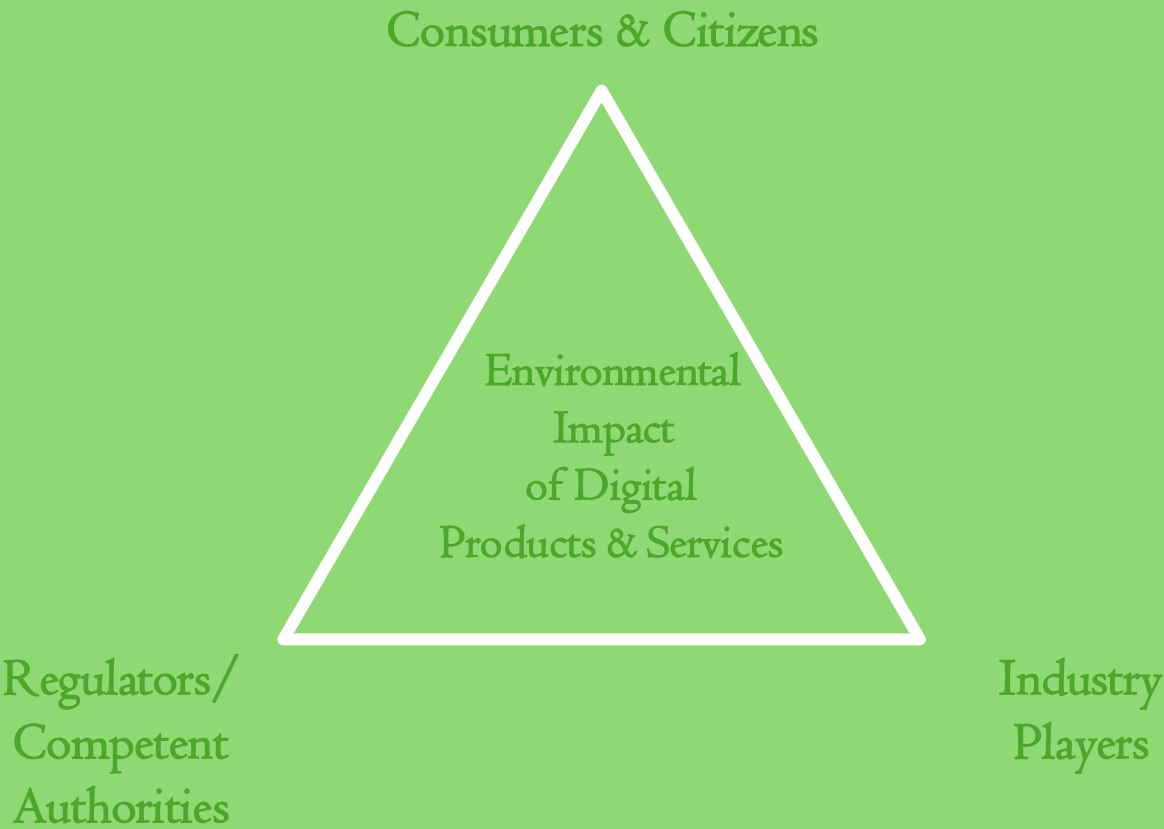
