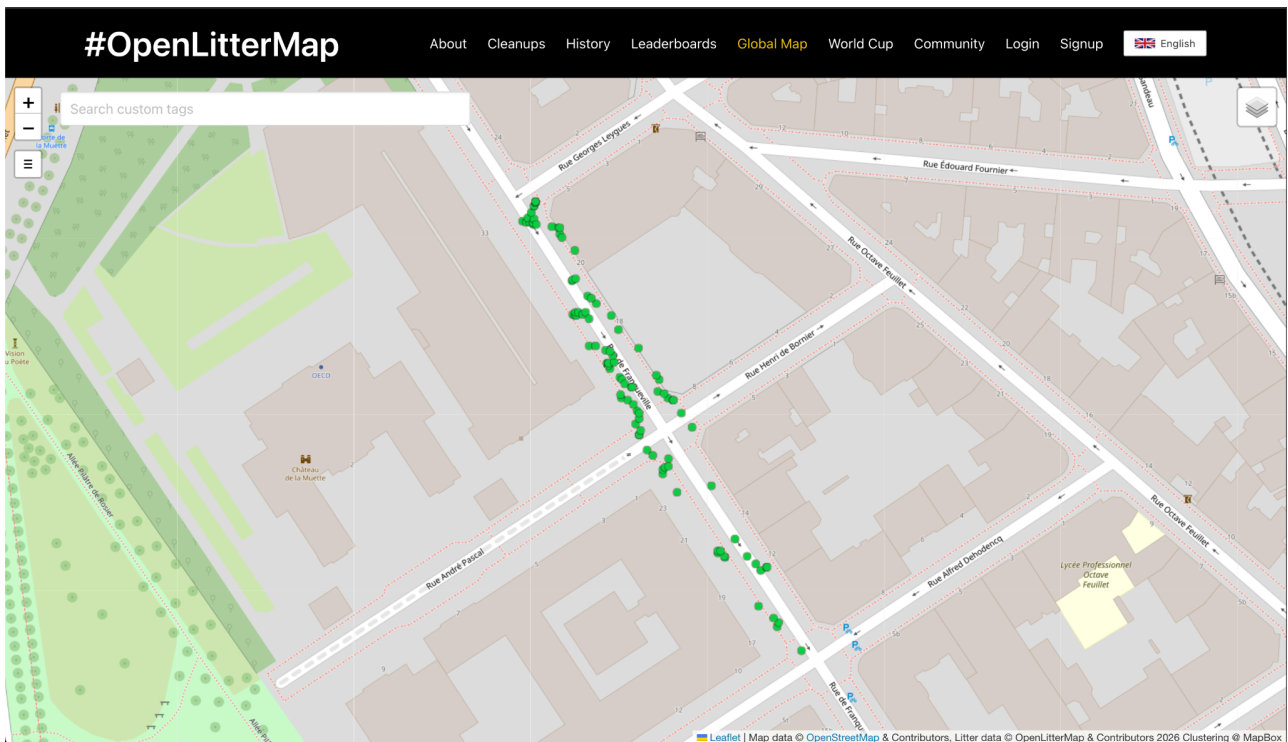
Litter mapped outside Cork City Hall, October 15, 2025

<https://openlittermap.com/global?lat=51.89711103897302&lon=-8.465621348705149&zoom=18.89>

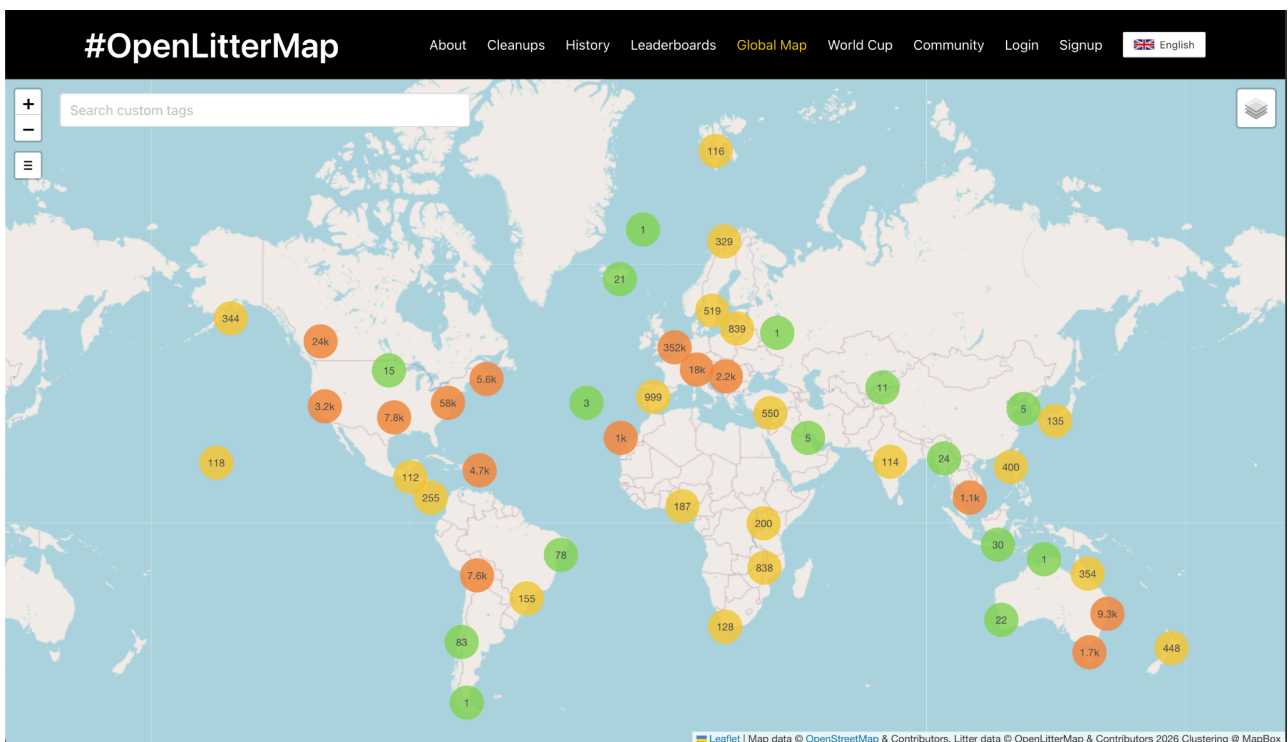


Litter mapped outside UNESCO headquarters in Paris on the 1st of January 2026 to mark the beginning of the year that Ireland will host the EU Presidency for 6-months

<https://openlittermap.com/global?lat=48.849445623185524&lon=2.305867552437682&zoom=17.78>



Litter mapped outside OECD headquarters in Paris on the 1st of January 2026 to mark the beginning of the year that Ireland will host the EU Presidency for 6-months
<https://openlittermap.com/global?lat=48.86156011590267&lon=2.2704970285172665&zoom=18.69>



The global OpenLitterMap. 100% open source, 100% open data, 100% citizen developed & contributed. All data loads in 30kb and 30ms. Keep the map open to see live updates!
<https://openlittermap.com/global>

Part I: Background

About the Author

Seán Lynch is a geographer and software engineer based in Cork City, Ireland. He holds dual Masters degrees in GIS & Remote Sensing (UCC, 2013-14) and Coastal & Marine Environments (NUIG, 2014-15); a BA in Geography & Economics (UCC 2008-2011); trained as a tropical divemaster (2011-12) which gave him his north star; and enjoys snorkeling in Atlantic kelp forests off the Irish coast when he is not working on the development of citizen science.

Seán's research on the citizen science of litter & plastic pollution began in the pre-iPhone era as an undergraduate Geography student at UCC the day he was introduced to GIS in 2008. Mesmerized by the potential of combining concepts of gamification with live interactive digital maps, he theorised that if you could empower community members with GPS instruments and digital cameras they could tell an important story about civic issues that were important to them—eg. Litter, broken footpaths, anti-social behaviour, volunteer actions, etc—crowdsourcing important data that would help local authorities make better decisions and influence national policy. During his first M.Sc. in 2013 he conceptualised OpenLitterMap the day he was introduced to OpenStreetMap. Unable to find its real-time data collection layer, he chose litter as the first application of a real-time data collection, reporting, citizen engagement & geosocial skills training layer for society & the internet. After taking out a €20,000 loan to do a second M.Sc.—wrongly thinking there would be some kind of an opportunity—he dove into the literature on litter, plastic pollution & citizen science before teaching himself how to code and finally launching OpenLitterMap in 2017. Seán has continued to self-finance and advance the development of OpenLitterMap independently by working and upskilling as a full-stack software engineer for small, medium and large organisations by day who have helped improve his skills for becoming more productive on evenings and weekends. In 2019 Seán registered a company *GeoTech Innovations Ltd.* to apply to Science Foundation Ireland's *Discover Programme* for support to try to catch up with a recently publicly funded \$1.5M litter app grant in the US. After doing x2 masters, teaching himself how to code, launching the MVP which achieved 100k uploads in 80+ countries, and then setting up the company and accounts, Science Foundation Ireland said they wouldn't even read the proposal. Despite some success and bootstrapping for more than 5 years, after more than 200+ funding rejections GeoTech died in 2024 after being rejected once again (for the final time) by the newly established *Research Ireland* who rejected supporting the development of the LitterWeek proposal and the underlying data collection OpenLitterMap methodology.

More recently, Seán's workflow has been transformed by AI enabling him to become incredibly more productive. He continues to build and is currently accepting pilots for a new LitterWeek digital skills training programme to teach about the data collection purpose of technology and empower people with the production of geographic information to complement a significantly improved OpenLitterMap that is scheduled to launch in 2026¹.

The Plastic Pollution Crisis

Litter and plastic pollution possess characteristics that make them uniquely suited to citizen science:

- **Globally ubiquitous**—present on nearly every street, every community, and every region.
- **Easily quantifiable**—requires no specialist training or equipment.
- **Notorious**—widely understood, requiring no persuasion of its significance.
- **Immediately rewarding**—participants experience direct results from their cleanup & data collection efforts.

These characteristics give litter mapping a **remarkably low barrier to entry**—allowing anyone with a smartphone to contribute meaningful data.

¹ <https://github.com/OpenLitterMap/openlittermap-web/pull/668>

This contrasts sharply with many other environmental challenges and activities. Climate change requires specialist equipment to measure atmospheric changes in parts per million. Biodiversity identification requires a PhD in ecology to correctly classify a bee. Litter requires a €50 device and a willingness to participate.

The Scale of the Problem

By 2019, the world produced over **460 million tonnes of plastic annually**², with millions of tonnes leaking into the environment each year. The Ocean Cleanup estimates there is approximately **300 million tonnes of plastic already in the ocean**³, with even more accumulated on land. Less than 10% of all plastic ever produced has been recycled (Geyer et al., 2017). Understanding this problem requires mapping at a scale no agency can achieve alone. The involvement of millions of people is necessary to transform our understanding and relationship with plastic, technology and the environment. This is not only necessary to map the scale of plastic pollution, but the involvement of people is critical for both proactive environmental and technological literacy.

Health Implications

Two interconnected health crises define our generation: **microplastics infiltrating human bodies** and **screens reshaping our brains**. Both are consequences of technology deployed without adequate understanding of long-term effects. Both require inclusive citizen engagement to monitor and address.

Microplastics and Human Health

Microplastics—plastic fragments smaller than 5mm—have become ubiquitous in the human body. Research has detected microplastics in blood, lungs, liver, brain tissue, placenta, and reproductive organs. Scientists estimate people **inhale approximately 68,000 microplastic particles daily** and may consume the equivalent of a credit card's worth of plastic weekly through food, water, and air (Yakovenko et al., 2025).

A landmark 2024 study published in *The New England Journal of Medicine* found that patients with microplastics in their carotid arteries had a **~4.5-fold increase in major adverse cardiovascular events** (Marfella et al., 2024). Studies have linked microplastic exposure to inflammation, oxidative stress, immune system impairment, gut microbiome disruption, and potential impacts on fetal development. Research published in 2025 demonstrated microplastics moving through mouse brains and blocking blood vessels.

As Stanford Medicine researchers noted in January 2025⁴: *"We're born pre-polluted"*. Microplastics have now been found in over 1,300 species, and scientists believe all plastic ever made—besides what has been incinerated—still exists in some form.

Climate Change Connection

A 2023 OECD report states that over 90% of plastics are made from fossil fuels⁵. In 2019, plastic production alone emitted **2.2 billion tonnes of greenhouse gases**—accounting for 3-5% of global emissions (OECD, 2022). Greenhouse gases are released at every stage: extraction, refining, manufacturing, transportation, and disposal.

If plastic production continues to grow as projected (tripling by 2060), the plastics industry could consume **21-31% of the entire global carbon budget** required to limit warming to 1.5°C (Karali et

²

<https://www.oecd.org/en/about/news/press-releases/2022/02/plastic-pollution-is-growing-relentlessly-as-waste-management-and-recycling-fall-short.html>

³ <https://theoceancleanup.com/faq/how-much-plastic-is-in-the-ocean/>

⁴ <https://med.stanford.edu/news/insights/2025/01/microplastics-in-body-polluted-tiny-plastic-fragments.html>

⁵ https://www.oecd.org/content/dam/oecd/en/publications/reports/2023/05/climate-change-and-plastics_d3364145/5e0bfe87-en.pdf

al., 2024). The World Economic Forum identifies plastics as *"the fastest-growing source of industrial greenhouse gas emissions."* Plastic pollution in oceans is believed to interfere with the ocean's capacity to absorb and sequester carbon dioxide as life becomes increasingly contaminated and loses its resilience (CIEL, 2019).

Why Citizen-Generated Data Matters

Citizen-generated litter data transforms plastic pollution from a distant, abstract crisis into something *immediately local, easily accessible, and personally relatable*—bridging the gap between global emergency and community action. Litter mapping empowers people—involving them directly in creating knowledge that can transform not just their own, but wider societies' understanding of how polluted local communities are, while generating data on producer responsibility, institutional accountability, and the effectiveness of interventions.

The Global Plastics Treaty and Ireland's Role

In March 2022, the United Nations Environment Assembly agreed to develop a legally binding international instrument to end plastic pollution. Negotiations have continued through five Intergovernmental Negotiating Committee (INC) sessions, with INC-5.3 scheduled for February 2026—**overlapping directly with Ireland's EU Presidency.**

Ireland is a member of the **High Ambition Coalition to End Plastic Pollution**—a group of 60+ countries advocating for a strong, legally binding treaty addressing the full plastic lifecycle. But what resources has Ireland committed?

Consider Norway, a fellow leading Coalition member. In 2024, Norway announced **NOK 1 billion (approximately €85 million)** to prevent plastic pollution⁶, explicitly supporting citizen engagement and local monitoring initiatives. Norwegian researchers argue their country "should lead the fight against plastic pollution" through community-based data collection and international cooperation.

Ireland allocates **€27+ million annually** to circular economy activities—waste management, recycling infrastructure, industry innovation grants⁷. Yet **none of this supports citizen science capacity**, despite treaty requirements for improved monitoring and despite hosting a globally-leading UN-recognised citizen engagement platform.

Ireland's contribution to citizen science capacity for litter & plastic monitoring: €0.

The treaty explicitly calls for improved **monitoring and reporting** of plastic pollution. The International Science Council, in its recommendations for the treaty, specifically states that *"local communities, particularly in remote areas, can contribute valuable grassroots data to complement scientific efforts"* and that *"effective training and standardization can help incorporate citizen science into formal monitoring systems."*⁸

This raises questions for Ireland:

- **What funding is Ireland planning on contributing to the development of citizen science capacity for treaty monitoring?**
- **What role does Ireland envision for citizen-generated data in implementing treaty obligations?**
- **Has Ireland engaged with any citizen science platforms that could contribute to treaty monitoring?**

⁶ <https://www.regjeringen.no/en/whats-new/nok-1-billion-to-prevent-plastic-pollution/id3035768/>

⁷

<https://www.gov.ie/en/department-of-climate-energy-and-the-environment/press-releases/27-million-to-accelerate-ireland-s-circular-economy-transition/>

⁸

<https://council.science/blog/monitoring-plastic-pollution-key-elements-for-a-science-based-framework-for-a-global-plastic-s-treaty/>

• **Why is Ireland advocating for strong global monitoring requirements while ignoring globally leading domestic citizen monitoring infrastructure in Cork South Central—constituency of Ireland’s current Taoiseach and EU Commissioner for Democracy Justice & Rule of Law?**

OpenLitterMap has 500,000+ geotagged observations with 850,000+ tags from 100+ countries—**exactly the kind of citizen-generated monitoring data the treaty requires**. It was conceptualised and built in Ireland, long before many realised the data collection purpose of technology or the scale of plastic pollution. Yet Ireland has provided zero funding, zero recognition, zero early-stage career development pathways and zero engagement with its potential role in treaty implementation.

Ireland cannot claim to support a Global Plastics Treaty that requires citizen monitoring while simultaneously refusing to recognise the citizen monitoring infrastructure developed by an Irish citizen. This is not ambition. It is incoherence.

The Screen-Based Childhood Crisis

Since the launch of the iPhone in 2007, over **5-6 billion people have been connected online with no training** in the data collection purpose of technology. Imagine drivers with no licences, no rules of the road, no guidance, no theory, and no responsible demonstration to adhere to. The results are predictable.

Mental Health Impacts

Research consistently shows that adolescents who use social media for **more than three hours per day face twice the risk** of negative mental health outcomes, including depression and anxiety. A 2024 systematic review found frequent social media use strongly associated with lower self-esteem, depressive symptoms, anxiety, and other mental health challenges in children.

