INDIAN OCEAN COMMISSION

ASSESSMENT OF INTELLECTUAL PROPERTY ISSUES RELATED TO INNOVATIVE CIRCULAR ECONOMY PROJECTS IN THE AFRICAN AND INDIAN OCEAN DEVELOPING ISLAND STATES

SWIOFISH 2

WORLD BANK GROUP

INDIAN OCEAN
COMMISSION

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Foreword

By Dr. Charlotte de Fontaubert, World Bank

We are pleased to be associated with the publication of these reports on the circular economy in the island states of Africa and of the Indian Ocean, which aim at accelerating a development that respects the environment and that is resilient to climate change. These documents, produced by the Indian Ocean Commission (IOC) as part of the implementation of the sub-component AIODIS of the second project on the Governance of fisheries and shared growth in the South-West Indian Ocean (SWIOFish2), deal with three important aspects of circular economy in the AIODIS countries: (i) the state of the circular economy, (ii) the questions of intellectual property with regard to innovative projects and (iii) the prevention, reduction and control measures of marine plastic pollution.

The World Bank has supported, since 2015, the countries of Africa and of the South-West Indian Ocean to meet the Sustainable Development Goals (SDGs) of the United Nations. To this end, we help several countries in their transition to a more sustainable ocean economy (SDG 14). The principle of blue economy is precisely a sustainable use of marine resources to stimulate economic growth, livelihoods and employment, while preserving the health of the ocean ecosystems. In that sense, the World Bank finances regional programmes on fisheries management in the islands of the Pacific, the Caribbean, West Africa and South-West Indian Ocean. It is in this context that lies our SWIOFish2 project in coordination with the IOC.

The first objective of the project is to assist these States to grasp and to increase the economic, social and environmental advantages of blue economy. This can be achieved by improving the management of their marine resources, namely by limiting the depletion of the fish stocks. This is also possible through an increase in alternative livelihood activities for targeted fishermen, and a reinforced regional cooperation in this sector.

With the sustainability of these resources under serious threat, addressing the sources of these multiple and interconnected threats requires us to rethink our entire economy. From the World Bank's perspective, this is why we are committed to supporting these states in their journey towards a circular economy that is best described as a restorative or regenerative industrial system by intent and design.

We are confident that by pooling their experiences and their initiatives through the AIODIS cooperation mechanism, these States will be able to better face their common challenges. Overcoming these challenges will require the use of sufficient technical and financial means coming from institutional frameworks and infrastructure conducive to the development of a circular economy. Thus, it was essential to identify them for each country, so as to set up the foundations of a framework that is adapted to different socio-economic contexts. Endowed with this new knowledge, we can henceforth move forward together towards a circular economy that brings sustainable and inclusive growth opportunities.

Foreword

Plastic: a marker of our times and a responsibility for action

By Prof. Vêlayoudom Marimoutou,
Secretary General of the Indian Ocean Commission

''The obligation to suffer gives us the right to know.''
Jean Rostand

Biologist Commoner draws our attention on one of the characteristics of human action: *"its capacity to produce materials that cannot be found in nature"*, and therefore *"to introduce in the system substances that are utterly unknown to it".* The great circular economy of nature, in which *"nothing is lost, but everything is transformed",* is more and more upset and disturbed by human manoeuvres.

The Modern world is also a world of pollution and, as Barnosky said in 2014, today *"there are few places on earth that are not affected by man-made environmental pollutants. It is common to find traces of pesticides and industrial pollutants in samples of soil and tree bark of any forest in the world, in whales' fat, in the body of polar bears, in fishes of most of the rivers and oceans".* Pollution has become one of the major problems of our times; local or global, of agricultural, industrial or urban origin, it contaminates the lands, the waters and the atmosphere, jeopardising the health of the ecosystems and thereupon that of humans.

Plastic is emblematic of pollution in general

In 2016, J. Zalasiewikz and his colleagues propose to use plastic as an emblematic signature of the general pollution of the Earth's ecosystem characterising the Anthropocene epoch. Plastics are polymers manufactured from petrochemicals, although some are made from cellulose (8% of petrol extracted on the planet, half as raw material). Adapted to multiples uses, plastic impresses with its theoretical capacity to infinite recycling and to the promise of saving natural resources, and because of its hygienic qualities which led to its adoption in pharmacies and hospitals. From the 1950s onwards, it has grown with mass consumption, on the back of synthetic materials and on the rising production of disposable items. It has rapidly become an essential component of electronics and informatics.