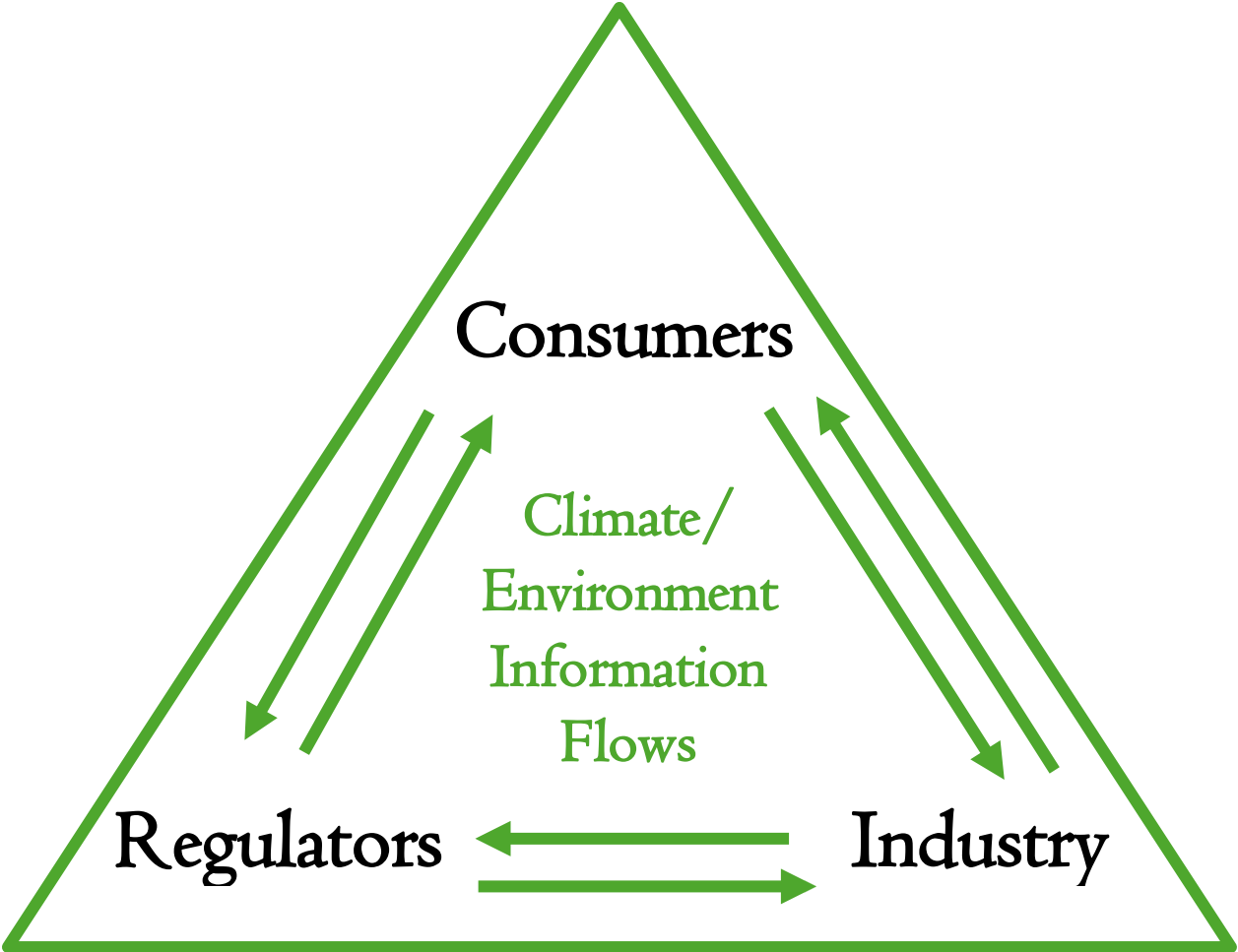