In June 2024, the U.S. Surgeon General called for **warning labels on social media platforms**⁹, citing growing evidence of harm to young people's mental health. A Nature study (Fassi et al., 2025) found adolescents with mental health conditions spend more time on social media and experience greater negative impact from online feedback on their mood.

The mechanisms are well-documented: social comparison, cyberbullying, sleep disruption, exposure to harmful content, and the displacement of in-person social interaction. A Pew Research survey (2025) found the share of teens who credit social media as a support system has **declined from 67% in 2022 to 52% in 2024**—suggesting that even young people recognise diminishing returns.

Physical Health Impacts

Screen time fosters sedentary lifestyles, contributing to childhood obesity and associated risks including hypertension, diabetes, and cardiovascular disease. American children spend an average of **5-7 hours daily on screens**¹⁰. Research links excessive screen use to attention-deficit symptoms, sleep disturbances, reduced physical activity, and unhealthy eating patterns.

The Irish Context: CyberSafeKids Research

Irish children's online experiences mirror international trends. CyberSafeKids' *"Left To Their Own Devices"* report (2024), based on surveys of over 7,000 children aged 8-14 across Ireland, reveals alarming patterns:

- **93% of 8-12 year olds** have their own smart device (rising to 99% of 12-15 year olds)
- **71% of 8-12 year olds** have social media accounts despite minimum age restrictions of 13
- **82% of children** have unsupervised device access

⁹ <https://www.nytimes.com/2024/06/17/opinion/social-media-health-warning.html>

¹⁰ <https://acpeds.org/media-use-and-screen-time-its-impact-on-children-adolescents-and-families/>

- **83% of primary school children** have internet-connected devices in their bedrooms
- **63%** are allowed devices in bedrooms overnight

Screen time dominates Irish children's waking hours: **56% go online straight after school**, 39% use devices just before falling asleep, and 11% reach for them first thing in the morning.

Children themselves recognise the problem: **48% acknowledge they spend too much time online**, 30% feel they waste time online, and 24% find it hard to switch off. Only **27% believe being online is mostly good for them**.

Most concerning: almost a third of children have been bothered or upset by something online, but **only half spoke to a parent or trusted adult**. Only 35% said their parents can see what they're doing online. As CyberSafeKids CEO Alex Cooney noted: *"We urgently need to provide better support to parents so they feel more confident about engaging with their children about their online activity."*

These Are Not Phones

Before discussing strategy, we must correct a fundamental conceptual misframing. **These are not phones.**

The telephone is a Victorian-era concept invented and patented by Alexander Graham Bell in 1876 which facilitated voice communication over a distance. For over a century, that is what telephones did—they transmitted voices from one fixed location to another.

The devices of today are not phones. They are **always-online mobile supercomputers**. These instruments contain significantly more processing power than the Apollo guidance systems that brought humans to the moon. They know your location, your contacts, your browsing history, your purchases, your sleep patterns, your taps and swipes, your facial recognition, your fingerprint, your face ID, and your physical movements.

The primary purpose of these devices is not communication. The primary purpose is **data collection**. Every tap and every click can extract data from users and record it. These are panoptic surveillance instruments disguised as fashionable entertainment accessories.

When we call these devices "phones," we import a century of assumptions about what they are for. We miss the fundamental transformation that has occurred. A more appropriate term could be "hand-sized supercomputers".

The question is not whether children should have "phones." The question is: who controls the data these devices collect and who influences the algorithms that deliver and tailor content?

Currently, that data flows to organisations whose business model is attention maximisation and is largely human-centric. Citizen science offers an alternative: instead of passive consumption of past events, empower yourself with active data production for public benefit in the present—built on open source code in the public domain, with non-human data input and complementary safety & privacy training, contributing to knowledge that serves society and broadens democratic inclusion. That is a fundamentally more purposeful and equitable use of our global abundance of data collection technology.

If we are going to give children supercomputers, we should teach them to use them like scientists and citizens to help their community and engage with nature—not like consumers to passively help giant human-centric data collection corporations.

The Missing Strategy

Nearly two decades after the smartphone revolution we have:

- **No smartphone strategy.**
- **No plan, no training and no direction.**
- **No responsible demonstration** of constructive technology use.
- **Only reactive measures:** bans, phone pockets, GDPR compliance.

These measures may address temporary classroom attention symptoms, but they do not address the root issue: **people don't know how to navigate the internet safely, create healthy barriers, and generate meaningful utility from the data collection purpose of these devices.**

Citizen Science: Better, Safer, & More Equitable

Citizen science is a better, safer, and more equitable use of technology than doomscrolling on social media. Citizen science transforms smartphones from passive consumption devices of past events into instruments for active citizenship. "Citizen science" (i.e. open, reproducible, and participatory science—*the real science*) is a temporary term used to overcome a corrupted institutionalisation of who is allowed to participate and contribute to the production of knowledge. This is designed to bring people out of their homes and into their communities. Citizen science demonstrates that technology can quantify complex geosocial and environmental phenomena at unprecedented scales, engage people in positive action, and generate knowledge that serves society rather than maximising attention extraction for advertising revenue.

Part II: The Infrastructure

OpenLitterMap: From Ireland to the World

OpenLitterMap is an open-source citizen science platform enabling anyone to map litter and plastic pollution in real-time. Litter is just the first application of this real-time impact mapping technology. To understand the origin of OpenLitterMap, you must first understand what inspired it.

OpenStreetMap

OpenStreetMap (OSM) is the most comprehensive map of the world ever created—crowdsourced by over 10-million volunteers who have collectively mapped roads, buildings, trails, and infrastructure that commercial & institutional mapping services had overlooked or paywalled. Unlike many proprietary services, all of the code & data that supports OSM is freely available for anyone to download, reuse, and build anything with, without permission. OSM demonstrates that distributed citizen effort can produce geographic data superior to proprietary alternatives. Today, OSM data underpins Apple Maps, Facebook, Snapchat, humanitarian response efforts, and countless applications worldwide. It has become the *de facto* standard for accessing geographic information.

However, OSM lacks a real-time data collection layer. While OSM excels at mapping static infrastructure—roads, buildings, boundaries, simply adding a point to the map is cumbersome. This requires a different approach—one that captures not just location, but time, evidence, and categorical detail—simple, fast and effectively.

From OSM to OLM

In 2013, OpenLitterMap was conceived as this missing real-time data collection layer to overlay OSM. Litter and plastic pollution is **the first application** of this technology. The same technology can be used to map anything, anywhere in real-time. Potholes, blocked gutters, biodiversity, etc. Simply upload a photo to OLM and generate a unique geolink that you can use to send anyone to any observation globally in real time. *It's like Pokémon Go for TidyTowns meets FixMyStreet on steroids.*

What OpenLitterMap Has Achieved

- **500,000+ geotagged observations** with 850,000+ individual tags making it one of the largest, oldest & most comprehensive databases of litter and plastic pollution in the world.
- **Users in 100+ countries** with many daily, weekly and monthly recurring users.
- **UN Digital Public Good** recognition by the Digital Public Goods Alliance who identify open source projects that can help accelerate the attainment of the SDGs.
- **98+ peer-reviewed academic citations** including x3 Nature and the World Bank.
- **Automated reporting** via twitter bot @OLM_bot every day/week/month/year.
- **Open source code** (GPL-3.0) on GitHub with dozens of contributors.
- **Built on AWS** through the Amazon Sustainability Data Initiative.
- **Featured in several blogs** including AWS Public Sector Blog (February 2023).

Technical Architecture

The platform uses Laravel (PHP) backend, Vue.js frontend, MySQL database, Redis for caching, and AWS infrastructure. Mobile apps (React Native) for iOS and Android. All code is available open source under GPL-3.0 on GitHub.

OpenLitterMap is currently undergoing its **most significant transformation to date**—an AI-driven upgrade which will significantly improve the tagging schema, visualisations, and enhancing automated data analysis and report generation capabilities.

Data Quality and Verification

Unlike social media platforms where content flows unmoderated, OpenLitterMap implements structured data verification. For years, all uploads from new users were manually reviewed by a small team of administrators. Trusted users can achieve automatic verification. Tags follow a standardised schema ensuring consistency across contributors, geographies & languages. This verification layer means the data is not just voluminous—it is auditable, correctable, and trustworthy allowing us to train AI systems if we had the time & resources. However, due to the lack of opportunity, manual verification & all other processes have fallen significantly behind.

LitterWeek: Digital Skills Through Environmental Action

To extend the academic data collection infrastructure, LitterWeek (<https://litterweek.org>) is a structured digital skills training programme that teaches responsible smartphone use through environmental data collection—**transforming citizens from passive scrollers to active data producers**. Designed for Education and Training Boards (ETBs), schools, individual, volunteer groups, and local authorities, the curriculum includes:

- Smartphone training and privacy fundamentals.
- Data collection methodology and quality assurance.
- Environmental awareness and litter identification.
- Open data principles and civic participation.
- Connection to UN Sustainable Development Goals.

DrugLitter.info: Ethical Data Handling

DrugLitter has been separated for mapping drug-related litter paraphernalia. DrugLitter.info demonstrates responsible handling of sensitive data—contributing to harm reduction without stigmatisation. A **7+ year collaboration with a HSE social worker** has produced a continuous dataset on drug-related paraphernalia in Cork City—potentially one of **the most comprehensive datasets on drug-related litter in the world**. This represents a model for engagement with complex social issues, demonstrating that sensitive environmental health data can be collected ethically and used constructively to aid the delivery of contentious public health services.

Longevity, Academic Foundation, and Global Reach

The research underpinning OpenLitterMap began in 2008 as an undergraduate project at UCC. The platform concept emerged in 2013 when introduced to OpenStreetMap during a Masters in GIS & Remote Sensing. After completing a second Masters and self-teaching software engineering, the platform launched in 2017. This is **geosocial infrastructure**—geography, society, and technology in service of public knowledge. Key differentiators:

- **Research since 2008, platform launched 2017**—8 years of continuous operation.
- **Dual Masters degree foundation** (GIS & Remote Sensing, UCC; Coastal & Marine Environments, NUIG).
- **Global adoption without institutional backing**—proof of concept through market validation.
- **UN recognition achieved independently**—demonstrating international standards compliance.

International Funding Comparison

Comparable citizen science platforms have received significant government funding internationally. This comparison illustrates the recognition gap:

- **New Zealand: \$2.7 million**—government support for national marine debris monitoring.
- **United States: \$1.5 million**—federal funding for global citizen science data collection.
- **Ireland: €0.**

Part III: The Policy Gap

The EU's **European Democracy Shield**¹¹ (November 2025) calls for a "whole-of-society approach" to democratic resilience, recognising that defending democracy requires strengthening connections at all levels—from institutions to individual citizens. It commits to "encouraging and supporting grassroots initiatives that bring together people of different ages and backgrounds and strengthen local connections." Yet the policy infrastructure to recognise citizen-led innovation does not exist.

Ireland's research and innovation funding architecture evolved to support top-down institutional research which is built on IP transfer from the individual researcher to the host institution. The following analysis identifies specific gaps—not to criticise existing structures, but to identify where complementary pathways should be created.

The Open Source IP Problem

EU research funding (Horizon Europe, ERC) requires consortia and institutional leads. Universities require IP transfer. But **open source code—which underpins 95% of the web—cannot transfer IP** which is in the public domain—where it often belongs. AI now enables individuals to build what previously required teams. Yet there is no clear or dedicated EU pathway for citizens building or maintaining open source digital public infrastructure for modern societies. This is a structural policy blind spot: EU programmes support institutions but lack instruments for recognising proven and pioneering digital public goods built by citizens.

The Funding Catch-22

As one of many examples, the European Research Council offers **€150,000 "Proof of Concept" grants**¹² to translate research into societal and commercial applications. However, eligibility requires affiliation with a Host Institution like a University. Independent innovators who have already built proven platforms cannot participate as Host Institutions require IP transfer which is incompatible with open source. To complicate things further, Irish Universities don't have any openings for emerging category-defining research and innovation in citizen science anyway so there is no position to apply for. The result is nothing original gets built without significant personal sacrifice.

Research Ireland (formerly SFI) offers early-career opportunities, but some of these require **completion of a PhD. Ireland has no PhD programmes or early-career innovation pathways in citizen science.** An independent researcher cannot obtain the credential that would make them eligible for funding, because the field has no institutional pathway or recognition.

The result is a triple lock: no institutional pathway → no PhD pathway → no IP-compatible pathway. Independent citizen science innovators are structurally excluded regardless of what they have built or achieved.

No Citizen Science Strategy

Despite a global abundance of data collection technology absorbed by a significant percentage of the population, Ireland does not have a national citizen science strategy. While the National Biodiversity Data Centre operates limited sector-specific programmes (particularly for biodiversity monitoring through projects like the Irish Butterfly Monitoring Scheme), there is no overarching framework for citizen science across environmental, social, or technological domains.

Countries including Germany, Austria, and Switzerland have developed national citizen science strategies that provide coordination, funding & career development pathways, and quality

¹¹ https://commission.europa.eu/publications/european-democracy-shield-documents_en

¹² <https://erc.europa.eu/apply-grant/proof-concept>

frameworks^{13,14,15}. Germany's *White Paper Citizen Science Strategy 2030* (2022) contains 94 action recommendations across 15 thematic fields, building on a decade of federal investment through the Ministry of Education and Research (BMBF). Austria's *Sparkling Science* programme funded 299 citizen science projects with €34.7 million between 2007 and 2019, with a successor programme launched in 2021. Switzerland published *Citizen Science in Switzerland: Taking Stock and Ways into the Future* (2024) through its Academies of Arts and Sciences, establishing national principles and a development roadmap. The 2025 OECD report *Embedding Citizen Science into Research Policy* provides recommendations for member countries to develop such frameworks. Ireland is an OECD member yet has not acted on any of these recommendations.

Research Ireland: Inherited Structural Assumptions

Research Ireland (the August 2024 amalgamation of Science Foundation Ireland and the Irish Research Council) administers research funding calls. Current eligibility criteria require institutional affiliation—applicants must be associated with a Higher Education Institution or Research Performing Organisation. Independent researchers are systematically excluded.

This design reflects an inherited assumption: that research originates within institutions and that citizens are merely the end-consumers of information, not co-creators in the production of systems or knowledge. Independent researchers, solo founders, and citizen innovators—regardless of what they have built or achieved—are not usually eligible to apply.

Impact 2030: No Citizen-Originated Pathways

Ireland's new national research and innovation strategy, Impact 2030 (launched following the Research Ireland merger), emphasises talent, public engagement, evidence for policy, and addressing grand challenges. It explicitly calls for wider community engagement and accessibility of research to policymakers and the public. However, the strategy contains no pathways for citizen-originated innovation or independent innovators. The focus remains on top-down institutional capacity. Recent academic and OECD papers (2025) have called for embedding citizen science in research policy, but Ireland has not yet adopted any of these recommendations.

DTIF: Structural Barriers to Solo Founders & Startups

The Disruptive Technologies Innovation Fund (€500M allocation) requires consortium partnerships from already established companies and Research Performing Organisations. Solo founders and small teams cannot apply regardless of the disruptive impact or innovation they are working on.

The fund is intended to de-risk innovation through established partnerships. However, this design excludes what may be the most genuinely disruptive form of innovation: independent builders working outside institutional structures who have already demonstrated viability and international recognition.

Ireland's Limited SBIR: Innovation on Demand, Not by Design

The United States Small Business Innovation Research (SBIR) programme reserves a percentage of federal R&D funding for small businesses to meet innovative socio-economic needs that the market cannot usually initially satisfy. Critically, US-based founders define the opportunity and apply directly with their own ideas—the innovation direction (obviously) comes from the innovator, not central planning. The programme has supported the development of many early-stage companies that later achieved significant scale and success. During the first Trump Administration in 2019, the National Science Foundation awarded more than \$1.5M to a citizen science litter

¹³

https://www.mitforschen.org/sites/default/files/grid/2022/11/15/White_Paper_Citizen_Science_Strategy_2030_for_Germany.pdf

¹⁴ <https://www.citizen-science.at/en/>

¹⁵ <https://www.schweizforscht.ch/>

platform through this mechanism¹⁶—enabling the US to race ahead in the emerging global citizen engagement market.

Ireland does have a Small Business Innovation Research (SBIR) programme, administered by Enterprise Ireland¹⁷. However, it operates on a fundamentally smaller & different model than its US counterpart. **Ireland's SBIR is centrally planned.** Public sector bodies define "Challenges" that companies can respond to. If no public body identifies citizen science as a challenge, there is no pathway—regardless of what a citizen has already built or identified. Since 2014, Ireland's SBIR has supported just 20 challenges with total contracts exceeding €1 million—compared to the billions allocated through the US programme. One challenge addressed illegal dumping CCTV monitoring—adjacent to litter monitoring—yet no citizen engagement occurred.

Local Enterprise Offices: Geographic Innovation Gap

Local Enterprise Offices (LEOs) provide valuable support for small businesses. However, LEOs are not designed to assess early-stage technology innovation with new and emerging global market potential. A citizen science platform with users in 100+ countries does not fit naturally within LEO assessment frameworks, which are oriented toward consumer-driven marketshelf opportunities, not a renaissance in geographic information science, despite significant transformative socio-economic potential.

This creates an alarming innovation gap which is particularly strong for founders outside Dublin who have fewer innovation pathways than those with proximity to Enterprise Ireland, venture capital, and technology ecosystems. This gap is particularly acute for geographic and civic technology, which may have significant socio-economic upside but is stuck in pre-market validation amid high academic epistemology. There are not many geographically trained academics validating new and emerging geosocial renaissances at the local enterprise office.

The Missing Function: Who Should Be Doing This Job?