Despite its theoretical infinite recycling capacity, we are far from the mark: it is estimated that 50% is recycled or converted into energy (pyrolysis), the proportion recycled being 15% to 25% in Europe and less than 5% in the USA. We therefore have an idea of the amount of plastic debris dispersed each year, in the form of fragments smaller than 5 mm, or even nano plastics, in the environment. Lightweight, easily transported by wind or water, plastic debris has invaded the entire planet, including the oceans, where it is dispersed from the surface to the bottom of ocean basins. The lightest plastics form areas of highest concentration around the 5 major ocean gyres. They represent a total of 25,000 tonnes of floating debris on the sea surface.

Invasion, resistance and toxicity

The problem posed by this pollution is two-fold.

The first is its resistance. Depending on their composition, the degradation of plastics takes between 50 years and 5 centuries, or even millennia for debris to sink to the deep seabed. If we take into account both this resistance to degradation and the 5 to 13 million tonnes of debris that reach the world's oceans each year, we can see the scale of the problem we are building. And according to B. Montsaignon, 'bioplastics' cannot provide a real solution: their manufacture from plant materials does not guarantee the biodegradability of polymers, and moreover it increases industrial pressure on agricultural land; as for those that are claimed to be compostable or fragmentable, they are still derived from petrochemical products.

Second is its toxicity: 50% of the chemical components of plastics are classified as hazardous by the United Nations classification system for chemicals. Studies have also shown the ability of additives used in PVC to pass into the human bloodstream, as well as the carcinogenic risks of certain components of PVC, polystyrene, polyurethane and polycarbonate. Similarly, biologists have warned of the risks that plastic debris poses to fauna, from micro-organisms to whales or seabirds, which are part of the food chain right up to our plate.

Rethinking the models, blue and circular

So, what should we do?

Regeneration, reinvention and restoration form a new framework for action to (re)think our strategies, to innovate and to provide solutions to this global challenge, which raises significant local issues in island territories. It is not a question of going to war against plastic, which has proved to be a useful, practical and inexpensive material. It is a question of analysing our relationship with this material, of defining new ways of consuming and producing it, and of developing innovative ways of disposing of it and reducing the pollution generated on our coasts and at sea.

To address the multifaceted challenge of marine plastic pollution in the islands of Africa and the Indian Ocean, the IOC and the World Bank, through the AIODIS component of the IOC-SWIOFish2 project, are publishing three studies on i) the state of the art of the circular economy, ii) intellectual property issues on innovative projects and iii) measures to prevent, reduce and control marine plastic pollution. We hope that they will prove useful to policy makers, entrepreneurs, and developers in the blue and circular economy sectors.

Executive Summary

Context

- This document reports on a consultancy on the assessment of intellectual property (IP) issues related to innovative projects in the field of the circular economy (CE) in the African and Indian Ocean Developing Island States (AIODIS). The study is managed by the Indian Ocean Commission and financed by the World Bank under the 'Promotion of African & Indian Ocean Island Developing States Blue Economy' component of the regional 'South West Indian Ocean Fisheries Governance and Shared Growth Project (SWIOFish2). The AIODIS are Cape Verde, Comoros, Guinea Bissau, Madagascar, Maldives, Mauritius, Réunion, São Tomé and Seychelles. While Réunion included in the analysis and review sections of the paper, no recommendations are made pertaining to its IP regime, as it is a department of France and therefore subject to French law and regulation, unlike the remainder of the AIODIS, which have autonomy over their legislative and regulatory regimes.

The Circular Economy, Sustainability, and Innovation

- The Circular Economy (CE) can contribute to the realisation of various sustainability goals. Promoting CE emergence and growth is challenging for the African and Indian Ocean Developing Island States (AIODIS) because of their insularity. But it is also necessary because of their heavy economic reliance (upwards of 30% of gross value add by tourism, agriculture and industry) on their natural endowments, the significance of the latter to global biodiversity and because of the AIODIS' mostly below par sustainability performance.
- The CE as currently pursued remains insufficient to bring resource consumption within the earth's ecological limits and requires innovation to promote resource efficiency, extend product lifespan and invent smarter products and manufacturing. The circular innovation spectrum can extend to development of multi-actor circular systems and networks, through product-service systems within value chains, but starts with firm or individual level innovation.