# Information Flows for the ‘Twin Transition’: The Triangle of Environmental Transparency



# Triangle of Environmental Transparency:



# Introduction

The 'Twin Transition' promotes the objective that as society becomes increasingly digitalized, it will simultaneously become more environmentally sustainable. While this is a worthwhile objective it is not an inevitability that digital progress will occur in parallel to more environmentally sustainable ways of powering the 'digital transition'. The Twin Transition will not come about organically and requires both thought leadership from a policy perspective and action from industry. The energy and resource demands required to fuel the digital economy require policies and actions to ensure that the proliferation and enablement of ICT across sectors does not rely on materials and processes, which will continue to damage the planet, as the default options.

Digital technologies are often lauded as enablers of the Twin Transition and viewed as critical drivers to achieve the objectives of the Paris Agreement and deliver the UN's Sustainable Development Goals (SDG). However, a growing body of research points to the significant environmental impact of these digital activities<sup>1</sup>. The environmental impact is not confined to Green House Gas emissions (GHGE) of using digital technologies, which are often in the spotlight, but also the environmental degradation associated with mining, manufacturing, production, distribution and decommissioning/end-of-life of electronic communications networks and services.

Currently, it is estimated that the ICT sector contributes to 4% of GHGE<sup>2</sup>. While this may seem like a small proportion, it is not insignificant – comparable to direct emissions from the aviation sector – and, furthermore, is predicted to continue to increase due to the growing use of connected and wearable devices, the resources required to run data centres, AI applications and the digitalisation of existing analogue products and services. The French telecoms regulator, Arcep, in 2024 noted that the country's four main electronic communications operators' emissions increased by 2% for the second year in a row "to reach 382,000 tonnes of CO2 equivalent in 2022"<sup>3</sup>.

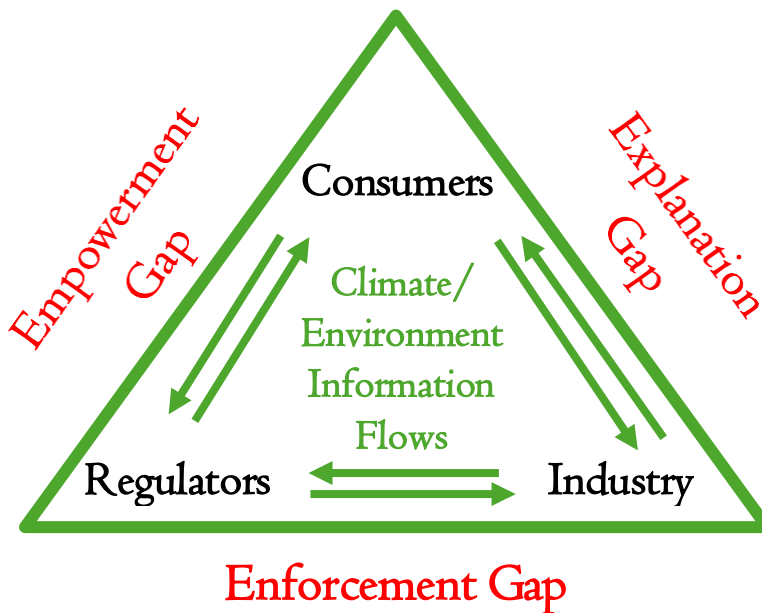
There are three main problems that hindering the realisation of a truly 'twin' transition:

- The lack of standardised data on the environmental impact of digital from industry
- An enforcement gap relating to the objectives of the Twin Transition
- Green 'blurring' where information presented to consumers is obfuscated

This essay puts forward a framework of the information flows required between consumers and industry, between consumers and regulators (or competent authorities) and between regulators and industry. Currently, none of these six 'information flows' are performing optimally, resulting in three gaps: an Explanation Gap, and Enforcement Gap, and an Empowerment Gap.

If these three gaps can be addressed, and the if six information flows can be established and maintained in an accurate and timely manner, then this '*Triangle of Environmental Transparency*' would be a foundation upon which the targets of the Twin Transition can be met, to assure future environmental sustainability. While this essay relies heavily on evidence from a European perspective, the Twin Transition in the context of combatting climate change is obviously a global problem, impacting every inch of our planet.