Why does it take a 17-year independent effort and a comprehensive dossier to put this information on a decision-maker's desk? Is there not a policy advisor, innovation scout, or dedicated function whose job it is to identify citizen-led innovation and connect it to support structures?

The answer, in Ireland, is **no**. Consider the agencies that might logically perform this function:

- **Research Ireland**—supports institutional researchers, not independent innovators.
- **Enterprise Ireland**—supports established companies, not pre-market academic innovators.
- **IDA Ireland**—attracts foreign direct investment, not domestic citizen innovation.
- **Local Enterprise Offices**—support local businesses, not globally-scalable civic technology.
- **Knowledge Transfer Ireland**—facilitates university-to-industry transfer, not citizen-to-policy transfer.
- **Department of Environment**—funds NGOs and agencies, not independent digital infrastructure builders.

Each agency has a defined remit. **No agency has a remit that includes identifying, validating, and supporting citizen-originated innovation.** The result is a systematic blind spot: innovation that does not originate from institutions or companies is structurally invisible to the ecosystem.

International Contrast: Countries That Have This Function

Germany has a **Citizen Science Strategy 2030** with 94 concrete recommendations, developed through a 2-year participatory process with 200+ stakeholders from 136 organisations. The Federal Ministry of Education and Research (BMBF) funds citizen science directly. The platform *Bürger schaffen Wissen* (Citizens Create Knowledge) hosts 100+ projects across disciplines. In

¹⁶ <https://seedfund.nsf.gov/portfolio/details/?company=litterati-llc>

¹⁷ <https://www.enterprise-ireland.com/en/supports/claims/small-business-innovation-research-sbir->

2025 & 2026, the Germany Sovereign Tech Agency has designated €384,000 to support OpenStreetMap alone.

Austria has the **OeAD Centre for Citizen Science** and the *Sparkling Science* programme funding 61 citizen science projects with €11.5 million. The Federal Ministry of Education, Science and Research supports citizen science as part of national research policy.

India established a **National Innovation Foundation** specifically to scout, validate, and support grassroots innovation. The *Honey Bee Network* actively scouts for citizen innovators across rural and urban communities. These functions recognise that valuable innovation can originate outside institutional structures.

United Kingdom: University College London were quick to support OpenStreetMap in 2004, providing access to GPS equipment, computer laboratories, and geospatial knowledge. UCL hosted OSM's servers for over a decade, enabling it to scale into global infrastructure now used by Apple, Meta, and humanitarian organisations worldwide. The UK also has Geovation UK from the Ordnance Survey, who specialise in helping geographic innovation start and scale.

Ireland has nothing like this. No citizen science strategy. No centre for citizen science. No innovation scouting function. No funding mechanism for proven Digital Public Goods or citizen-led innovation. No PhDs. No recognition. No geographic accelerator. No pathways. No opportunities.

Global Recognition: The Copenhagen Framework on Citizen Data

In March 2025, the United Nations Statistical Commission endorsed the Copenhagen Framework on Citizen Data¹⁸, officially recognising the role of citizen-generated data within national statistical systems. The Framework establishes standards for producing and using citizen data responsibly—grounded in quality, ethics, and meaningful citizen engagement—to complement official statistics.

The UN Collaborative on Citizen Data is now working with Colombia, Kenya, Ghana, Malawi, Nepal, Nigeria, and others to implement the Framework, including using citizen data to measure plastic waste.

OpenLitterMap has been generating citizen data on plastic waste since 2017—with research starting 17 years before this Framework was endorsed. Ireland's Central Statistics Office has no known engagement with the Copenhagen Framework. The country that built one of the world's most established citizen data platforms has never been consulted by its own government on citizen data policy.

OECD Recommendations (April 2025)

The OECD report *"Embedding Citizen Science into Research Policy"* (April 2025) identifies six key success factors: research funding, legal framework, institutional culture, capacity building, infrastructure, and societal dialogue. It emphasises that citizen science requires *"dedicated funding mechanisms and new approaches to impact assessment"* and that *"proactive policies are required to promote and reward transdisciplinary research."*

Ireland is an OECD member. These recommendations exist. They have not been implemented.

The question is not whether citizen science is valuable—the OECD, European Commission, and UN have all affirmed this. The question is why Ireland has no mechanism to identify, validate, or support it. This is a policy architecture gap, not a resource gap.

¹⁸ <https://unstats.un.org/UNSDWebsite/citizenData/events/The-Copenhagen-Framework-on-Citizen-Data-v1.pdf>

The Resource Paradox: Well-Funded Departments, No Citizen Science

Ireland is not a poor country struggling to fund innovation. It is **one of the wealthiest nations in Europe with the fiscal capacity to pioneer new approaches.**

Budget 2025 Education Allocations:

- Department of Education (primary and post-primary): **€11.9 billion** — the largest education budget in the history of the State.
- Department of Further and Higher Education, Research, Innovation and Science: **€4.5 billion.**
- **Combined education spending: approximately €16.4 billion, increasing to €18b in 2026.**

Ireland's Fiscal Position:

- 2024 government surplus: **€23.2 billion**—a record, nearly triple the 2023 surplus
- One of the largest budget surpluses in Europe—an outlier among OECD nations

As economist David McWilliams noted: *"Ireland is a first world economy with third world infrastructure."*¹⁹

From combined budgets of €16.4 billion for two departments of education, not a single euro has been allocated to recognise, support, or develop citizen science—despite Ireland hosting a UN-recognised Digital Public Good built by an Irish citizen over 17 years who has made repeated application attempts for years.

This is not a resource constraint. This is a choice. The question for policymakers is whether that choice reflects Ireland's stated commitments to innovation, inclusion, and sustainability or if Ireland will continue to be a laggard and an outlier.

Inside the Machine: 100s of Principal Officers, No Citizen Science

Ireland's Departments are staffed by hundreds of senior civil servants at Principal Officer level and above—the grade responsible for policy development, strategic planning, and programme design. Here is what the "Who Does What" pages on gov.ie reveal:

Department of Education (€11.9 billion budget for 2025):

- 11 Assistant Secretaries + Chief Inspector
- 60+ Principal Officers across units including:
 - Curriculum and Assessment Policy Unit
 - Teacher Education Policy (Digital)
 - Social Inclusion Unit
 - Strategy and Development

Citizen science strategies and recommendations produced: 0.

Department of Further and Higher Education, Research, Innovation and Science (€4.5 billion budget for 2025):

- 5 Assistant Secretaries including Office of Government Science Advisor
- 25+ Principal Officers across units including:
 - Research Policy Programmes.
 - Evidence For Policy.
 - EDI and Social Policy.

Citizen science research, innovation and early stage career development funding mechanisms created: 0.

¹⁹ <https://universitytimes.ie/2025/03/from-surplus-to-shortfall-irelands-wealth-paradox/>

Department of Climate, Energy and the Environment:

- 8 Assistant Secretaries
- 45+ Principal Officers across units including:
 - Climate Adaptation, **Citizen Engagement** and Local Government.
 - Circular Economy Strategic Policy.
 - Environment Policy Section.
 - Responsible for the **National Litter Monitoring System**.

Citizen science recommendations issued: 0.

Department of Housing, Local Government and Heritage:

- 10+ Assistant Secretaries.
- 55+ Principal Officers across units including:
 - Local Government Structures and Modernisation
 - Digital Transformation.
 - Strategic Performance & Innovation Unit.
- **Technology-enabled citizen monitoring integrated: 0.**

Combined total: 185+ Principal Officers across four departments. Combined citizen science output: Zero.

The 26-Year National Litter Monitoring System Without Maps, Open Data or Citizen Science.

The National Litter Pollution Monitoring System²⁰ has operated since **1999**—26 years. Every year, 31 local authorities conduct over **1000's of clipboard surveys** to assess litter pollution levels. The system is coordinated by **Tobin Consulting Engineers** (a private contractor) and funded by the Department of Environment.

In 26 years of operation:

- Citizen participation integrated: **None**
- Smartphone technology deployed: **None**
- Recognition of citizen-built platforms: **None**
- Pilot programmes with existing citizen science tools: **None**
- Digital maps created to educate society: **None**

National Litter Monitoring vs OpenLitterMap: A Comparison

Metric	National Litter Pollution Monitoring System	OpenLitterMap Ireland
Years of operation	26 years (1999–2025)	8 years live (launched 2017). 17+ years R&D.
Operator	Tobin Consulting Engineers (private contractor)	Independent citizen-led platform (startup died)
State funding received	26 years of continuous contracts	€0

²⁰ litter.ie

Methodology	Clipboard surveys; not publicly available	Open source; publicly auditable. Anyone can contribute.
Annual surveys/observations	~5,000 surveys	19,797 photos (cumulative)
Individual items recorded	Not published	59,749 tagged items
Geographic coordinates	None	Every observation
Photographic evidence	Not published	Every observation
Timestamps	Survey date only	Precise datetime (YYYY-MM-DD HH:MM:SS)
Brand identification	None	100s of brand tags
Public map interface	None	Global data loads in 30ms
Open data access	No	Yes (ODbL)
Citizen participation	None	201 contributors
Peer-reviewed citations	Unknown	98+
International recognition	None	UN Digital Public Good
Code availability	No code	Open source (GPL-3.0)
Global reach	Ireland only	Global (100+ countries)

What each system can answer:

Question	NLPMS	OpenLitterMap
"Is litter getting better or worse?"	Yes (aggregate trend)	Yes (with evidence)
"Where exactly is litter concentrated?"	No	Yes
"Which brands contribute most to litter?"	No	Yes
"Can I verify the underlying data?"	No	Yes

"Can citizens participate?"	No	Yes
"Can researchers access the raw data?"	No	Yes
"Can local authorities see their area?"	No	Yes

The Cost of Cleanups

According to the Irish Times, at least €85.2 million was spent on street cleaning and litter management by local authorities across Ireland in a single year (2021)²¹. The largest expenditure was in the greater Dublin area, where €36 million was expended by the four local authorities. The previous year (2020), street cleaning cost all the local authorities more than €92 million, a slight increase on 2019.

The NLPMS contract value was worth €48,000 in 2021²². However, this figure represents only the coordination and reporting fee paid to the contractor. The full cost of the system includes local authority staff time conducting surveys and the opportunity cost of not using better systems—none of which are captured in the contract value. For context, the National Litter Monitoring System captures about ~5,500 visual surveys annually across 31 local authorities, allocated by population (ranging from approximately 30 surveys in Leitrim to 600 in Dublin City). Each survey requires an officer to travel to a location, conduct a visual inspection, complete paperwork, and submit data. The cumulative staff time across 31 authorities represents a significant hidden cost borne by local government budgets—to produce highly questionable data that systematically excludes citizens.

A study commissioned by the German Association of Local Utilities (VKU) found that the collection and disposal of litter costs German municipalities €700 million a year²³. Crucially, the removal of cigarette butts alone costs €225 million and disposable plastic cups €120 million. A subsequent study by the German Environment Agency enabled Germany to propose targeted levies: €1.23/kg for disposable plastic cups and €8.95/kg for plastic cigarette filters. The data identified whose products were creating the costs—and made producers pay.

Environment Minister Svenja Schulze was direct about the implications: "It's costing us all a lot of money because at the moment it's only the local authorities which are bearing the cleanup costs in parks and streets. I find it only fair that, in future, the burden of cleaning and disposing of the waste will be taken on more by the polluters." A subsequent study by the German Environment Agency (Umweltbundesamt) refined these figures and developed a methodology for calculating producer levies. The result: targeted cost rates by product type—€1.23/kg for disposable plastic cups, €8.95/kg for plastic cigarette filters. In November 2022, the German Cabinet approved the Single-Use Plastics Fund Act. The fund is expected to collect approximately €450 million annually from manufacturers, redistributed to municipalities to offset cleanup costs. Germany moved from data (2020) to policy (2022) to implementation (2025) in five years—because they had the evidence and competent systems to justify action.

Ireland spends €85+ million annually cleaning streets but does not systematically collect data on whose products it is cleaning up. The NLPMS reports "packaging items" as a category. It does not report that Coca-Cola products appear 756 times in citizen-collected data, or that Heineken appears 180 times, or that McDonald's appears 163 times.

²¹ <https://www.irishtimes.com/news/environment/revealed-how-much-it-costs-to-clean-up-ireland-s-streets-1.4762292>

²² <https://www.oireachtas.ie/en/debates/question/2022-01-19/143/>

²³ <https://www.politico.eu/article/plastic-and-cigarette-litter-costs-german-towns-e700m-a-year/>

The Oversight Gap

The National Oversight and Audit Commission (NOAC)²⁴, which scrutinises local authority performance across 46 indicators (including litter pollution: E3), reveals a fundamental misunderstanding of what success (or basic methodology evaluation) looks like.

In the 2024 oversight report, Dún Laoghaire-Rathdown is praised for increasing community clean-ups from 615 in 2023 to 671 in 2024²⁵. But consider the logic: if litter was decreasing communities would need fewer clean-ups, not more. An increase in clean-ups is evidence that litter is getting worse—that more volunteer labour is required to manage a growing problem. NOAC is celebrating the escalating cost of failure.

NOAC attributes improvement to "the work of volunteers" and "community engagement"—while the monitoring system those volunteers are excluded from remains a gated process which was not mentioned. Citizens can pick up the litter. Citizens can organise clean-ups. Citizens can donate their time and their taxes. But citizens are not permitted to contribute data that measures whether any of it matters. Their labour is welcomed. Their knowledge is systemically excluded.

The 671 community clean-ups in Dún Laoghaire-Rathdown represent thousands of hours of citizen effort—all gone unrecorded, lost, unmapped, and largely invisible. Many participants would have smartphones in their pockets—devices capable of capturing geotagged, timestamped, brand-identified photographic evidence of every piece of impact made in their community. Instead, that impact is largely invisible while a council officer with a clipboard methodology from 1991 decides whether the area looks "slightly polluted" or "moderately polluted.". Somehow this qualifies as science a quarter of the way into the 21st century.

The 2024 Performance Indicator Report presents E3 results without any commentary on methodological limitations or alternative measurement approaches. NOAC's own Chair acknowledges the limitations of performance indicators. In the 2024 Report's opening message, Ciarán Hayes writes:

"Performance indicators are monitored and adjusted on an ongoing basis to capture and measure the impact of service provision. This is not always an exact science and it may be necessary to amend the indicators on a regular basis in order to ensure they adequately capture the extent and impact of local government services to communities."

An oversight body that claims "strong anti-litter policies" publishes no methodological critique of a 26-year-old clipboard system—while a UN-endorsed Digital Public Good with 500,000+ geotagged photos operates unrecognised in the same country—is not fulfilling its statutory function to "support best practice" in local government. The data gap is not technical. It is institutional. This is the democracy gap in practice.

The Accountability Gap

The companies whose products dominate litter—Coca-Cola, Heineken, Budweiser, Red Bull, McDonald's—privatise the profits and socialise the costs of cleanups. Irish taxpayers spend €85+ million annually cleaning up their waste. Irish citizens have documented which brands appear most frequently. The state has refused to make the connection.

One "official" system produced by "authorities" produces annual reports with no maps, no coordinates, no photos, and no brand data. This is reported every year in the media by journalists, who never seem to question the integrity of the methodology. Conversely, many citizens actively contribute valuable geographic data to a live, searchable, downloadable database with photographic evidence of every observation—which has been recognised by the UN-endorsed

²⁴ <https://noac.ie/>

²⁵ <https://cdn.noac.ie/wp-content/uploads/2025/09/NOAC-Local-Authority-Performance-Indicator-Report-2024.pdf>

Digital Public Goods Alliance as an open source good that can help accelerate the attainment of the SDGs.

This is the democracy gap in action: 26 years of public funding for a system that excludes citizens and limits data access, while the more open, auditable, and transparent alternative has not received a single opportunity to support its development.

OpenLitterMap Ireland: What Citizen Data Reveals

While the National Litter Pollution Monitoring System has operated for 26 years without geographic coordinates, photographic evidence, or brand identification, OpenLitterMap has been collecting precisely this data since 2017—without state funding.

OpenLitterMap Ireland Statistics (April 2017 – December 2025):

- 19,797 geotagged photographs
- 59,749 individual litter items tagged
- 201 citizen contributors
- 2,000+ brand identifications
- Average 297 items tagged per contributor

Category Breakdown:

Category	Items	Percentage
Smoking	11,685	19.6%
Soft drinks	9,102	15.2%
Alcohol	8,394	14.1%
Food	6,554	11.0%
Coastal	3,636	6.1%
Coffee	1,919	3.2%
Other	16,139	27.0%

Brand-Level Data: The Missing Dimension

The NLPMS reports that "packaging items" constitute 17-18% of litter. It does not identify which companies' packaging is responsible for becoming litter. OpenLitterMap does.

OpenLitterMap Brand data for Ireland:

Brand	Items Found
Coca-Cola	756

Heineken	180
Budweiser	175
Red Bull	167
McDonald's	163

This data has direct implications for Extended Producer Responsibility. If EPR schemes are meant to hold producers accountable for packaging waste, brand-level litter data is essential. The state contracts for category-level data while ignoring freely available brand-level data.

A Note on Methodology

OpenLitterMap's data shows different category percentages than the National Litter Pollution Monitoring System. This is expected: OLM captures opportunistic citizen observations; NLPMS uses structured surveys.

With a single opportunity, OpenLitterMap could implement standardised sampling protocols, quality assurance frameworks, and direct comparison studies. Without support, it operates as a proof-of-concept demonstrating that citizens will participate in environmental monitoring when given the tools to do so but it requires significant personal sacrifice as our institutions have structural barriers to citizen-led innovation.