Circular innovation, diffusion, and IP regulation as an enabler

- CE could therefore grow better if innovation diffusion can overcome social inequities, empower consumers, end-users, and independent firms. The role of intellectual property (IP) in this is to incentivise innovation, but not promote early product disposals and replacement by enabling restriction of repair information or parts access. This could be especially beneficial for developing island states were insularity already restricts repair networks and information, reducing experiential learning opportunities for potential innovators.
- In contrast to repair-based circular innovation diffusion, 'green design' related to smarter product use and manufacture is better promoted through non-IPR instruments such as taxes, incentives, penalties, standards and environmental certifications, waste management policy, extended producer responsibility (EPR), state facilitation of cross-sectoral partnerships and education and awareness campaigns. However, these incentives may only make sense once IP enablement of repair-based innovation diffusion creates sufficient scale of circular innovation diffusion.
- The business case to leverage IP as an enabler of circular innovation has four components:
  - it could help reduce economic dependence on the environment and improve sustainability competitiveness;

- it could aid post Covid-19 recovery, improve resilience through improved current account balances (because of reduced imports) and increased (youth) employment;
- it could increase GDP growth, reduce poverty and inequality, and improve human development;
- it could ameliorate the limitations of OM or company-level take-back schemes, by empowering independent repurposing, remanufacturing, refurbishing, repairing, and reusing.

Key Consultancy Tasks

Implications of the COVID-19 pandemic for investigating IP issues in relation to CE

- Recognition for the need to grow the CE worldwide is rooted in the need for an economic "reset" in the way we respond to sustainability risks such as climate change. It precedes but is also forms parallels with responses to the COVID-19 pandemic. This in that CE is a globally minded response that requires government intervention to reduce indiscriminate human intrusion into nature and avert sustainability crises and their potential economic fall-out, especially for vulnerable demographics.
- The experience of COVID-19 showed IP measures could be structured enable innovation diffusion rapidly to achieve a goal such as the emergence and the growth of the CE as a specific response to sustainability risks, mindful of the needs of relevant stakeholder, including:
  - governments and intergovernmental organisations;
  - incumbent IP holders;
  - business/industrial CE "entrants" into established sectors; and,
  - voluntary grassroots CE "entrants" into established sectors.

Barriers to innovation and diffusion in the CE across the AIODIS

- Institutional independence and capacity: AIODIS industrial property authorities are mostly internal to a government department rather than operating on a parastatal basis, implying a risk that executive authorities may act as both the rule-makers and adjudicators. There is also no subsidiary coordinating intergovernmental IP arrangement common to the AIODIS to regionalise for scale.
- IP and CE disjuncture: There are no legislation or regulations either directly related to IP or adjacent to IP law, such as implementation rules or regulations, that either pronounce on or is known to take sustainability or circular innovation into account in the IP regimes of any of the AIODIS nation states. This contrasts with the European Union (EU) where "right to repair" regulations were recently enacted.
- Sustaining innovation drive: due to a perceived underperformance on sustainable innovation, disadvantages in terms of educational and research support and typical developing island states disadvantages such as lack of scale and insularity.
- Low levels of CE adoption: Most of the islands are still only at the awareness stage of CE adoption, resulting in low appetite for innovation and diffusion of IP to develop new growth opportunities. Formal incentives for entities to increase the pace of green innovation, to convert to sustainable business models or to prioritise issues such as environmental concerns, competition, and consumer autonomy are non-existent or insufficient. Commercial players in waste collecting, recycling and recovery are too few, too small in scale to wield policy influence, and too focused on low-level circular economy activities (recycling and recovery) despite the pressure of cheap consumer goods upstream of them and the depleting landfill capacity and lack of export opportunities downstream of them.