# Gaps: Problems with Current Info Flows



Currently, none of these 'flows' are performing optimally, resulting in three gaps:

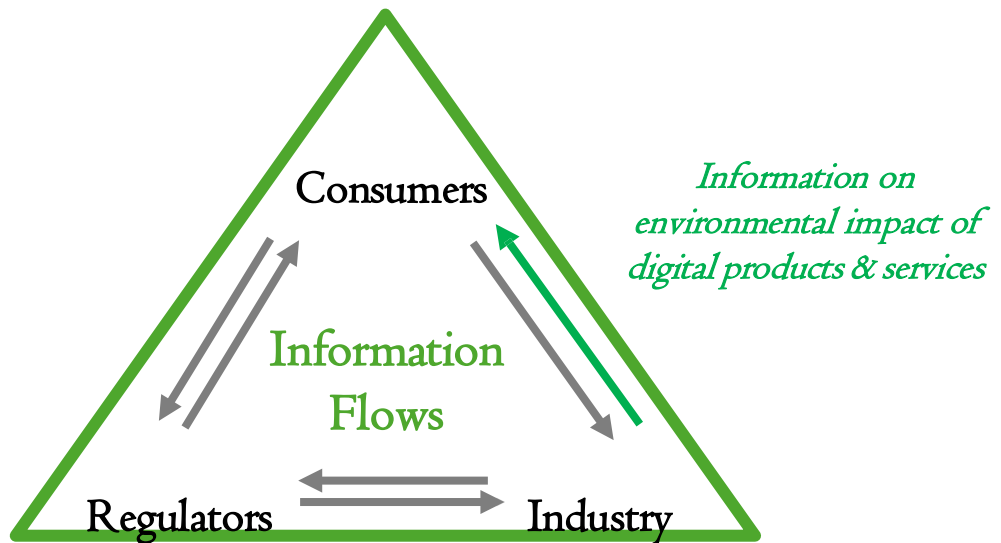
- An 'Explanation Gap' between Industry and Consumers
- An 'Enforcement Gap' between Regulators and Industry
- An 'Empowerment Gap' between Regulators and Consumers

**Explanation Gap:** Information collected by the European Commission on 'empowering consumers for the green transition'<sup>4</sup> found that 33% of participants cited difficulty in verifying environmental claims as the main obstacle for their participation in the circular economy, and 28% reported a lack of knowledge on how to adopt 'more sustainable consumption behaviour'. This information asymmetry between industry and consumers can be addressed by industry players providing accessible, easily digestible and verifiable information on the environmental impact of products/services to consumers. This can be addressed in parallel to the 'Empowerment' gap (below).

**Enforcement Gap:** A report from the Body of European Regulators for Electronic Communications (BEREC) on 'Sustainability Indicators for Electronic Communications Networks and Services' highlighted that only certain National Regulatory Authorities (NRAs) collect data regarding the environmental impact of electronic communications networks, and the data collected is not homogenous<sup>5</sup>. Moreover, regulators and competent authorities often lack the mandate and expertise to collect information/assess environmental performance of industry. This may require cooperation with environmental protection agencies, who have the environmental expertise but may not have the depth expertise in the communications sector.

**Empowerment Gap:** Another recent BEREC report, 'Empowering end-users through environmental transparency on digital products'<sup>6</sup> sought to address this empowerment gap. The report found that efforts of the ICT industry are essential for end-users' empowerment and environmental transparency on digital products, and that telecom regulators have a role to play to support end-users' awareness on the environmental footprint of ICT products, in collaboration with other competent bodies.