The platform's limitations are not evidence against citizen science. They are evidence of the cost of institutional neglect. Researching, developing, maintaining and advancing citizen science infrastructure requires resources that Ireland's institutions chose to ignore.

Academic Recommendations: Ignored

A 2021 peer-reviewed paper in *Frontiers in Communication* titled "Citizen Science in Ireland" by Roche et al. explicitly recommended:

"To increase awareness of citizen science and to align with the commitment to support citizen science at European levels, the Irish government should adopt an official policy on citizen science that sets out how the field will be supported and developed to improve the lives of Irish citizens."

Four years later, Ireland still has no citizen science policy. The recommendation was not rejected. It was not debated. It was ignored. By 100s of Principal Officers. Across several departments. With combined budgets billions. Nowhere is this more clear than in a recent Dáil "debate" where 30+ members of the house interacted on the nature of science during science week, without a single mention of citizen science²⁶.

This is not bureaucratic inertia. This is bureaucratic absence. The technology exists. The funding exists. The capacity exists. The staff exist. The recommendations and promises exist. The software exists. What does not exist is someone whose job it is to make a decision.

The 2021 Roche et al. paper itself illustrates a deeper conceptual gap. Its catalogue of Irish citizen science projects (Table 2) lists initiatives run or supported by established institutions: the National Biodiversity Data Centre, BirdWatch Ireland, Teagasc, the EPA, etc. OpenLitterMap—an Irish-built **citizen-led** platform that had been operating since 2017 with a peer-reviewed publication in 2018,

²⁶ <https://www.oireachtas.ie/en/debates/debate/dail/2025-11-13/34/>

users in 100+ countries, and would later achieve UN Digital Public Good recognition—was not included.

The paper notes that citizen science initiatives in Ireland "only have the capacity to become national endeavors when they have the support of an established public or private organisation." This framing reveals a structural assumption: that citizens are *participants* in institutional projects, not *originators* of research infrastructure. The possibility that a citizen might build something independently—and that institutions should recognise and support it—does not appear in the analysis, despite being a core tenet of citizen science.

This is the democracy gap. Even academic papers advocating for citizen science policy reproduce the assumption that innovation flows from institutions to citizens, not the reverse. The term is "citizen science"—yet the citizen is positioned as a data collector, not an infrastructure builder or research lead. Until this framing changes, The Republic of Ireland will continue to miss the meaning of both citizen science and the republic - *a state in which supreme power is held by the people*.

Part IV: The Reality of Geographic Education

The Geographic Tradition

As Northern-Irish Geographer David Livingstone documented in *The Geographical Tradition* (1992)²⁷; Geography is a contested practice that has transformed repeatedly over centuries. From the Age of Renaissance—when explorers and cartographers redrew the known world—through to the Scientific Revolution, the Enlightenment, the Darwinian era, and the age of empire, each epoch brought new instruments, new methods, and new questions about how we understand the Earth and our place in it. Our understanding and knowledge of the world and our experience of reality is shaped and situated by the things, theories and methods we have available. Many geographic innovations that improved how we experience time & space had profound implications for navigation, commerce, and science (e.g. John Harrison's Pocket Watch²⁸). The quantitative revolution of the 1960s marked a significant moment as geographers literally rose from their armchairs—overcoming descriptive narratives by embracing statistical methods, mathematical models, & satellites which were being made increasingly possible at University computer labs.

Throughout history we have seen that new instruments have not simply extended what geographers can observe—they have changed what counts as knowledge and who can produce it. Failing to embrace contemporary practice can have devastating socio-economic disadvantages losing legitimacy, power, and limiting complementary efforts in climate action, digital skills development, and biodiversity conservation which, without modern geographic foundations—will be built on outdated practices and increasingly disconnected from the citizens they aim to serve.

Despite not being reflected in contemporary pre-university education yet, the geographic tradition has continued to evolve. Since the quantitative revolution in the 1960s, the discipline of geography has undergone a geospatial revolution driven by an advanced interconnected network of satellites, sensors, GPS, and billions of always-online devices producing ever-increasing petabytes of spatial data daily. Once bound by financial and spatiotemporal restrictions, only 50 years ago producing geographic information was limited to those with immense power (i.e. emperors, military, & increasingly global IT firms). Participatory geography—both active and voluntary—is increasingly the norm.

Pre-university Irish geographic education continues to largely reflect the pre-geospatial 1960 descriptive era. Students learn to describe primary geographic processes—rivers, mountains, and coastlines often using static paper maps. Measurement, not description, is now the core of Geography. Yet primary & secondary education largely teaches description without measurement, maps without methodology, and technology without purpose.

A Global Abundance of Technology

Out of more than 8 billion people alive today, more than 6 billion are connected online²⁹. Even pre-teenagers now possess a device capable of capturing centimeter-accurate geophotographic data, which is combined with accelerometers, gyroscopes, barometers, and processing power exceeding the Apollo guidance computers and rivaling the mapping ability of colonial empires. Yet few people know about the history of how these devices originated let alone their productive utility.

Without appropriate training, students become data subjects. Their devices extract information while the geographic curriculum hasn't changed since when their grandparents were in school. CyberSafeKids reports 93% of Irish 8–12 year olds have their own device. The instruments exist. The only thing missing is the political will to update the curriculum with geographic training & education.

²⁷ <https://www.dubraybooks.ie/product/the-geographical-tradition-9780631185864>

²⁸ <https://www.goodreads.com/book/show/4806.Longitude>

²⁹ <https://www.statista.com/statistics/617136/digital-population-worldwide/>

The Education Gap

Ireland's *Digital Strategy for Schools to 2027* is a 67-page framework backed by €200 million. Its vision is to "develop competent, critically engaged, active learners" who "participate fully as global citizens in a digital world" (p. 11). The strategy emphasises active learning, problem-solving, and safe use of digital technologies.

The strategy does not mention geography as a subject that could benefit from digital transformation; nor does it mention geospatial data; GPS as a learning instrument; citizen science, data production by students, or contributing to public knowledge systems. The strategy treats students largely as end-users and navigators of digital technology—not as emerging minds that deserve an opportunity to participate as co-producers in the production of knowledge—which is reserved for a handful for IP-transfers at Universities, where there are no PhD opportunities to support fundamental category defining research and innovation in citizen science.

This is not a criticism of the strategy's intention—online safety matters and improved digital education is welcome. However, passive safety education may pale in significance to the potential of active digital citizenship. The strategy's own vision—"competent, critically engaged, active learners" who act as "global citizens"—requires more than protection from harm. It requires capacity for contemporary mid-21st century contribution that recognises geodigital skills as fundamental reading & writing building blocks for future.

Many geography educators work within constraints to introduce GIS tools and environmental projects—but without curricular mandate, or dedicated resources, or pathways connecting classroom activities to real knowledge systems the constraint remains limited by policy.

Geography & The Modern Problem-Solving Workforce

The case for citizen science in education is not only democratic—it is economic. Geographic teaching & practice is a training ground for an engaged disciples, yet education still treats it as a descriptive subject with predefined answers.

The contemporary Geographer is tasked with using emerging incomplete datasets from a variety of sources to try and make sense of the reality of something. This requires working with incomplete data, validating inputs, contributing to shared platforms, thinking in systems, while trying to understand the past, present & future simultaneously. Citizen science is a temporary term used to deinstitutionalise the practice. These skills are increasingly prerequisites for careers in data, environment, logistics, urban planning, public administration, utilities, defence, and lots more.

Educational Alignment

In an electronic environment saturated with algorithmically tailored content and synthetic media, the ability to produce empirical data is a critical differentiator. While most content is delivered passively, citizen science removes the device from ones face re-presenting your actual physical lived experience. This is not an environmental hobby. It is cognitive infrastructure for the mid-21st century that can help create a direction to help shape our relationship with technology.

The Democratic Consequence

Citizens who cannot produce evidence cannot contribute to public knowledge, cannot participate in collaborative problem-solving, cannot support climate action with local data, and cannot engage meaningfully in evidence-informed governance. They can only consume what others produce.

This is not an additional competency layered onto an already full curriculum. It is the foundation on which digital, scientific, and civic competencies now depend. A democracy functions best when citizens are equipped to contribute to the knowledge systems that inform collective decisions.

Every previous revolution in geographic measurement reshaped education, commerce, and power. The only unprecedented thing about the present moment is the institutional reluctance to act on it.

Part V: The Closed Loop—Industry Influence on Ireland's Knowledge Ecosystem

The exclusion of citizen science from Irish environmental governance is not an isolated oversight. It reflects a **comprehensive system** in which industry influences the knowledge and innovation pipeline—from early childhood education right through to policy development and implementation. At every stage where environmental knowledge is produced, validated, funded, or applied, industry sits at the table while citizens are excluded.

Stage 1: Childhood Education

Before examining policy consultation, it is instructive to examine who delivers environmental education—particularly litter education—in Irish schools. The picture reveals near-complete industry control of the educational pipeline.

Green-Schools (Eco-Schools Ireland): Ireland's "leading environmental management and award programme" operates in over 94% of Irish schools. It is coordinated by An Taisce but **sponsored by Repak** (the packaging industry compliance scheme) and **Mars Wrigley** (the sweet and chewing gum manufacturer). The international "Litter Less Campaign" embedded within Eco-Schools is a "joint project between **Mars Wrigley Foundation** and the Foundation for Environmental Education," running since 2011 and reaching 7.4 million students across 35 countries. The goal is to teach personal responsibility, which is important, but does not encourage more fundamental questions like *why does this exist?* This characterises general litter education perfectly, which has been infantilised into a child's issue with no room for a mature conversation.

TidyTowns: The heartbeat of Ireland's community and voluntary sector. Run by a supermarket. No data collection. No digital youth engagement. No citizen science. An annual award ceremony is held every year with results determined by adjudicators who travel the country to inspect street cleanliness and flower planting. Not a single point of litter mapped in decades of spending 100,000s of volunteer hours repeatedly cleaning up after people who litter.

Gum Litter Taskforce: An actor-led school programme visiting schools across Ireland, designed to teach children & society about responsible gum disposal. Funded & Copyrighted by Mars. The Gum Litter Taskforce itself is operated by IBEC, the Irish Business and Employers Confederation—Ireland's largest lobby group.

Repak "Team Green for Schools": A primary school programme run by Repak—the packaging industry's compliance scheme—teaching children about recycling. Repak's members include Coca-Cola, Nestlé, Lidl, and other major packaging producers & retailers.

Neat Streets: An anti-litter programme for secondary schools, also coordinated by An Taisce. The UK version received funding from Coca-Cola Foundation, McDonald's, and packaging industry bodies.

The Pattern: Every major litter and waste education programme reaching Irish schoolchildren is funded, sponsored, or operated by the industries whose products create the packaging that can become litter. The litter goes in bins. The phones go in pouches. The data goes nowhere. Children are taught about personal & consumer responsibility and "behaviour change" by programmes funded by companies who have a vested interest to facilitate the conversation. The educational message focuses on individual disposal behaviour—not consumer alternatives or producer responsibility. The companies whose business models depend on single-use packaging fund the education that frames litter as a consumer behaviour problem for children. The maturity of the conversation stops at primary school with no secondary school citizen science programmes, no PhDs, and nothing done to support the development of citizen science at our well-funded public institutions.

Stage 2: Research and Innovation—The Catch-22

Citizens who innovate outside institutional structures face systematic barriers to research and innovation opportunities. As documented earlier, the ERC catch-22 ensures that citizen innovators cannot access European research funding without institutional affiliation and institutions have no pathway to recognise citizen or student-led innovation, or opportunities to support and enable the development of citizen science. Irish research funding bodies (Science Foundation Ireland, Irish Research Council, EPA Research) require institutional hosting. The result: **17 years of citizen innovation producing a UN-recognised platform used in 100+ countries remains ignored and excluded by all of Ireland's research institutions.**

Number of citizen science platforms directly produced & maintained by all of Ireland's Universities, National Research Institutions and Local Authorities: 0.

Stage 3: Environmental Monitoring—Outsource The Responsibility

As documented earlier, Ireland's National Litter Pollution Monitoring System has operated for 26 years through **Tobin Consulting Engineers**—a private contractor. Despite the existence of internationally recognised citizen-built open source monitoring platforms being pioneered following the launch of the iPhone, the state contracts increasingly irrelevant clipboard monitoring to private firms rather than engaging with citizens or building up innovative academically informed capacity. The monitoring contract creates no pathway for citizen data, citizen technology, or citizen expertise to enter the system. There are no PhDs, no research or innovation opportunities, and despite the “results” reported on every year in the media, no journalist or academic ever seems to question the integrity of the methodology—which is unknown. The reliability or integrity of the system has yet to come up for consideration following the launch of the iPhone.

Stage 4: Policy Development—For Who?

If the state has no mechanism to identify citizen innovation, it is worth asking: **who gets a seat at the table to help shape policy?** The answer is observable in how Ireland's litter and packaging policies have been developed.

Extended Producer Responsibility (EPR) schemes—which require producers to fund the management of packaging waste—are developed through **negotiated agreements with industry**. Repak, the compliance scheme for packaging waste, was established in 1997 as an industry-led solution. The cigarette filter EPR scheme, approved in 2023, was developed in consultation with tobacco importers and manufacturers.

The **Gum Litter Taskforce** illustrates the structural arrangement. This “joint initiative” with the Department of Environment is operated by **IBEC** (Irish Business and Employers Confederation)—Ireland's largest employer and business lobby group. The body tasked with reducing gum litter is literally run by the business lobby representing gum manufacturers.

This is not improper. Industry consultation is standard practice in regulatory design. The question is one of **structural asymmetry**:

- Packaging producers have a seat at the table when packaging policy is designed.
- Chewing gum manufacturers have a seat when gum litter policy is designed.
- Tobacco companies have a seat when cigarette filter policy is designed.
- Citizens and consumers who use the products, pay the taxes to run the public institutions and systems (e.g. bin collection), or those build tools to monitor the *results* of these policies are systemically ignored.

Political scientists call this **“policy capture”**—when policy domains are systematically shaped by organised interests while diffuse public interests remain unrepresented. It is not a conspiracy; it is a design choice. Industry groups are *organised*, with trade associations, lobbyists, and designated points of contact. Citizens are *dispersed*, with no equivalent infrastructure to channel their knowledge into policy. (Note: This is what citizen science addresses).

The result is a system where:

- Those who **create pollution** are consulted on pollution policy.
- Those who **document pollution** are ignored.
- Policy is made *about* consumers, never *with* citizens.

Citizen science offers a structural correction. It creates **organised democratic capacity**—not to oppose industry, but to ensure that policy is informed by independent data, ground-truth verification, and distributed observation that no single institution can replicate. OpenLitterMap's 500,000+ geotagged photos represent exactly this kind of organised and inclusive citizen capacity. The question is whether the state is willing to recognise its existence and open up to democratic inclusion.

Stage 5: Innovation Recognition

When a citizen builds a geospatial platform over 17 years that achieves UN Digital Public Good status, 98+ peer-reviewed citations, and adoption in 100+ countries, how does Ireland's innovation ecosystem respond? No pathway exists to recognise citizen-originated innovation that emerges outside institutional frameworks.

Enterprise Ireland supports industry startups. Research Ireland (formally Science Foundation Ireland) funds academic research with IP transfer. Local Enterprise Offices support small businesses. **No agency exists to recognise or support citizen innovators who build public-interest technology outside market-validated or institutional structures.** The innovation pathway does not exist to support the development of new and emerging academic and market opportunities.

The Closed Loop: A Complete System

This is not a collection of isolated gaps. It is a **complete system** that excludes citizen knowledge at every stage of the pipeline:

Stage	Who Participates	Citizen Access
1. School Education	Industry	None
2. Research Funding	Universities, SFI, ERC	Requires IP transfer
3. Environmental Monitoring	Dept. Environment, outsource to "consultants".	None
4. Policy Development	IBEC, industry, trade bodies	None
5. Innovation Support	Enterprise Ireland, LEOs	None

The knowledge pipeline runs from childhood education (industry-funded) through research (institutionally gated) through monitoring (privately contracted) through policy (industry-consulted) through implementation (industry-delivered). At no point does the system create space for citizen knowledge, citizen technology, or citizen innovation. **The loop is closed.** In this framework there are not citizens, only consumers.

The Question of Cui Bono

When analysing any system, the Roman question *cui bono* ("who benefits?") often reveals more than stated intentions. Consider the current arrangement:

- **Mars Wrigley** funds school programmes teaching children not to litter gum. Mars Wrigley sells gum.
- **Coca-Cola/Repak** fund school programmes teaching children to recycle. Their members produce 100s of millions of tonnes of plastic that is notoriously polluting the oceans.
- **IBEC** runs the Gum Litter Taskforce. IBEC represents the employers whose products become litter.

- **Private contractors** deliver environmental monitoring. They are paid to continue to facilitate purposefully underdeveloped clipboard surveys with no brands identified, not to generate unique insights and digital skills innovation that might empower people to help to solve the problem proactively with inclusive education and a more purposeful use of technology than social media.
- **Ministers** launch awareness campaigns. The campaigns produce photo opportunities but nothing for geographic information science.

Each actor in this system has an **incentive to continue the current arrangement**. Industry maintains reputational cover. Contractors outsource responsibility. Journalists report on the “official statistics”, but never question the integrity of the source. Politicians maintain the public appearance of change. **No one in the system has an incentive to change how we address the problem.**

Note: No impropriety is alleged. All arrangements described above are lawful and publicly documented. The question is structural, not moral.

Citizen Actions

Citizen science disrupts this equilibrium. It provides *independent verification* that no stakeholder controls. It generates *continuous open geographic data* rather than closed unmapped periodic clipboard reports. It creates *public accountability* that cannot be negotiated away in private meetings. It opens the door for citizens to participate in democratic citizenship and empower themselves with the production of geographic information anytime they want.