# I. Info Flow: Industry to Consumers



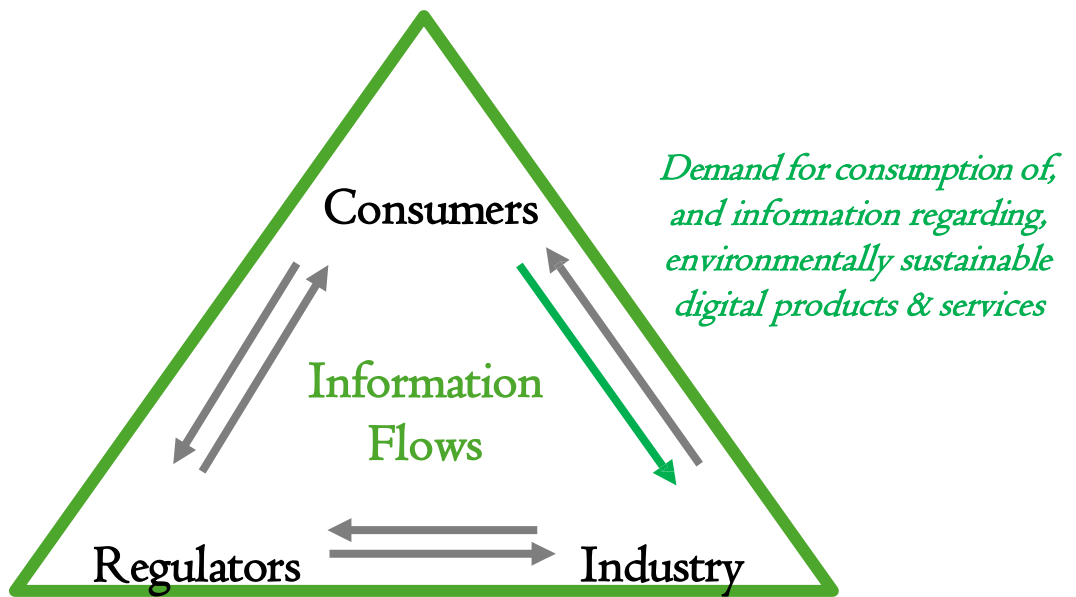
In order for the communications industry to assure future sustainability, industry players must provide accurate and accessible information regarding the environmental impact of digital products and services they provide to consumers. When consumers, who value environmentally sustainable offerings, have digestible and comparable information on the environmental impact of a product/service, they can then make an informed purchasing decision on this basis of this information. In the absence or obfuscation of such information, a company could profit from a potentially higher price paid for a so-called 'green' offering, which thus gives them a competitive advantage based on a falsehood. In this instance, the consumer is paying a premium for an attribute of a purchase that does not exist.

**Green Blurring:** Language is important, and terms such as 'green' and 'environmentally friendly' are often bandied around loosely in the discourse surrounding and marketing of digital products and services. 'Green blurring' is where an organisation selectively chooses terms and information which are technically may be 'correct' but used in a particular context which obfuscated the actual impact on the environment/planet.

It is incorrect to use the terms 'net zero' and 'carbon neutral' interchangeably, as the former refers completely negating the GHGE produced by human activity by reducing emissions and absorbing carbon, whereas the latter refers to no 'net' release of carbon dioxide (CO<sub>2</sub>) into the atmosphere, often achieved through carbon offsetting. Carbon offsetting has been the subject of controversy in the wake of investigations which exposed significant flaws in many carbon offsetting programmes<sup>7</sup>.

The EU's 'Green Claims Directive'<sup>8</sup> seeks to prevent companies from making unfounded claims about environmental sustainability, although currently it is not clear how this would be enforced in Member States across sectors.

## 2. Info Flow: Consumers to Industry

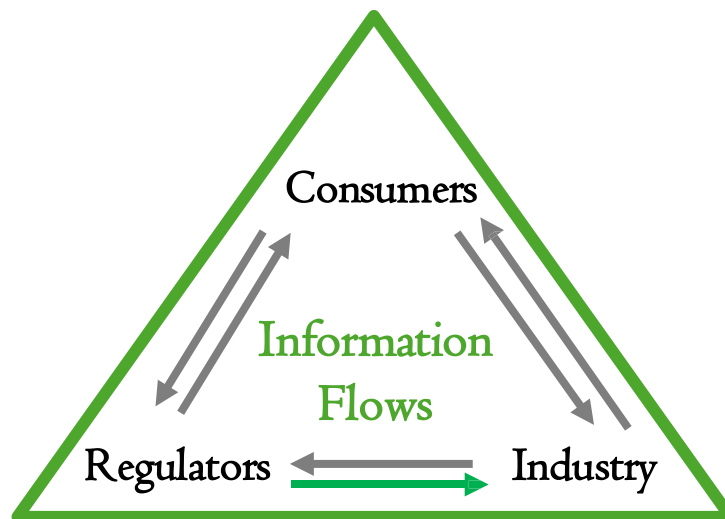


Consumers provide information to industry when they signal their willingness to choose environmentally sustainable digital products and services, which indicates the importance they place on protecting the planet and fighting climate change. These purchasing decisions can only be made when sufficient, accurate and verifiable information regarding the environmental impact of these digital products and services are provided to consumers.

In addition to purchasing decisions, there exists other data to highlight the importance that consumers place on protecting the environment. Eurobarometer data from May 2024 shows the readiness towards more sustainable consumer behaviour, with almost six in ten respondents willing to “pay more for sustainable products that are easier to repair, recyclable and/or produced in an environmentally sustainable way”<sup>9</sup>. The face-to-face survey found that European citizens support reducing the amount of waste by sorting their waste for recycling correctly and using reusable packaging, as part of a more circular economy.

In a similar vein that household appliances/buildings can have an ‘energy rating’, the European Commission has proposed an energy labelling system and ecodesign requirements for smartphones and tablets regarding battery life and durability<sup>10</sup>. While this may not appear significant for one device, the energy efficiency and savings across multiple devices in a household will not be insignificant.

### 3. Info Flow: Regulators to Industry



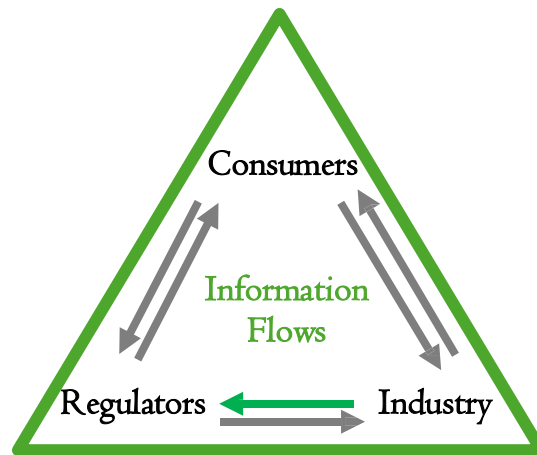
*Information on requirements to comply with legislation relating to environmental obligations and rights*

As succinctly stated by the OECD, “Regulation is a key tool for achieving the social, economic and environmental policy objectives of governments that cannot be effectively addressed through voluntary arrangements and other means”<sup>11</sup>. It can be argued that voluntary actions with regards to environmental/climate have not been sufficient to date and will not be adequate for achieving the Twin Transition.

The foreword of the 2024 joint ITU and World Bank report ‘Measuring the Emissions & Energy Footprint of the ICT Sector: Implications for Climate Action’ notes that “In most countries, data collection and analysis of the ICT sector’s GHG emissions and energy consumption is limited”<sup>12</sup>. This can be as a result of a lack of mandate and/or resources/expertise for assessing the environmental data reported by industry. Currently NRAs in the EU are tasked with enforcing the European Electronic Communications Code (EECC, of ‘the Code’, 2018)<sup>13</sup>, which has limited guidance on environmental regulation. The Code is expected to be reviewed in 2025.

In addition to applying the more tradition regulatory approached to environmental performance of electronic communications networks and services, a more innovative approach could also be to incorporate an ‘environmental’ or ‘climate’ element to Regulatory Impact Assessments (RIA). Environmental protection agencies use ‘Environmental Impact Assessments’ (EIA)<sup>14</sup>, which examine the anticipated environmental effects of a proposed project. This would require upskilling at telecoms/electronic communication regulators, as well as cooperation and coordination with environmental protection agencies.