This is not about "getting a seat at the table." The table itself is structured to exclude citizens. The question is whether Ireland is prepared to build a different table—one where citizens have an entry point into the governance process. That is democracy in action.

The system appears closed—but citizens have been pushing back through every democratic channel available. Since 2012, Ireland has conducted six citizen assemblies on topics from marriage equality to drugs policy. The Citizens' Assembly on Biodiversity Loss (2022–2023) was the world's first on that subject, producing 159 recommendations. Three specifically called for citizen science: Recommendation 48 (funding for community groups "participating in citizen science"), Recommendation 69 (a funded programme to "promote and support citizen science"), and Recommendation 70 (enhancing the National Biodiversity Data Centre's role in "citizen science"). In 2021, Science Foundation Ireland's "Creating Our Future" gathered 18,062 public ideas on research priorities. Among them: 65 mentioned litter, 6 called for citizen science.

Part VI: What Litter Data Tells Us About Public & Democratic Health

Litter is indicative of public health. Take a walk anywhere and you can read a public health report: 52–56% tobacco, 17–18% packaging, 8–9% confectionery, 8–9% fast food, 7–9% chewing gum. This is the physical residue that underpins addiction, ultra-processed food, and sugar—a public health crisis made visible on our pavements.

According to the National Litter Pollution Monitoring System, Ireland's litter composition breaks down as follows:

National Litter Pollution Monitoring System (26 years, methodology unpublished):

- Cigarette-related litter: 52–56%
- Packaging items (bottles, cans, wrappers): 17–18%
- Sweet-related litter: 8–9%
- Food-related litter (fast food wrappers, coffee cups): 8–9%
- Chewing gum: 7–9%
- Alcohol-related (cans, bottles, broken glass): "significant presence"

OpenLitterMap Ireland (59,749 items tagged, 2017–2025):

- Smoking-related: 11,685 items (19.6%)
- Soft drinks: 9,102 items (15.2%)
- Alcohol: 8,394 items (14.1%)
- Food: 6,554 items (11.0%)
- Coastal debris: 3,636 items (6.1%)
- Coffee cups: 1,919 items (3.2%)
- Other: 16,139 items (27.0%)

Both datasets—despite different methodologies—tell the same story: the vast majority of litter comes from **tobacco products, ultra-processed food, sugary drinks, confectionery, and alcohol**. Vaping products are now joining this list. Facemasks made a brief appearance. This is not the sign of healthy living. This is the physical residue left behind by a public health crisis made visible on our streets.

The Obesity Epidemic

The World Health Organisation declared in 2022 that **obesity has reached epidemic proportions in Ireland**³⁰. The statistics are stark:

- **60% of Irish adults** are overweight or obese.
- **1 in 5 children** are living with overweight or obesity.
- Eurostat data (2019) ranked Ireland with the **second highest adult obesity rate in the EU** (behind Malta).
- Adult obesity increased from 8% (men) and 13% (women) in 1990 to 26% and 21% respectively by 2011—and has continued rising.
- Estimated **lifetime cost of childhood obesity on the island of Ireland: €5 billion** (Safefood, 2017).

The 2016 Obesity Policy and Action Plan set a 10-year goal to "reverse obesity trends." By 2025, the target date, **no EU member state is on track to meet obesity reduction targets** (WHO). Ireland's policy was acknowledged to have "low implementation" of food environment measures.

³⁰ <https://www.who.int/europe/publications/i/item/9789289057738>

The Screen Crisis: A Parallel Epidemic

Health experts recommend **no more than 1–2 hours of screen time per day** for children. The reality:

- Irish young people (Gen Z) spend an average of **4–6+ hours per day** on smartphones.
- **21%** of Irish Gen Z spend **six or more hours daily** on their phones.
- **One third of Irish children** say they use screens "whenever they want".
- Globally, **41% of teenagers** spend over 8 hours on screens daily.
- Teens spending 5+ hours daily on screens are **twice as likely to show depression symptoms** (American Psychological Association).

CyberSafeKids reports that **84%** of Irish 8–12 year olds now own smartphones — the age when obesity and digital dependency patterns are being established.

The Pattern We Teach Ourselves—But Cannot Practice

Consider what we teach in schools:

- *"Don't litter"*—yet litter remains endemic, and the companies producing the waste fund the education about it.
- *"Eat healthy"*—yet 60% of adults are overweight or obese, and ultra-processed food dominates the shelves.
- *"Limit screen time"*—yet children spend 4–8 hours daily on devices designed to be addictive. Many return home after office work to watch Netflix and doomscroll.
- *"Be an active citizen, look at our EU democracy shield"*—yet citizen knowledge has no pathway into policy and citizen science frameworks remain ignored and underdeveloped.

We ask society to practice behaviours that adults—and the systems adults have built—can barely facilitate a conversation about, let alone practice. The educational message is contradicted by the structural reality. Industry designs addictive products. Industry funds the education about the problems those products create. Industry sits at the policy table. Citizens are ignored.

Democracy: One Vote Every Four Years, or Continuous Participation?

This brings us to the fundamental question about democratic participation. Ireland operates a representative democracy: citizens vote every four years, elect a handful of representatives, and those representatives govern on their behalf. This is "democracy" in its minimalistic sense—periodic input, delegation of authority, trust in representatives to act in the public interest.

But the challenges of the 21st century—environmental degradation, public health crises, digital transformation—require substantially more. They require **continuous citizen engagement**, not periodic elections. These challenges require **distributed observation**, not limited centralised monitoring. These challenges require **real-time data and innovation pathways**, not annual surveys contracted to clipboard "authorities". Our challenges require **citizen activation**, not citizen exclusion.

Democratic inclusion is what digital public infrastructure makes possible. A citizen science platform like OpenLitterMap enables anyone, anytime, anywhere to produce and share empirical geographic information. This transforms passive consumers into active producers. This creates a continuous feedback loop between citizen observation and policy evidence. It is democracy operationalised—not as a once-every-four-year cycle, but as an always-available process for ubiquitous participation. Anyone, anytime, anywhere. Inclusion by default, not by exception.

The technology exists. The platform works. The question is whether the state is willing to recognise that **citizen-generated knowledge is legitimate knowledge**—or whether democracy in Ireland will remain limited to the inter-annual ballot box while the real decisions are made in negotiated agreements with industry, behind closed doors, with citizens as observers of final reports and systems, rather than participants in their design and implementation.

The Democratic Stakes

We need to ask—what kind of democracy Ireland intends to be. Political theorist Sheldon Wolin (1989) distinguished between "*democracy*" as periodic elections and "*democratisation*" as the ongoing expansion of citizen participation in governance. A state can hold elections while systematically excluding citizens from the design of policy that affects them.

Wolin's concept of "**inverted totalitarianism**" describes a system where the merger of state and corporate power doesn't require jackboots or secret police. It works through managed democracy, corporate colonisation of public institutions, depoliticisation of the citizenry, and policy made by negotiation between state and capital while the public watches from outside.

This is not a conspiracy theory. It is a description of observable structural arrangements. In Ireland in 2025:

- The body responsible for reducing gum litter is run by the business lobby representing gum manufacturers.
- The programmes teaching children about litter are funded by the companies whose products become litter.
- Environmental monitoring is contracted to private firms while citizen-built platforms are ignored.
- Policy is developed through "negotiated agreements" with industry while citizens have no equivalent channel.
- 185+ senior civil servants across relevant departments produce zero citizen science output.

In 2026, Ireland and Europe face a choice. We can continue to operate a policy architecture where industry is consulted, academics are funded, NGOs are contracted, and citizens are—at best—subjects of diluted awareness campaigns for children. Or we could begin to recognise **the role and purpose of technology in society**.

Ireland does not just have a citizen science gap. It has a democracy gap. The absence of pathways for citizen knowledge is not a technical oversight. It is a structural feature of a system designed to keep citizens as spectators rather than participants.

The EU Presidency in July 2026 offers Ireland an opportunity to lead on citizen science—or demonstrate that "citizen engagement" remains a phrase for strategy documents rather than a practice embedded in governance. The world will be watching. History will be recorded. The results will be reflective of contemporary European values.

Part VII: Policy Alignment

LitterWeek is the only programme in Ireland that combines digital literacy with environmental action. No existing initiative bridges these two priority areas but treats them as distinct entities. This positions LitterWeek uniquely as a delivery mechanism for multiple interlocking & overlapping national strategies.

Harnessing Digital – The Digital Ireland Framework (2022)

Ireland's overarching national digital strategy, aligned with the EU Digital Decade 2030, commits to **80% of adults with basic digital skills by 2030** (2021 DESI baseline: ~56%). The framework structures priorities around Digital Infrastructure, Skills, Business Transformation, and Public Services. Key commitments (p. 15, 25, 45–48) emphasise embedding digital literacy from early years, "safe and ethical use of the internet," and practical skills for societal participation. Progress reports (2022–2024) confirm ongoing implementation. LitterWeek provides hands-on smartphone education contributing directly to these targets through ETBs, schools, and community organisations.

Digital Strategy for Schools to 2027

This successor strategy (published April 2022, with Implementation Plans 2022–2024 and 2025–2027) — backed by **€210 million in ICT grants** (multiple tranches: €50m in 2022, further in 2023–2025) — aims to equip learners to "navigate an ever-evolving digital world" as "*engaged, active citizens*." The strategy explicitly emphasises "*building awareness and knowledge around the safe and ethical use of the internet*" (p. 26–29, 38). Recent developments include the 2025 Guidance on AI in Schools stressing ethical/responsible use. LitterWeek operationalises these goals through structured curriculum teaching GPS, geospatial data collection, data ethics, and responsible smartphone use via real environmental action.

Education for Sustainable Development to 2030

Ireland's Second National Strategy on Education for Sustainable Development (ESD; aligned with UNESCO ESD for 2030 and SDG 4.7) aims to equip learners with knowledge, skills, dispositions, and values to become "*informed active citizens taking action for sustainability*." Priority areas include advancing policy, transforming learning environments, building educator capacities, empowering/mobilising youth, and accelerating local actions. The Eighth National ESD Forum (recently held) highlights education's role in climate/sustainability. LitterWeek uniquely addresses both ESD and digital strategies in a single programme—a combination no existing Irish initiative provides.

Climate Action Plan 2025

Published September 2025, the Climate Action Plan (which doesn't mention citizen science) emphasises citizen and community involvement in climate action, just transition, and behavioural change. It supports ESD, youth mobilisation, and local actions — calling for scalable monitoring and waste/circular economy strategies for local authorities. While there is no direct citizen science mechanism, the plan's emphasis on "accelerating local actions" and behavioural change aligns directly with LitterWeek's approach. OpenLitterMap is designed to provide citizen-generated data infrastructure to support local authority waste and pollution reporting.

Shared Island Initiative

The Shared Island Initiative (€1+ billion Fund to 2035) funds citizen science for biodiversity — specifically an all-island invasive species programme. This establishes direct precedent for government-funded citizen science in Ireland.

The initiative supports cross-border cooperation on environmental challenges including peatland restoration, biosecurity, nature restoration, and community climate action. However, **citizen**

science for litter and plastic pollution remains unsupported—despite pollution being a shared all-island issue with a much lower barrier to entry than biodiversity monitoring.

This asymmetry is notable: biodiversity monitoring (which does not directly implicate commercial interests) receives support, while pollution monitoring (which generates data on packaging, branding, and corporate responsibility) does not. Extending Shared Island to include pollution monitoring would address this gap while fostering North-South youth collaboration on shared environmental concerns.

National AI Strategy

Ireland's National AI Strategy ("AI – Here for Good", 2021; updated 2024–2025) focuses on ethical AI adoption, skills, and innovation but does not prioritise citizen science as a better, safer and more ethical non-human alternative to human-centric technological focus. Recent updates emphasise AI literacy in education, with Advisory Council recommendations for schools. OpenLitterMap's data platform has significant AI ambition—automated litter identification, gamification experience, spatial pattern analysis—aligning with applied AI for societal challenges. LitterWeek builds foundational AI/digital literacy (data collection, pattern recognition, ethical use) in schools.

Programme for Government 2025

Government Commitment	How Citizen Science Addresses It
Digital literacy for all ages (p.94)	LitterWeek delivers structured smartphone skills training through environmental data collection
ICT and digital skills in schools (p.66)	Curriculum-ready programme: equipping learners to participate in a changing world
EU Zero Pollution Action Plan (p.112)	OpenLitterMap provides standardised citizen-generated pollution data for monitoring
Climate and biodiversity action (p.108)	Environmental monitoring platform with global reach and open data
Support for indigenous innovation	Irish-originated platform with UN recognition and global user base

The policy infrastructure is ready; recognition is the missing piece. Government commitments exist across digital skills, sustainability education, and environmental monitoring. No mechanism currently connects citizen-built infrastructure with these stated priorities.

Online Health Taskforce Report (Published December 2025)

On 12 December 2025, Ireland's Minister for Health published the Final Report of the Online Health Taskforce—a public health response to evidence linking online activity to physical and mental health harms in children and young people, including anxiety, sleep deprivation, eating disorders, self-harm, and suicide ideation.

The report operates through four foundational principles and ten operational recommendations spanning five domains: children and young people's rights, safety by design, critical digital literacy, enforcement and accountability, and regulatory frameworks. Chair Jillian van Turnhout noted: "Young people are the true experts on their digital experiences."

Three recommendations are directly relevant:

Recommendation Three: Ireland should advocate at EU level for "Child Rights by Design" principles in all digital products and services, encompassing "participation, agency, privacy, safety, well-being, development"—principles directly embedded in LitterWeeks training modules.

Recommendation Five: "Building on existing initiatives, an evidence-informed critical digital literacy campaign and educational programme should be implemented across Ireland. This should focus on the promotion of health and well-being, ensuring online safety and protecting children and young people's rights."

Recommendation Nine: "The Government should take a leadership role during its Presidency of the Council of the EU from July 2026, with the aim of encouraging collaboration and alignment of policy actions in the digital environment that will promote health and well-being."

Foundational Principle Two: "All relevant Government strategies, legislative frameworks, funding allocations, and delivery mechanisms must work coherently to ensure that all children and young people's spaces—online and offline—provide opportunities for them to be healthy and safe, to grow, to learn, to thrive, to explore and achieve."

The report emphasises building on "existing initiatives" rather than creating programmes from scratch—and specifies embedding digital literacy in school curricula without reliance on technology company partnerships.

LitterWeek is an existing initiative that operates independently of industry funding—in contrast to programmes like Green-Schools (Mars Wrigley), Neat Streets (Coca-Cola), and the Gum Litter Taskforce (IBEC). AWS hosting is infrastructure, not partnership. The curriculum is not shaped by commercial interests. LitterWeek is designed to transform screen time from passive consumption—the source of the harm the Taskforce documents identifies—into active civic engagement. Unlike industry-funded school programmes, LitterWeek operates independently—aligning with the report's emphasis on solutions free from commercial influence.

Part VIII: International Comparison

Citizen science is not experimental. It is established global infrastructure. iNaturalist has logged over 190 million observations. Zooniverse engages 2 million volunteers. The Marine Debris Tracker has recorded more than 5 million items of ocean pollution. NASA runs 30+ active citizen science projects. These are not pilot programmes—they are mature systems connecting citizen observation to scientific knowledge and policy evidence.

Ireland remains disconnected from this infrastructure. While Irish citizens contribute to global platforms, the Irish state has no strategy to recognise, support, or integrate citizen-generated data into environmental governance.

National Citizen Science Frameworks

Several comparable countries have developed specific frameworks for citizen science and independent innovator support:

Country	Citizen Science Framework	Solo Founder / Innovator Support
Germany	Citizen Science Strategy 2030; Bürger schaffen Wissen platform; BMBF funding (€100M+)	EXIST programme for founders; Sovereign Tech Fund (€384k grant to OpenStreetMap)
Austria	Citizen Science Strategy Austria; OeAD Centre for Citizen Science; Sparkling Science (€11.5M)	Top Citizen Science awards; university partnership pathways
Switzerland	Citizen Science Network Switzerland; Swiss Citizen Science Center (ETH Zurich)	Innosuisse direct support for innovators
USA	Federal Crowdsourcing & Citizen Science Act (2016); CitizenScience.gov; NASA, NOAA, EPA programmes	NSF, SBIR/STTR fund individuals directly
UK	No national strategy, but UKRI citizen science funding calls; Natural History Museum programmes	Innovate UK; university partnerships
Netherlands	Nationale Citizen Science Kennisagenda; NWO funding streams	Multiple pathways for independent research
Ireland	<i>No national strategy</i>	<i>No equivalent pathway</i>

Global Citizen Science Platforms

Major citizen science platforms demonstrate the scale and maturity of this infrastructure globally:

Platform	Scale	Notes
iNaturalist	190+ million observations; 400,000+ species	California Academy of Sciences + National Geographic. Governments use data for biodiversity monitoring.
Zooniverse	2+ million volunteers	World's largest citizen science web portal. NASA, universities, museums as partners.
SciStarter	3,000+ projects; 100,000+ participants	US-based aggregator connecting citizens to research projects. Federally supported.
NASA Citizen Science	30+ active projects	Globe Observer, GLOBE Program. Federal agency directly engaging citizens in data collection.
eBird	1+ billion observations	Cornell Lab of Ornithology. Used by conservation agencies worldwide for policy decisions.