## 4. Info Flow: Industry to Regulators



*Information and data on environmental impact of digital products & services provided*

### The First Step - Standardised Measurements of Environmental Impact:

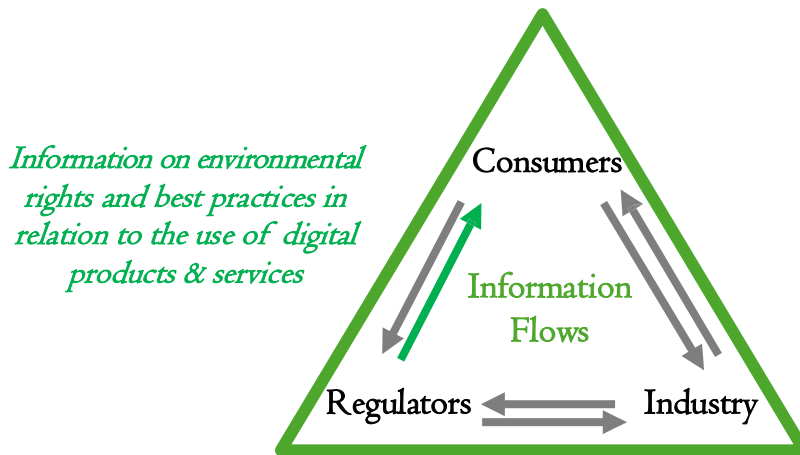
There is currently a lack of standardisation in terms of how industry measures and reports on environmental impact. In financial accounting for example, there are commonly agreed standards so that consumers/investors can compare options provided by various companies, and that regulators/competition authorities can have transparency on financial activities. Various organisations, including BEREC and ETSI, have begun to explore ways in which to standardise the measurements and metrics which could be used by industry to quantify environmental impact.

- **BEREC:** The BEREC report on Sustainability Indicators for Electronic Communications Networks and Services seeks to address harmonisation problem, piloting 19 indicators for assessing the environment performance of electronic communications networks<sup>15</sup>. This BEREC report has fed into the European Commission's work in this area, and a forthcoming 'Code of Conduct' for telecoms networks and services (similar to the Code of conduct on data centre energy efficiency<sup>15</sup>).
- **ETSI:** The European Telecommunications Standards Institute has a Working Group dedicated to Sustainable Digital Multiservice Communities<sup>16</sup>.

**Specific initiatives to operationalize the Twin Transition can only be achieved once there are widely adopted harmonised standards for measuring and assessing environmental performance in place.** One such innovation at the national level could be linking the rate of corporation tax rates to environmental performance – for example, the full rate for companies who cannot report a predefined level of environmental performance, with a reduced rate for companies with reported evidence of reduced environmental impact. This policy would be at a governmental level and outside the remit of regulators or competent authorities.