Litter & Marine Debris Citizen Science

Citizen science for pollution monitoring is well-established internationally. These projects demonstrate that the methodology works and data informs policy:

Project	Origin / Scale	Policy Impact
Marine Debris Tracker	USA (NOAA + Univ. of Georgia); 5+ million items	Government-academic partnership. Data informs federal ocean plastics policy.
Litterati	USA (global); 7+ million items tagged	Brand data collected. Commercial model with municipal partnerships.
OSPAR Beach Litter Monitoring	North-East Atlantic Convention; 15 countries	Ireland submits citizen-collected beach data. Methodology not extended to terrestrial litter.
Marine Conservation Society (UK)	UK; 30+ years of data	Data cited in parliamentary debates. Contributed to UK single-use plastic bans.
Ocean Conservancy ICC	USA (global); 35+ years; 180+ countries	International Coastal Cleanup. Largest global database of ocean trash.
OpenLitterMap	Ireland (global); 17 years; 100+ countries	UN Digital Public Good. 500,000+ photos. Brand-level data. Zero state recognition or funding.

European Citizen Science Infrastructure

The European Union has citizen science projects, but they remain fragmented, run by time and project based consortia, and rarely maintained and driven by a founder.

COST Action IC1203 ENERIGIC (European Network for Advancing Geographic Information):

The COST programme funds the physical meetup of researchers and practitioners across Europe on a variety of topics often connecting postgraduate students with senior researchers which has inspiring effects³¹. In 2013, COST ACTION IC1203 invited a UCC Masters student Seán Lynch to attend the ENERIGIC training school in Fiesole, Italy where he met leading citizen science practitioners and software engineers for the first time. There, Seán was inspired to teach himself how to code and build OpenLitterMap from scratch. Thanks to these connections and travel-accommodation funding opportunities, Seán would go on to become the only Irish founding member of the European Citizen Science Association.

The pathway existed—through COST Actions, training schools, and practitioner networks. A citizen found it, participated in it, and society benefited from it.

Case Study: Plastic Pirates – Go Europe! (€2M Horizon Europe)

The EU's flagship citizen science initiative for plastic pollution³² demonstrates the gap between institutional investment and outcomes:

Plastic Pirates (€2M EU funding)	OpenLitterMap (€0 state funding)
93,700 plastic items collected	850,000+ items tagged
13 countries	100+ countries
Time-limited sampling windows (Sept-Nov)	Continuous—any time, any place
Rivers and coastlines only	Terrestrial, urban, and marine
No brand-level data	Brand-level data
Project ending (30 months, 2022-2024)	17 years and ongoing
25,000 students (schools only)	Open to anyone with a smartphone
No UN recognition	UN Digital Public Good
No digital skills training	LitterWeek digital skills training

The EU's flagship plastic pollution citizen science initiative—€2 million, institutional backing across 13 countries, ending after 30 months—collected fewer items than a solo Irish founder with zero state funding operating continuously for 17 years. Plastic Pirates requires coordinated sampling windows, school participation, and ends when funding ends. OpenLitterMap runs continuously, open to anyone, producing brand-level accountability data the EU initiative does not collect.

This is not an argument against Plastic Pirates—educational value is real and the participants surely benefited from it. It is an argument that European citizen science infrastructure remains project-based, time-limited, and disconnected from the continuous civic infrastructure that already exists and is being accelerated by AI.

³¹ <https://www.cost.eu/>

³² <https://www.plastic-pirates.eu/en>

Initiative	Description & Irish Participation
European Citizen Science Association (ECSA)	300+ member organisations across Europe. Ireland had one founding member—a citizen (Seán Lynch), not an institution. No Irish university or state agency was present at ECSA's founding.
COST Action IC1203 ENERIGIC	European Network for Advancing Geographic Information in Citizen Science (2013-2015). Training schools connected practitioners across Europe. Enabled Irish citizen participation. Many went on to complete PhDs. No Irish institutional follow-through.
EU-Citizen.Science	EU platform connecting projects, resources, and training. Funded under Horizon 2020. Platform for knowledge exchange across member states. Lists OpenLitterMap since its inception.
Horizon Europe Citizen Science Calls	Dedicated funding stream for citizen science in EU research. Requires a time-bound consortia. Complex application requirements, often requiring 50+ page documents.
Copenhagen Framework	UN Statistical Commission framework for integrating citizen-generated data into official statistics. Ireland signed but has not implemented.

UNEA-7 Statement on Science (December 2025)

On 12 December 2025—the same day Ireland's Online Health Taskforce published its final report—Switzerland delivered a Statement on Science at UNEA-7 in Nairobi on behalf of 60 countries, including the European Union and all 27 member states³³.

The statement responds to the 'triple planetary crisis of climate change, biodiversity loss, and pollution' and affirms:

'Science is not negotiable and must remain the basis for evidence-based policy making.'

'We therefore call on all Member States and partners to strengthen inclusive, transparent, and well-resourced science-policy interfaces, defend scientific integrity, and ensure that environmental governance at all levels is guided by sound scientific evidence.'

The statement acknowledges 'the invaluable work of research institutions and the wider scientific community' and recognises 'the contribution of Indigenous knowledge'—but makes no mention of citizen science, despite citizen-generated data now being endorsed by the UN Statistical Commission through the Copenhagen Framework.

Citizen science is the most inclusive science-policy interface and most dramatic democratisation shift. It enables anyone with a smartphone to contribute to geographic knowledge production.

Ireland signed this commitment yet has no mechanism to honour it. The 2026 EU Presidency offers an opportunity to change that—or continue to demonstrate that international commitments are statements, not intentions.

³³ https://estatemnts.un.org/estatemnts/61.0604/2025121215000000/_RzkAsBdN/M_PhacJVQQF_nrb_en.pdf

What Success Looks Like

In Germany, citizen-collected data on urban biodiversity informs municipal planning. In the USA, Marine Debris Tracker data shapes NOAA knowledge and policy on ocean plastics. In the UK, Marine Conservation Society beach clean data has been cited in parliamentary debates and contributed to single-use plastic bans. These are not experimental programmes—they are established infrastructure connecting citizen observation to policy outcomes.

Ireland has no equivalent. The infrastructure exists globally. Irish citizens use it. The state simply does not recognise, support, or connect to it.

The 2026 EU Presidency is an opportunity to lead—or to confirm that Ireland remains an outlier and a laggard in its philosophy of citizen science.

Part IX: Ireland's EU Presidency

The Choice

Ireland holds the EU Council Presidency from July to December 2026. This is not an invitation—it is a test and a reflection of contemporary EU values.

For six months, EU member states will observe whether Ireland practices what it preaches on citizen engagement, science-based policy, and indigenous innovation. The evidence assembled in Parts I–VII documents a structural gap between Ireland's institutional rhetoric and practice. The Presidency will make that gap visible to European partners—or demonstrate that Ireland is closing it.

On 12 December 2025, Ireland signed the UNEA-7 Statement on Science delivered by Switzerland on behalf of 60 countries including the EU and all 27 member states. The statement commits signatories to *"strengthen inclusive, transparent, well-resourced science-policy interfaces"* and ensure *"environmental governance guided by sound scientific evidence."* Citizen science is the most inclusive science-policy interface available—it enables anyone with a smartphone to contribute to geospatial knowledge production. Ireland signed this commitment. The Presidency will reveal whether Ireland intends to honour it.

The German Benchmark

During Germany's EU Presidency (July–December 2020), the German Federal Ministry of Education and Research launched Plastic Pirates – Go Europe! as a flagship citizen science initiative. The project expanded from Germany to the Trio Presidency countries (Germany, Portugal, Slovenia), later receiving €2 million in Horizon Europe funding to scale across 13 EU member states.

Germany used its Presidency to showcase national citizen science capacity and position itself as a European leader in participatory environmental research.

Cork City: Home of OpenLitterMap—Hosts EU Mayors Summit on Climate & Health

Cork City—home of OpenLitterMap, the same constituency that is represented by the EU Commissioner for Democracy and the current Taoiseach—will host the **European Mayors' Summit on Climate and Health** on **5–6 October 2026**, bringing together city leaders from across Europe to address climate action and public health at the municipal level. Cork City Council Lord Mayor Cllr Fergal Dennehy who is from Togher, the same neighborhood as OpenLitterMap founder Seán Lynch, announced the summit, positioning Cork as a convening point for European urban policy during Ireland's EU Presidency³⁴.

Cork is a WHO Healthy City and EU Mission City committed to climate neutrality by 2030.

Why This Matters at EU Level: EU climate, health, and pollution policies increasingly rely on city-level implementation. The Cork Summit brings together precisely the actors—mayors and municipal administrations—responsible for translating EU objectives into lived outcomes. Demonstrating citizen science as operational urban infrastructure in Cork would serve as a transferable model for EU cities, not a local case study.

The Cork Summit is the obvious venue to demonstrate domestic citizen science innovation to European city leaders. The question is whether Cork's own citizen science infrastructure will have

³⁴

<https://www.corkcity.ie/en/council-services/news-room/latest-news/lord-mayor-invites-mayors-from-across-europe-to-attend-a-major-summit-in-cork-next-year-on-climate-and-health/>

an opportunity to participate—or whether European mayors will continue to hear a narrative that excludes Cork’s citizen-led innovation^{35, 36}.

European Maritime Day 2025: A Case Study in Institutional Blindness

European Maritime Day 2025 was held in Cork (21–23 May), co-hosted by Cork City Council, the European Commission, and the Department of Environment, Climate and Communications. Over 1,000 participants attended Europe’s flagship maritime event. Plastic pollution and marine litter were on the agenda.

Cork is home to the only Irish-originated UN Digital Public Good for mapping plastic pollution. Its founder was not invited.

MaREI, the Research Ireland Centre for Energy, Climate and Marine—headquartered in Ringaskiddy, approximately 10 kilometres from Cork City Hall—displayed a citizen science project at the event. The project runs on SPOTTERON, an Austrian platform. SPOTTERON’s litter tracking functionality was inspired by OpenLitterMap.

The Boolean Paradox

OpenLitterMap’s founder holds two Masters degrees in Geospatial Science and a BA in Geography & Economics from Irish universities, including x2 from UCC. The education at UCC was exceptional—inspiring rigorous training in GIS, remote sensing, geospatial & environmental science that provided the academic foundation for pioneering missing digital public infrastructure.

But there are no PhD positions at UCC to pioneer the development of citizen science. No research pathways for postgraduate innovation. No-one from Science Foundation Ireland or Research Ireland scouting potential and supporting application development. No geographic accelerator. No recognition vehicle for the fundamental category defining research and innovation that Irish graduates develop independently and deploy globally.

UCC produced a graduate capable of building world-leading citizen science infrastructure and inspired him to do it when the iPhone came out. Yet it offered no route to develop this research and innovation capacity.

The Austrian Contrast

SPOTTERON success comes from Austrian institutions consistently commission contracts to support the development of domestic citizen science infrastructure & capacity. The systems allowed for the creation of a domestic market. The platform now powers dozens of apps across Europe and sells services to research institutions in countries that never built their own like Ireland.

Ireland’s research ecosystem does not commission citizen science infrastructure. When Irish institutions occasionally require such tools, they import them. OpenLitterMap offered a domestic alternative—earlier, more comprehensive, and now UN-recognised—but Ireland’s institutions chose to maintain structural incompatibility with domestic innovation.

The Question for EU Institutions

Ireland will hold the EU Council Presidency from July to December 2026. Cork will host the European Mayors’ Summit on Climate and Health in October 2026. These events will feature discussions on environmental data, citizen engagement, and urban sustainability.

³⁵ <https://www.corkcity.ie/en/climate-action/eu-projects/eu-mission-restore-our-ocean-and-waters/>

³⁶ <https://www.corkcity.ie/en/doing-business-in-cork/eu-and-international-relations/european-maritime-day-2025/>

Ireland has already demonstrated it can host EU-level events on plastic pollution. It has not demonstrated it can recognise the citizen science infrastructure operating in its own city.

Should EU institutions wait for Ireland to notice? Or should they ask why a UN-recognised Digital Public Good—built by an Irish citizen, deployed in 100+ countries, cited in 98+ publications—remains excluded from Irish policy while Irish research centres purchase alternatives?

What Must Happen Before July 2026

Immediate Actions (January–March 2026)

1. Interdepartmental Coordination (*Lead: Department of the Taoiseach*)

The following departments must coordinate citizen science messaging before Presidency communications are finalised:

- **Department of Enterprise, Trade and Employment (DETE):** Research Ireland funding pathways, DTIF & SBIR eligibility, innovation policy
- **Department of Environment, Climate and Communications (DECC):** Environmental monitoring, EPA relationships, climate action delivery
- **Department of Education:** Digital Strategy for Schools, Education for Sustainable Development, curriculum integration
- **Department of Further and Higher Education:** ETB engagement, lifelong learning, skills development
- **Department of the Taoiseach:** Presidency communications, strategic messaging, international positioning

Without interdepartmental coordination, citizen science will appear—if at all—as isolated mentions rather than coherent positioning.

2. Acknowledge Existing Infrastructure (*Lead: Presidency Communications Unit*)

Ireland cannot credibly champion citizen science in EU forums while refusing to acknowledge Irish citizen science achievements. Before July 2026, official Presidency materials should:

- Reference OpenLitterMap as Irish-originated UN Digital Public Good operating in 100+ countries
- Include LitterWeek in education and digital literacy communications
- Acknowledge ECSA founding membership by Irish citizen (not institution)

This requires no new funding, legislation, or programme creation—only factual accuracy in how Ireland presents its existing citizen science capacity.

3. Brief Research Ireland and EPA (*Lead: DECC / DFHERIS joint briefing*)

Research Ireland and the Environmental Protection Agency will represent Irish research capacity in Presidency contexts. Both agencies should be briefed on:

- Existing Irish citizen science infrastructure and its international recognition & growth
- Copenhagen Framework commitments on citizen-generated data integration
- EU monitoring obligations where citizen data could supplement official collection
- The structural barriers (consortium requirements, academic affiliation) that have excluded citizen innovators

Presidency Period Actions (July–December 2026)

4. Cork Summit Integration (5–6 October 2026) (*Lead: Cork City Council / DECC*)

The European Mayors' Summit on Climate and Health should include:

- Presentation of OpenLitterMap as city-level environmental monitoring infrastructure
- LitterWeek demonstration as model for municipal digital literacy and civic engagement

- Workshop session on citizen-generated data for urban climate and health policy

This positions Cork as demonstrating—not just mentioning—citizen science integration.

5. Council Working Group Engagement *(Lead: Permanent Representation to the EU)*

Ireland will chair relevant Council working groups during the Presidency. Citizen-generated data standards should be raised in discussions on:

- Environmental monitoring and reporting harmonisation
- Circular Economy Action Plan implementation
- Zero Pollution Action Plan delivery mechanisms
- Climate action strategies
- Social inclusion

Ireland should propose Council conclusions—through the Environment Council and relevant Working Parties—recognising citizen-generated data as complementary to official environmental monitoring, with explicit reference to the Copenhagen Framework that Ireland has signed but not implemented.

6. Presidency Showcase Event *(Lead: Department of the Taoiseach / Research Ireland)*

Host a dedicated citizen science event during the Presidency programme—not as a standalone gesture, but connected to policy discussions on environmental monitoring, digital skills, and research participation. The event should:

- Present Irish examples alongside European comparators
- Include independent citizen innovators, not only institutional representatives
- Connect to specific policy outcomes, not generic "awareness raising"

Post-Presidency Structural Reforms

The Presidency creates a political opportunity to facilitate domestic innovation.

Research Infrastructure

National Citizen Science Strategy

Ireland is the only major EU economy without a national citizen science strategy. Germany, Austria, Switzerland, and the Netherlands have published strategies with dedicated funding streams. A strategy should:

- Establish cross-departmental governance (not siloed in a single department)
- Create dedicated funding stream for citizen-led citizen science projects
- Define standards for integrating citizen-generated data integration into official statistics
- Connect to EU frameworks (Copenhagen Framework, Horizon Europe Mission calls)

Citizen Innovator Pathway within Research Ireland

Current Research Ireland funding requires academic affiliation or consortium partnerships. This structurally excludes the citizen innovators who built platforms like OpenLitterMap. A dedicated pathway should:

- Allow applications from proven independent researchers with demonstrated outputs
- Evaluate track record (publications, citations, international recognition, user base) rather than institutional affiliation
- Provide funding for infrastructure maintenance and scaling, not only new project development

Funding Reform

Irish SBIR Equivalent

The US Small Business Innovation Research (SBIR) programme funds early-stage innovation by individuals and small entities without consortium requirements. Ireland has no equivalent. DTIF

requires academic or industry partnerships that exclude solo founders.

An Irish SBIR equivalent should:

- Fund proven innovators directly based on demonstrated capacity
- Remove consortium requirements for applicants with established track records
- Provide staged funding from proof-of-concept through to commercialisation and scaling

DTIF Eligibility Reform

The Disruptive Technologies Innovation Fund explicitly requires consortium participation. This should be reformed to:

- Allow solo founder applications where the applicant demonstrates exceptional capacity (increasingly normalised with AI)
- Recognise UN Digital Public Good status as evidence of international validation
- Evaluate outputs (users, data volume, citations, recognition) rather than partnership structures

Academic Capacity

PhD and Postdoctoral Pathways in Citizen Science Methodology

Irish universities offer no dedicated training in citizen science methodology, data quality assurance, or participatory research design. Funded positions should be created to build academic capacity in:

- Citizen science project design, development, and evaluation
- Data quality frameworks for citizen-generated data
- Integration of citizen science with official monitoring systems
- Ethical and governance discussions on participatory research

Professorships in Citizen Science

Germany, Austria & The Netherlands have established professorships in citizen science at major universities. Ireland has none. We need to:

- Build research leadership in the field
- Create pathways for PhD supervision and early-career development
- Position Irish universities as European contributors rather than followers
- Connect academic research to existing Irish citizen science infrastructure

Open Source Compatibility

Irish research funding and university partnership models assume intellectual property transfer as a condition of support. This is incompatible with open source which underpins approximately 95% of the web. The IP cannot transfer because the IP is licensed to stay in the commons where it often belongs. This is not a deficiency; it is the point—it makes knowledge open, reusable and accessible which is where innovation flourishes. This is not always appropriate for some industries (e.g. pharma) but it is often the *de facto* standard in computer & geographical science. Funding and partnership pathways should:

- Remove IP transfer requirements for open source projects, recognising that society is a public beneficiary
- Assess impact by adoption, citations, international recognition, and demonstrated use rather than licensing criteria
- Recognise UN Digital Public Good status and equivalent certifications as evidence of validated open source legitimacy
- Create explicit funding streams for maintaining and scaling existing open source infrastructure, and for new project creation
- Accept that AI now enables individuals to build what previously required teams—policy should reflect this shift

Presidency Legacy Outcome

What are the results of Ireland's Presidency in December 2026?

Proposed Presidency Output: *EU Council Conclusions on the Role of Citizen-Generated Data in Environmental Monitoring and Research Participation*

These conclusions would:

- Recognise citizen science as complementary public research infrastructure
- Encourage member states to adopt Ireland's citizen science strategies
- Mandate the Commission to explore integration pathways under existing EU frameworks (Copenhagen Framework, Horizon Europe, Nature Restoration Regulation monitoring)
- Reference existing European and Irish exemplars as operational models and make Ireland determined to lead on domestic citizen science innovation on the global stage

Council conclusions are not legislation—they are political commitments that shape future Commission action and member state implementation. They are achievable within a Presidency term. They provide a named legacy outcome that Ireland either delivers or does not.

The Stakes

Ireland's EU Presidency will be observed by 26 member states, EU institutions, and international partners. What they observe will shape Ireland's credibility on:

Research and innovation: Ireland claims to be a knowledge economy and innovation leader. The Presidency will reveal whether this extends to internationally-recognised citizen-originated innovation or applies only to institutional and corporate research.

Climate and environment: Ireland has committed to climate neutrality, biodiversity protection, and pollution reduction. The Presidency will reveal whether Ireland includes citizen-generated data—or excludes evidence that implicates protected interests.

Digital transformation: Ireland hosts major technology companies and claims leadership in digital innovation. The Presidency will reveal whether digital citizenship means active civic participation or passive consumption of industry-designed platforms.

Democratic participation: Ireland signed the UNEA-7 statement committing to "inclusive science-policy interfaces." The Presidency will reveal whether inclusion means citizens as knowledge producers or as end consumers.

The evidence is assembled. The infrastructure exists. The international recognition has been earned. The policy frameworks are in place. The Cork Summit is scheduled. The only missing element is political will.

Ireland can use its EU Presidency to demonstrate that citizen science works—that a citizen built a UN Digital Public Good, that Irish innovation extends beyond institutional boundaries, that democratic participation includes knowledge production.

Or Ireland can demonstrate that 17 years of exclusion was not an oversight of policy design, but a choice embedded within it.

The Presidency will make that choice visible to Europe.

Part X: The Cost of Inaction

The Cost of a Single Opportunity

A platform like OpenLitterMap requires only a single opportunity from our systems to accelerate it in a positive direction which could enable the development of a strengthened geodigital innovation cluster to help accelerate socio-economic prosperity. One research opportunity. One PhD. One institutional partnership. One paid pilot opportunity. One policy pathway that recognises postgraduate initiated software as a legitimate form of innovation.

A functioning innovation system would have recognised the launch of the iPhone as a fundamental transformation of society's data collection capacity and set up the research and innovation pathways to enable its understanding and help position and situate the purpose of these devices in society. Even modest early-stage support could have positioned Ireland as a global leader in civic technology, citizen science, and participatory environmental monitoring. Instead, the system presented only structural barriers: no funding pathway for independent researchers, no recognition mechanism for citizen-originated platforms, no policy framework connecting digital innovation to policy outcomes.

Other countries provided that single opportunity. The results are documented:

Country	Investment	Outcome
New Zealand	NZ\$2.7M initial + ~NZ\$300k/year ongoing	National citizen science litter monitoring programme (Litter Intelligence) integrated into official government reporting
United States	~US\$1.25M (NSF SBIR Phase I + II)	Litterati platform development, computer vision, 60-city deployment, UK national baseline
European Union	€2M (Plastic Pirates, 13 countries)	Cross-border citizen science programme engaging schools and communities
Ireland	€0	<i>200+ funding rejections over 17 years for the only Irish-originated UN Digital Public Good in this domain</i>

The failure to provide a single opportunity compounds across five dimensions.

1. No Smartphone Training

Ireland has no national smartphone strategy. No citizen science plan. No policy framework connecting digital literacy to civic participation.

The consequence is predictable: a generation trained to consume content but not to create value. Screens become sites of extraction—harvested attention—rather than tools for environmental stewardship, democratic participation, or scientific contribution.

Policy response to this outcome has been reactive and punitive. The Online Safety and Media Regulation Act 2022 focuses on age verification and content restriction. Politicians propose ID requirements and usage bans. These are symptoms of a deeper failure: the absence of any positive vision for the purposeful role of technology in society.

Supporting early-stage research and innovation in citizen science would have enabled policymakers to become leaders and authors in its global implementation. Ireland could have developed smartphone training methodologies, exported educational frameworks, and demonstrated how digital devices can transform environmental outcomes. Instead, the policy conversation centres on how to limit harm from devices whose beneficial applications were never recognised.

Smartphone policy has been developed largely without input from practitioners in geography, software engineering, digital product design, or civic technology—reflecting a governance gap between regulation and technological capability.

What society needs is not more government surveillance but training in the fundamentals of technology: how to contribute rather than consume, how to think rather than be told, how to generate data rather than merely surrender it, how to use devices as instruments of participation rather than exclusion.

2. Weakened Digital Innovation Cluster

Ireland excels at economic cluster development. Pharmaceutical manufacturing, medical devices, financial services, sustainability technology, and multiple areas of information technology have all benefited from coordinated policy support, institutional investment, and strategic positioning.

Unfortunately, this economically advantageous position does not extend to domestic or civic innovation yet.

Irish institutions cannot identify or articulate the benefits of citizen-led digital infrastructure. There is no funding category for platforms that generate public goods. There is no recognition pathway for open source contributions that cannot be transferred to the central planning of the state. There is no policy mechanism connecting environmental citizen science to public and environmental health.

This is not a failure of talent, but of institutional limitations.

This structural blindspot has significant socio-economic consequences. While Ireland maintains its existing clusters, other jurisdictions are developing new ones. Civic technology, participatory governance, environmental data infrastructure, and citizen science platforms represent emerging markets with significant growth potential. Countries that invested early—Austria with SPOTTERON, New Zealand with Litter Intelligence, the United States with NSF SBIR support for environmental applications—are now capturing market share that Ireland could have been leading on.

The market does not wait for Ireland to recognise what it missed. Austrian platforms now sell citizen science infrastructure to countries that never built their own—including, through MaREI's adoption of SPOTTERON, to Irish research institutions located ten kilometres from where OpenLitterMap was developed.

3. Wasted Taxpayer Contributions

Ireland's approach to litter monitoring exemplifies misallocated public investment.

The National Litter Pollution Monitoring System (NLPMS) has operated for 26 years. It relies on contracted clipboard surveys using manual methodology, producing annual reports with limited no spatial resolution, no temporal granularity, and no capacity for citizen engagement. The system captures a fraction of the data that modern citizen science platforms generate. They are structurally limited by design.

Ireland spends approximately €100 million annually on litter-related costs: cleanup, enforcement, contracted monitoring, and the downstream consequences of ineffective intervention. A genuine investment in citizen science education—perhaps €1 million annually—could transform both the data infrastructure and the behavioural outcomes that drive litter generation.

Innovation should reduce public expenditure or enable resources to be redirected to areas of greater need. Housing, healthcare, and education all face funding constraints. Money spent on clipboard systems that produce inferior data to citizen science platforms is money unavailable for priorities that cannot be addressed through voluntary participation.

4. Reputation

Ireland holds a seat at significant international tables. It is a signatory to the Paris Climate Agreement, committed to the UN Sustainable Development Goals, bound by the Aarhus Convention on access to environmental information and public participation, and embedded in the EU Green Deal framework. It participates in EU environmental directives, digital strategies, and climate commitments. Irish officials attend these negotiations and endorse these frameworks.

The Aarhus Convention explicitly requires public participation in environmental decision-making. The SDGs call for citizen engagement in monitoring and implementation. The EU Green Deal envisions participatory transition. Ireland signs these agreements. It does not build the domestic infrastructure to deliver them.

Ireland has no national citizen science strategy. No funding pathway for participatory environmental monitoring. No recognition mechanism for citizen-originated platforms that could help Ireland meet the commitments its diplomats negotiate abroad.

The gap between international positioning and domestic reality is measurable. Innovation Island is a brand. The treatment of citizen-originated infrastructure reveals the operational reality. Ireland's international credibility depends on the assumption that commitments made at EU and UN level translate into action at home.

Ireland will hold the EU Presidency in 2026 having signed every relevant agreement while building none of the citizen infrastructure those agreements require.

5. Lost Research Capacity

Citizen science research, innovation and adoption could be significantly more advanced by now.

A single early investment could have catalysed institutional development: collaborating professorships across geography, computer science, environmental science, and education; PhD programmes developing novel methodologies for participatory environmental monitoring; cross-disciplinary research centres demonstrating how to include society in the protection of biodiversity, water quality, and public spaces.

None of this exists.

The absence is not accidental; it is the cumulative result of 17 years without a single enabling decision. Irish universities produce graduates with relevant skills. The education was exceptional. The research pathway was absent.

The research capacity that could have positioned Ireland as a global leader in environmental citizen science was never built. The opportunity cost is now embedded in the structure of Irish academia, invisible because the alternative was never allowed to develop.

These failures share a single origin: the absence of a recognised research and innovation pathway for citizen-originated digital infrastructure.

Part X-B: Signs of Progress (December 2025)

Despite structural barriers, recent engagement demonstrates that when pathways open, progress follows.

Local Authority Engagement In December 2025, we met with Cork City Council's Environment Department—the first such engagement in 17 years of development. Council officials indicated commitment to supporting LitterWeek during National Spring Clean Week 2026. This demonstrates that local authorities will engage when research concepts and software infrastructure is more developed.

Innovation Hub Recognition Tyndall National Institute's European Digital Innovation Hub (EDIH) has recently been formed to support local SME development³⁷. They have indicated willingness to provide support contingent on re-establishment of a limited company structure. This represents the first institutional recognition from an Irish research body—and highlights how company structure requirements can create barriers for citizen-originated projects operating on limited resources.

Market Validation Within 24 hours of launching LitterWeek.org, a school principal requested that his small school become Ireland's first pilot programme. The speed of uptake demonstrates latent demand—schools want digital skills training for their students. What is missing is not interest but funded delivery capacity.

Underutilised Procurement Pathways Pre-tender contracts (under €10,000—€50,000) allow public bodies to commission pilots without full procurement processes. This mechanism is significantly underutilised for micro SMEs and capacity building. Local authorities and ETBs could commission LitterWeek pilots immediately under existing procurement rules—no new policy required.

These developments suggest the infrastructure is ready for integration. The constraint is not demand, recognition, or legal authority. It is the absence of a coordinating decision to activate existing pathways before Ireland's EU Presidency in July 2026.

³⁷ <https://entire-edih.ie/>

Part XI: Recommendations

Tier 1: Immediate Actions (No Budgetary Requirement)

1.1 Ministerial Acknowledgment

Either the Minister for the Education & Youth (E&Y) *and/or* The Minister for Climate Energy & Environment (CEE) *and/or* the Minister for Further & Higher Education, Research, Innovation & Science (FHERIS) should formally acknowledge the potential of nurturing Ireland's domestic citizen science capacity in relevant policy communications.

1.2 Departmental Coordination Lead

DFHERIS should designate an Assistant Secretary-level official to serve as cross-government coordination lead for citizen science.

1.3 Interdepartmental Briefing

An interdepartmental briefing be convened no later than Q 2026 to align Ireland's position ahead of the EU Presidency.

Departments to be represented:

- Department of the Environment, Climate and Communications
- Department of Education
- Department of Enterprise, Trade and Employment
- Department of Further and Higher Education, Research, Innovation and Science
- Department of Rural and Community Development

The briefing should establish:

- An agreed inventory of existing citizen science infrastructure in Ireland
- Ireland's obligations under Aarhus, the SDGs, and EU Green Deal participation requirements
- Ireland's intended position on citizen-generated data during the Presidency

Tier 2: Pilot Implementation Measures

The following pilot programmes can be commissioned under existing procurement frameworks. Contracts below relevant public procurement thresholds (typically €10,000-€50,000 for services under national rules) do not require full tender processes.

These pilots are service delivery and capacity-building engagements, not research grants, and fall within existing procurement discretion.

2.1 Local Authority Pilots

Pilot contracts with Local Authorities for delivery of LitterWeek citizen science training:

- **Contract value:** €10,000 per authority
- **Scope:** One-week citizen science training programme in 5 schools or community groups
- **Deliverables:** Digital skills training, evaluation reports, geotagged litter data, improved local authority capacity for ongoing citizen engagement

National coverage: 31 Local Authorities × €10,000 = €310,000

This will generate more actionable data at a fraction of current contracted survey costs while building local capacity in climate action.

2.2 ETB Digital Skills Integration

Pilot contracts with Education and Training Boards for curriculum integration:

- **Contract value:** €50,000 per ETB
- **Scope:** One-week citizen science training in up to 25 schools or FET groups. Emergence of citizen science as a new and innovative digital skills programme for beginner to more advanced skills training
- **Deliverables:** Curriculum materials, trained facilitators, student-generated environmental data, increased institutional capacity

National coverage: 16 ETBs × €50,000 = €800,000

2.3 Combined Investment

Total for national pilot coverage: €1,110,000

This represents approximately 1% of Ireland's estimated annual litter-related expenditure. It will establish citizen science delivery capacity in every local authority area and every ETB region delivering a **fresh concrete baseline** of our citizen science capacity.

2.4 Data-Sharing Framework

Establish a Memorandum of Understanding between OpenLitterMap and participating Local Authorities for real-time data access, citizen communication and reporting. OLM data is already open in near-real time, but not yet integrated into LA systems in real-time.

This will enable:

- Local authority access to citizen-generated data for their areas in real-time and stream it to the relevant service provider or contractor (e.g. powerwashing, drug related paraphernalia, graffiti removal, street-sweeper, etc)
- Nurture a domestic innovation model that can be grown and be exported
- Support the development of a leading global digital innovation cluster in Cork

Tier 3: Structural Reform Measures

The following actions require policy development and new funding mechanisms.

3.1 National Citizen Science Strategy

Development of a national citizen science strategy.

Germany adopted its strategy in 2016. Austria has operated a national citizen science platform since 2014.

The strategy should include:

- **Recognition framework:** Criteria for acknowledging citizen science contributions to geospatial monitoring & infrastructure development
- **Funding pathway:** Dedicated funding stream for citizen science infrastructure, digital skills training, & capacity development
- **Measurable outcomes:** Baseline evaluation, targets for citizen participation, data volume, and policy integration

3.2 Research Ireland Citizen Innovator Pathway

Research Ireland establish a **Citizen Innovator Pathway** within its funding architecture.

A Citizen Innovator Pathway will:

- Recognise demonstrated impact (peer-reviewed citations, international adoption, independent validation)
- Provide funding for infrastructure maintenance and new project development.
- Remove IP transfer requirements to enable funding for open source R&D
- Reflect the reality that contemporary digital and AI tooling is increasingly enabling individuals to build infrastructure that previously required teams & institutions

3.3 Irish SBIR Equivalent

An establishment of an Irish equivalent to the United States Small Business Innovation Research (SBIR) programme.

The US SBIR programme provides early-stage, non-dilutive federal funding for innovative small market-driven businesses, including citizen science platforms. SBIR funding enabled a similar platform to receive approximately US\$1.25 million (Phase I + Phase II awards) from the National Science Foundation without surrendering equity or intellectual property. Ireland's €500M DTIF does not accept applications from solo founders—only consortiums of established industries.

An Irish SBIR equivalent will:

- Provide seed funding for exemplary proof-of-concept development.
- Require no equity transfer or IP assignment
- Encourage open source as public money = public good
- Accept applications from individuals and micro-enterprises
- Prioritise public-benefit innovation alongside commercial potential
- Leverage the networking capacity of the state to increase collaboration with Universities, Institutions, schools etc
- Follow the SBIR model of phased funding: small initial grants for feasibility, larger follow-on funding for validated concepts that meet criteria

3.4 Geographic Innovation Support

The geospatial sector is projected to reach USD \$1.4 trillion in global GDP by 2030, growing at 14–20% CAGR³⁸. Ireland has no coordinated strategy to participate in this market.

International experience demonstrates that geospatial ecosystems are deliberately cultivated. In the United Kingdom, **Geovation**—supported by Ordnance Survey and HM Land Registry—has provided structured acceleration, dataset access, and seed funding to geospatial startups since 2014, treating geospatial infrastructure as a strategic global asset. The United States actively supports geospatial innovation through NASA, NSF, and SBIR mechanisms. Germany and Austria explicitly recognise citizen science and geospatial platforms within national research strategies.