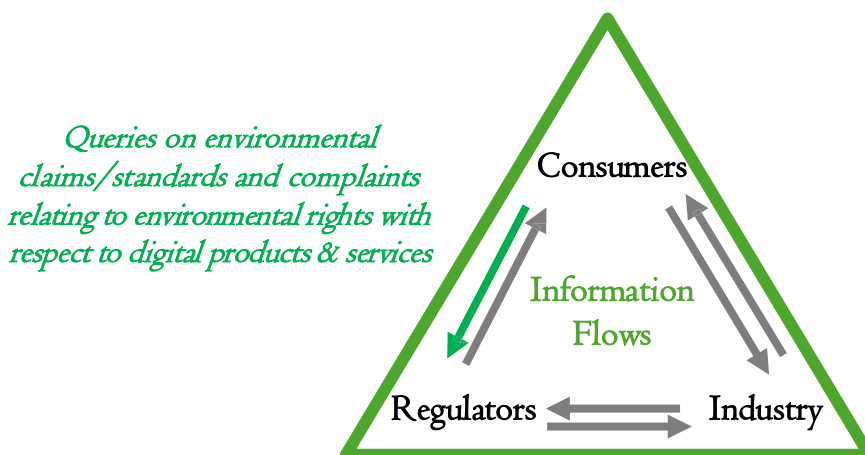


## 5. Info Flow: Regulators to Consumers



Regulators and other competent authorities are often tasked with empowering and protecting consumers. In the context of the environmental impact of digital products and services, this may be applicable to electronic communications regulators, consumer protection regulators, and environmental protection agencies. In addition to consumer rights, citizens also have environmental rights, which are being increasingly challenged in courts of law. While the burden should not be solely placed on consumers, the journey to the Twin Transition will be bolstered by consumers who are empowered by understanding the various elements of environmental impact.

## 6. Info Flow: Consumers to Regulators



Consumer complaints regarding industry players often provide regulators and competent authorities with valuable information regarding regulated entities which may be noncompliant with relevant legislation. A 2023 survey by BEUC found that almost half of respondents (48%) preferred to buy products with an environmental label than products (rather than without such a label). However, only 3% were confident in distinguishing false 'green claims' with almost 70% stating they would trust public authorities/third-party organisations to verify green claims and labels<sup>17</sup>.

## Box 1

# Electronic Communications Networks

The OECD's Digital Economic Outlook (DEO) Volume 1 2024 notes that the connectivity ecosystem is being shaped by next generation wireless networks. A 'Spotlight' section in this DEO on research initiatives, market trends and developments towards integration of terrestrial wireless connectivity solutions like 5G and 6G with non-terrestrial technologies (e.g., satellites) identifies challenges including regulatory collaboration and environmental sustainability<sup>18</sup>.

It is incredibly difficult to retrospectively ensure that a product, service or system is environmentally sustainable. For this reason, 'ecodesign' principles are gaining traction for digital products and services - for example the EU's Ecodesign for Sustainable Products Regulation (ESPR)<sup>19</sup>. In the early developmental stages of 5G, the topics of 'climate change' and 'environmental protection' were not as high on policy agenda. For 6G, conversations on environmental sustainability are happening earlier in the process and are being baked into the design of network topologies, as discussed at the Forum Europe event in Brussels in March 2023, for the panel session '5G and Sustainability'.

## Box 2

# Artificial Intelligence

The OECD's DEO<sup>18</sup> also notes that advanced AI (training and inference) will require significant compute resources, which in turn will have environmental impacts including on energy and water use, carbon emissions, e-waste and natural resource extraction like rare mineral mining. This gives cause to concern in the context where generative AI becomes more accessible, with increasing demand for server time and AI inference due to applications like user-friendly chatbots.

In 2023, researchers at UC Riverside estimated that global AI demand could cause data centres to suck up 1.1 trillion to 1.7 trillion gallons of fresh water by 2027.<sup>20</sup> The rise of 'general purpose technology' (GPT) and agentic AI will augment the future resource use and thus environmental impact of AI across the world.

# Conclusion

While digital technologies are often lauded as enablers of the 'Twin Transition' there is a growing body of research alerting policy makers, industry and environmentally conscious consumers to the significant environmental impact of these digital activities. This essay puts forward a framework of the information flows required between consumers and industry, between consumers and regulators (or competent authorities) and between regulators and industry. Currently, none of these six 'information flows' are performing optimally, resulting in three gaps: an Explanation Gap, and Enforcement Gap, and an Empowerment Gap.

If these three gaps can be addressed, and the if the information flows can be established and maintained, then this '*Triangle of Environmental Transparency*' would be a foundation to ensure future environmental sustainability.

It is of paramount importance that when digital policies and legislation are being discussed and developed with stakeholders, that environmental sustainability considerations are included in these discussions. Currently, there is a trend when 'green' or 'climate change' projects are siloed away to one side. Cooperation and coordination between electronic communications regulators, consumer protection regulators, and environmental protection agencies will also be necessary for the Twin Transition to become a reality.

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