A Geographic Innovation Accelerator will:

- Support economic cluster development in the emerging geospatial market.
- Fill a massive gap in our innovation pathways
- Accelerate our ability to deliver on national priorities
- Offer access to institutional networking & technical expertise
- Deliver non-dilutive seed funding & non-financial support to early-stage concepts & platforms
- Support both pre-commercial and public-benefit innovation from concept development to market deployment & scaling

Tier 4: Presidency-Level Actions (July–December 2026)

The objective of Tier 4 is to achieve a Presidency legacy: integration of citizen science into EU-level discussions on environmental monitoring, participatory governance, climate, urban, and health policy.

4.1 Citizen-Generated Data Standards

Ireland should champion recognition of citizen-generated data in EU environmental monitoring frameworks.

The EU is developing data frameworks under the Green Deal. Ireland should advocate for:

- Recognition of citizen-generated data in official environmental monitoring
- Contribute to recognition & standardisation of criteria that enable citizen science platforms to feed into national and EU policy development
- Demonstrate research and innovation pathways for local and regional development

4.2 Citizen Science Presidency Showcase

Ireland should host a participatory citizen science summit event during the Presidency programme.

This event will:

- Feature Irish and European citizen science platforms
- Demonstrate practical applications for environmental monitoring, public health, and democratic participation
- Position Ireland as a leader in participatory research

Options include a hackathon + workshop, innovation showcase, citizen science conference, or LitterWeek campaign.

³⁸ <https://geospatialworld.net/gw-market-insights/advancing-augmenting-usd-1-4-trillion-geospatial-market-by-2030/>

4.3 European Mayors' Summit Integration (Cork, October 2026)

Citizen science must be included in the European Mayors' Summit on Climate and Health, to be held in Cork during Ireland's Presidency.

The Summit's focus on climate and health aligns with citizen science capabilities:

- Air quality monitoring through citizen-deployed sensors
- Litter and pollution mapping through participatory data collection
- Urban biodiversity tracking through community observation
- Walkability auditing through citizen-reported data

4.4 OECD Policy Review

Ireland should commission an OECD-aligned review of Ireland's citizen science policy landscape.

This review will:

- Benchmark Ireland against peer countries
- Identify structural barriers to citizen science integration
- Provide independent validation of the gaps identified in this dossier
- Generate recommendations from an internationally recognised policy authority

4.5 Participatory Research Leadership

Ireland should position itself as a leader in participatory research and innovation during its Presidency.

This requires:

- A credible national position (Tiers 1–3)
- Active engagement in EU citizen science networks
- Contributions to the EU narrative on digital skills & public participation

Part XII: Documented Effort (2008–2025)

Stage 1: Fundamental Research & Concept Development

Year	Milestone
2008	Introduced to GIS as undergraduate, University College Cork. Concept for real-world environmental data collection game began with a challenge to write a dissertation in 3rd year.
2011	Wrote a dissertation on the walkability and mapping anti-social behaviour of my local urban neighborhood.
2012	Worked as divemaster in Koh Tao, Thailand. Inspired to develop citizen science tools for tropical coastal ecosystems.

Stage 2: Literature Review & Methodology Development

Year	Milestone
2013	Returned to Ireland to complete a MSc in GIS & Remote Sensing at UCC. Introduced to OpenStreetMap; OpenLitterMap concept developed as its real-time data collection layer.
2014	First pitched to New Frontiers entrepreneur programme. Told the idea was "timely" but provided no introduction to investors or further support after completing Stage 1.
2015	Completed a second MSc (Coastal & Marine Environments, NUIG) with a first-class honours dissertation on OpenLitterMap and the citizen science of litter & plastic pollution. Became only Irish founding member of the European Citizen Science Association.

Stage 3: Self-Taught Software Engineering & Platform Launch

Year	Milestone
2016	Self-taught full-stack software development. Wrote stacks of code with pen and paper. Began building OpenLitterMap from scratch.
2017	15 April: OpenLitterMap.com launched. Funded entirely with personal savings. Began accepting uploads globally.
2018	First peer-reviewed publication. First software engineer position secured; platform development which continued evenings and weekends.

Stage 4: Continuous Development & Structural Obstacles

Year	Milestone
2019	GeoTech Innovations Ltd incorporated to apply to Science Foundation Ireland. iOS app launched. State of the Map conference speaker (Heidelberg). Ignored by SFI.
2020	Android app launched. Platform open-sourced under GPL-v3.0. Wrote first Oireachtas submission: <i>The Magic Teapot: Citizen Science—A Scientific Renaissance</i> . Acknowledged; no action.
2021	First funding opportunity from a crypto fund: Project Catalyst on Cardano invested ~€20,000 into OpenLitterMap and citizen science. Engine Lease Finance corporate pilot delivered. Two developers were hired. OpenLitterAI training tool released. UN Geneva Forum presentation.
2022	Mobile App v3.2.3 stable. Platform approaching 250,000 uploads. Second crypto funding (Bitcoin). 12-page report sent to multiple Oireachtas committees—no substantive response. Presentations to Cork City Council and UNEP.
2023	Platform improvements. AWS Public Sector Blog feature.

Stage 5: The Death of GeoTech Innovations Ltd & Birth of LitterWeek

Year	Milestone
2024	GeoTech Innovations Ltd wound down after receiving its final (200+) rejection from Research Ireland. Started using AI to refactor OpenLitterMap and fix a lot of technical debt while developing the LitterWeek concept further.
2025	Second Oireachtas submission: <i>From Data to Direction</i> . Launched LitterWeek.org. First national school pilot secured within 24 hours of launch. Met with Cork City Council civil servants & engineers in the litter department for the first time. Wrote <i>The Democracy Gap</i> for 2026.

Academic Impact (2018–2025)

Lynch's peer-reviewed paper has been cited in 98+ academic publications³⁹.

Year	Citations	Notable Publications
2018	2	Original publication (Lynch, S.)
2019	5	<i>Nature Sustainability</i> : Citizen science and UN SDGs
2020	7	<i>Royal Society Philosophical Transactions</i> : Marine conservation
2021	14	World Bank : <i>From City to Sea</i> guide for municipalities
2022	14	Multiple AI/computer vision papers adopting OLM methodology
2023	19	Taylor & Francis textbook; JOSS: Trash AI
2024	20	<i>Nature</i> : Citizen science for GBF indicators
2025	7+	Continuing citations in AI, environmental monitoring, blockchain

Altmetric ranking: Top 5% of 26 million research papers tracked globally⁴⁰.

³⁹

<https://github.com/OpenLitterMap/openlittermap-web/blob/42f032e0ea481dd7ca1a1de68bca14fa2e914e65/resources/js/views/Academic/referencesList.js>

⁴⁰ <https://springeropen.altmetric.com/details/43580718#score>

Case Study: Engine Lease Finance (2021)

In 2021, Engine Lease Finance—a global aircraft engine leasing company headquartered in Shannon—purchased a licence to use OpenLitterMap for one year.

Programme delivered:

- Global workforce given half-day Friday for community litter collection & impact communication
- Employees participated with their families, teaching them digital skills and active citizenship
- Data & maps used in corporate sustainability reports
- Flagship project continuously demonstrated across EU and global institutions

Outcome: The company received cost-effective community-first engagement, employee wellbeing, internal team-building value development commitments, a half-day to spend with family, and CSR compliance. OpenLitterMap received its first Irish corporate client.

Significance: This engagement demonstrated market demand for structured citizen science training delivered through employer-sponsored programmes. This interaction directly informed the development of LitterWeek as a formalised training and delivery model.

Constraint: Despite proven commercial viability, the LitterWeek model remains in development for years. The absence of research and innovation pathways—PhD programmes, accelerator support, institutional partnerships—has prevented the structured market development that would enable regional scaling. Many functioning societies instead race ahead with active supports leaving Ireland’s solo-founder community to do everything events & weekends instead of having a full-time opportunity.

The Engine Lease Finance case demonstrates that demand exists. What is missing is the institutional infrastructure to identify it.

Recent Activity (2024–2025)

- LitterWeek programme developed as a practical delivery mechanism in December 2025.
- Outreach conducted to: Cork ETB, Cork City Council, schools, local authorities
- December 2025: First meeting with Cork City Council civil engineers
- First school pilot confirmed: Q1-2 2026

LitterWeek represents an adaptation to institutional barriers—reframing existing infrastructure as a structured education and skills programme rather than a standalone research platform.

Platform Scale (28th December 2025 10.30pm GMT+1)

Metric	Value
Uploads	505,859
Tags	838,834
Participants	8,875
Countries	110
Brands identified	1,500+

Cumulative Record

Category	Total
Years of development	17
Personal funds invested	€100,000+
Funding and partnership applications	200+
Oireachtas submissions	2
State funding received	€0
Ministerial meetings granted	0

Conclusion

The record demonstrates systematic pursuit of available institutional pathways over seventeen years. International recognition, academic citation, and proven operational capacity were achieved without domestic institutional engagement.

This is not a failure of effort. It is a structural exclusion embedded in existing research, funding, and policy pathways—one that individual persistence alone cannot overcome.

Part XIII: Accountability & Progress

This document has presented evidence. It has named institutions, counted staff, traced funding flows, and documented structural exclusion. It has connected litter on the streets to the obesity epidemic to screen addiction and barriers to democratic participation.

What remains is a set of questions that Irish institutions must answer to the citizens they serve:

1. If a citizen builds a UN-recognised platform over 17 years, what is the pathway for the state to recognise it?
2. If the industries that create waste fund the education about waste, whose interests does that education serve?
3. Across four departments, more than 185 Principal Officers have held responsibility for policy domains in which no formal citizen science pathway exists. Can any department identify and rectify this?
4. Is democracy a minimalist 1 vote every 4-years event, or is it continuous participation and civic engagement?
5. If we teach children "don't litter, eat healthy, limit screens, be active citizens" while doing nothing to support the development systems that can teach these, what are we actually teaching them?

The cost of not answering these questions has direct social implications. It is borne in underdeveloped innovation ecosystems, ineffective contracts and outdated monitoring systems, rising public health risks, disengaged citizens, and increased institutional stagnation. The continued outsourcing of digital knowledge and capacity to foreign actors represents that our institutions are not fit for purpose. Each year of inaction entrenches systems that are more expensive to run, less trusted by the public, and less capable of meeting stated policy goals.

It is also a matter of record that both OpenLitterMap and LitterWeek have been developed in Cork South-Central. This constituency is represented by the Taoiseach, Micheál Martin, and is also the political base of Ireland's EU Commissioner for Democracy, Michael McGrath who previously held the position of Minister for Finance, and the Minister for Public Expenditure & Reform.

This geographic proximity underscores that the absence of a pathway for citizen-built public infrastructure cannot be attributed to lack of visibility, distance from decision-making, or peripheral location. The work has been developed at the centre of Irish political authority and European democratic responsibility.

The EU Council Presidency in July 2026 is not symbolic. It is the only clear, time-bound opportunity for Ireland to demonstrate—at negligible cost—whether citizen-built public infrastructure matters. If this moment passes without action, the message to citizens and to Europe will be unambiguous: there is no pathway, and there is no intention to create one.

Final Note: The Historical Record

In December 2025, a document was submitted to Irish government officials. It documented:

- A UN-recognised Digital Public Good developed by an Irish citizen over 17 years
- €100,000+ in personal investment with €0 state support
- International adoption in 100+ countries
- 98+ peer-reviewed academic citations
- 100s Principal Officers across relevant departments producing zero citizen science output
- 26 years of environmental monitoring contracted to the same firm
- No pathway for citizen knowledge to enter governance

The document proposes reforms. It offers solutions. It provides a window—the 2026 EU Council Presidency—for Ireland to step up and lead on the development of citizen science.

We will record whether the document was read or filed. Whether recommendations were implemented or ignored. Whether the structural exclusion continued or was reformed.

We will record whether ministers who gave speeches about "citizen engagement" and "participatory democracy" acted on those words or merely spoke them.

We will record whether a country during a period of unprecedented fiscal capacity found a way to support domestic innovation—or continued to claim there was no pathway.

The evidence has been assembled. The pathways have been proposed. What remains is a decision.

Contact & Resources

Seán Lynch — Founder, OpenLitterMap & LitterWeek

info@openlittermap.com | sean@litterweek.org

Geographer | Software Engineer | Tropical Divemaster | Atlantic Snorkeler

MSc GIS & Remote Sensing (UCC) | MSc Coastal & Marine Environments (NUIG)

openlittermap.com | litterweek.org | druglitter.info | discoverable.app

Appendices

Academic Publications

1. Fassi, L., Ferguson, A.M., Przybylski, A.K., Ford, T.J., & Orben, A. (2025). Social media use in adolescents with and without mental health conditions. *Nature Human Behaviour*, 9(6), 1283-1299. <https://doi.org/10.1038/s41562-025-02134-4>
2. Geyer, R., Jambeck, J.R., & Law, K.L. (2017). Production, use, and fate of all plastics ever made. *Science Advances*, 3(7), e1700782. <https://doi.org/10.1126/sciadv.1700782>
3. Karali, N., Khanna, N., & Shah, N. (2024). Climate Impact of Primary Plastic Production. Lawrence Berkeley National Laboratory. <https://doi.org/10.20357/B7MS3W>
4. Lynch, S. (2018). OpenLitterMap.com – Open Data on Plastic Pollution with Blockchain Rewards (Littercoin). *Open Geospatial Data, Software and Standards*, 3(6). <https://doi.org/10.1186/s40965-018-0050-y>
5. Marfella, R., Prattichizzo, F., Sardu, C., et al. (2024). Microplastics and Nanoplastics in Atheromas and Cardiovascular Events. *New England Journal of Medicine*, 390(10), 900-910. <https://doi.org/10.1056/NEJMoa2309822>
6. Riehm, K.E., et al. (2019). Associations Between Time Spent Using Social Media and Internalizing and Externalizing Problems Among US Youth. *JAMA Psychiatry*, 76(12), 1266-1273. <https://doi.org/10.1001/jamapsychiatry.2019.2325>
7. Roche, J., Ní Shúilleabháin, A., Mooney, P., Barber, G.L., Bell, L., & Ryan, C. (2021). Citizen Science in Ireland. *Frontiers in Communication*, 6, 629065. <https://doi.org/10.3389/fcomm.2021.629065>
8. Wolin, S. (1989). *The Presence of the Past: Essays on the State and the Constitution*. Johns Hopkins University Press, p. 150.
9. Yakovenko, N., Pérez-Serrano, L., Segur, T., Hagelskjaer, O., Margenat, H., Le Roux, G., & Sonke, J.E. (2025). Human exposure to PM10 microplastics in indoor air. *PLOS ONE*, 20(7), e0328011. <https://doi.org/10.1371/journal.pone.0328011>

Reports and Policy Documents

1. Center for International Environmental Law (2019). Plastic & Climate: The Hidden Costs of a Plastic Planet. <https://www.ciel.org/plasticandclimate/>
2. CyberSafeKids (2024). Left To Their Own Devices: Annual Trends and Usage Report 2023-24. Dublin: CyberSafeKids. <https://www.cybersafekids.ie/report2024/>
3. Department of Climate, Energy and the Environment (2025, June 4). €27 million to accelerate Ireland's circular economy transition. Government of Ireland.

<https://www.gov.ie/en/department-of-climate-energy-and-the-environment/press-releases/27-million-to-accelerate-irelands-circular-economy-transition/>

4. Department of Education (2022). Digital Strategy for Schools to 2027. Dublin.
5. Government of Ireland (2016). A Healthy Weight for Ireland: Obesity Policy and Action Plan 2016-2025. Department of Health.
6. Government of Ireland (2022). Harnessing Digital: The Digital Ireland Framework. Department of the Taoiseach.
7. Government of Ireland (2025). Climate Action Plan 2025. Department of Environment, Climate and Communications.
8. OECD (2022). Global Plastics Outlook: Economic Drivers, Environmental Impacts and Policy Options. OECD Publishing, Paris. <https://doi.org/10.1787/de747aef-en>
9. OECD (2023). Climate Change and Plastics Pollution: Policy Highlights. p.7. https://www.oecd.org/content/dam/oecd/en/publications/reports/2023/05/climate-change-and-plastics_d3364145/5e0bfe87-en.pdf
10. OECD (2025). Embedding citizen science into research policy. OECD Science, Technology and Industry Policy Papers, No. 175. OECD Publishing, Paris. <https://doi.org/10.1787/a1cfb1a8-en>
11. Online Health Taskforce (2025). Final Report of the Online Health Taskforce. Department of Health, Ireland. Published 12 December 2025.
12. Pew Research Center (2025, April 22). Social Media and Teens' Mental Health: What Teens and Their Parents Say. <https://www.pewresearch.org/internet/2025/04/22/teens-social-media-and-mental-health/>
13. Safefood (2017). The Cost of Childhood Overweight and Obesity on the Island of Ireland. Cork: Safefood.
14. Stanford Medicine (2025, January 29). What's the deal with microplastics, the material that 'never goes away'? Stanford Medicine News. <https://med.stanford.edu/news/insights/2025/01/microplastics-in-body-polluted-tiny-plastic-fragments.html>
15. United Nations Environment Programme (2023). Turning off the Tap: How the world can end plastic pollution and create a circular economy. UNEP, Nairobi.
16. World Economic Forum (2025, September). Why solving plastic pollution is one of the biggest climate wins hiding in plain sight. <https://www.weforum.org/stories/2025/09/why-solving-plastic-pollution-is-one-of-the-biggest-climate-wins-hiding-in-plain-sight/>
17. World Health Organization (2022). WHO European Regional Obesity Report 2022. WHO Regional Office for Europe, Copenhagen.

International Frameworks

1. European Commission (2025). European Democracy Shield. November 2025.
2. United Nations Statistical Commission (2025). Copenhagen Framework on Citizen Data. UN Statistical Commission, March 2025.