Global best practice with respect to IP for the CE

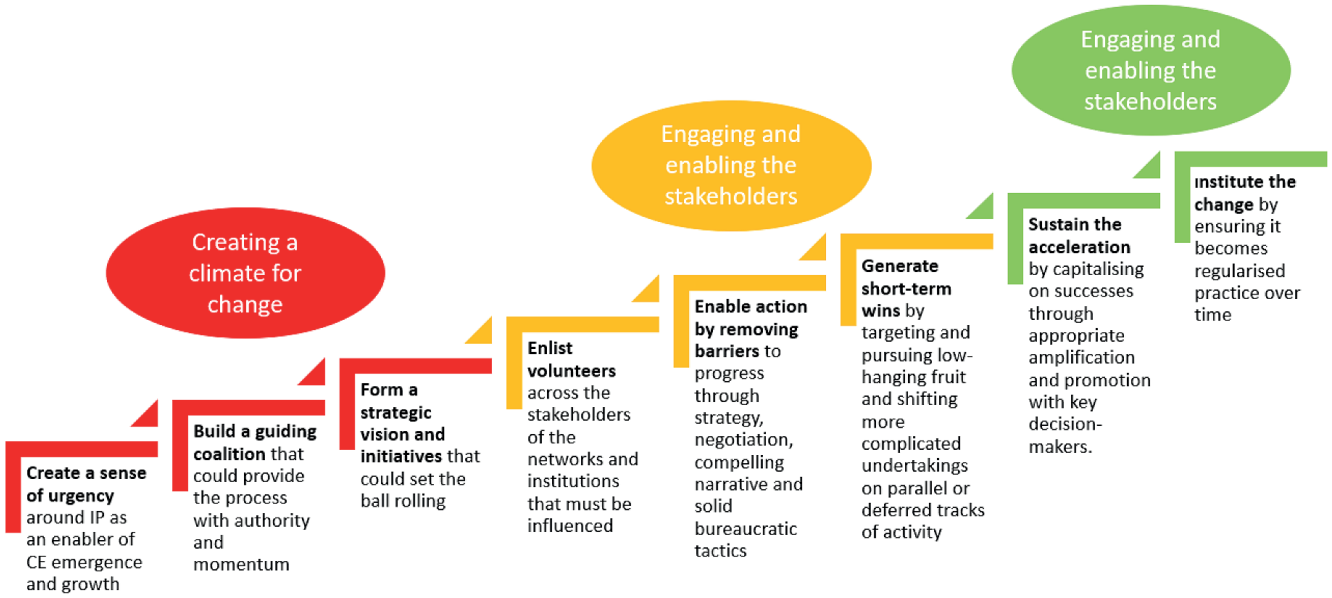
- Expedited examinations for green technology: Popular amongst developed countries with strong R&D cultures and technologically advanced manufacturing sectors, administrative incentivisation is meant to encourage the factoring of IP development into business planning, with particular impact in the areas of materials and processing innovations.
- Company-level IP strategies to accelerate sustainability transitions: Companies can share their IP widely (open model), with a selected group of others (through semi-open models) or not at all (closed model). Knowing their IP and claiming IP ownership (e.g., through a patent) enables to make decisions and control the usage of their IP but is not protective in and of itself. The key focus areas for company-level IP strategies to accelerate sustainability transitions have been the maximisation of material and energy efficiency, creating value from waste and substituting with renewables or delivering functionality without ownership (i.e., product-service system models). While protective behaviour can be purported to aid these objectives, other strategies include sharing IP openly by clarifying existing (background) IP and collaboratively develop new (foreground) IP in collaboration contracts; sharing out the internally owned IP through out-licensing; or, externally access IP owned by others through in-licensing. Licensing can be in exchange of licensee's IP (cross-licensing), one-off payment, periodic royalty payments or even for free (free licensing).
- Non-IPR right to repair legislation: Demands for non-IPR right to repair legislation generally arises through social and industry activism around consumer autonomy and competition concerns to extend product lifecycles through the improved availability of repair information, parts, and equipment. Focus industries have included consumer electronics, agricultural equipment, vehicle repairs and home and commercial appliances. Key modalities of advancing non-IPR right to repair legislation include:
    - advocating for the institution of right to repair provisions with model legislation in constituent jurisdictions, such as by the right to repair movement in the USA;
    - legislation by an executive authority, such as done by the European Commission's 2019 directive on rules on reparability, availability of spare parts and access to repair and maintenance information for home and commercial appliances;
    - legislation advanced or requested by a legislative body, such as seen in the European Parliament, where Members have requested that the above-mentioned directive be expanded to other product categories and that greater parts commonality and product life expectancy labelling information requirements be pursued; or,
    - through determinations by relevant regulatory bodies, such as the example of South Africa's Competition Commission, which in 2020 issued guidelines to allow more inclusive participation in repair and other services in the automotive aftermarket through, for instance, making it anti-competitive to void vehicle warranties for repairs with independent repairers.
- Main IP law right to repair options: The notion that sustainability values (through right-to-repair or any other aspect) should be embedded into main IP law exist in concept, but not yet in practice. It would therefore be experimental to pursue and politically risky because it is likely to be controversial.

SWOT analysis of Innovation and IP across the AIODIS.

Strength	Weakness
- Relatively stable economies - Young populations - Biomass availability - Various nascent CE activities under way	- Low R&D investment and financing - Lacking university education options - Poor innovation linkages - Low IP activity - Institutional capacity and resourcing - No policy linkage between IP and sustainability or CE - Low levels of CE adoption, focused mostly on recovery and recycling
Opportunities	**Threat**
- Alignment with SDG's - Leveraging green financing options - Existing IP authorities - Existing IP laws in place - EU linkage via Reunion, where right to repair regulations have been passed	- Variable reputations as investment and IP destinations - Insularity - Institutional capacity - No common regional IP organisations - Low appetite for innovation

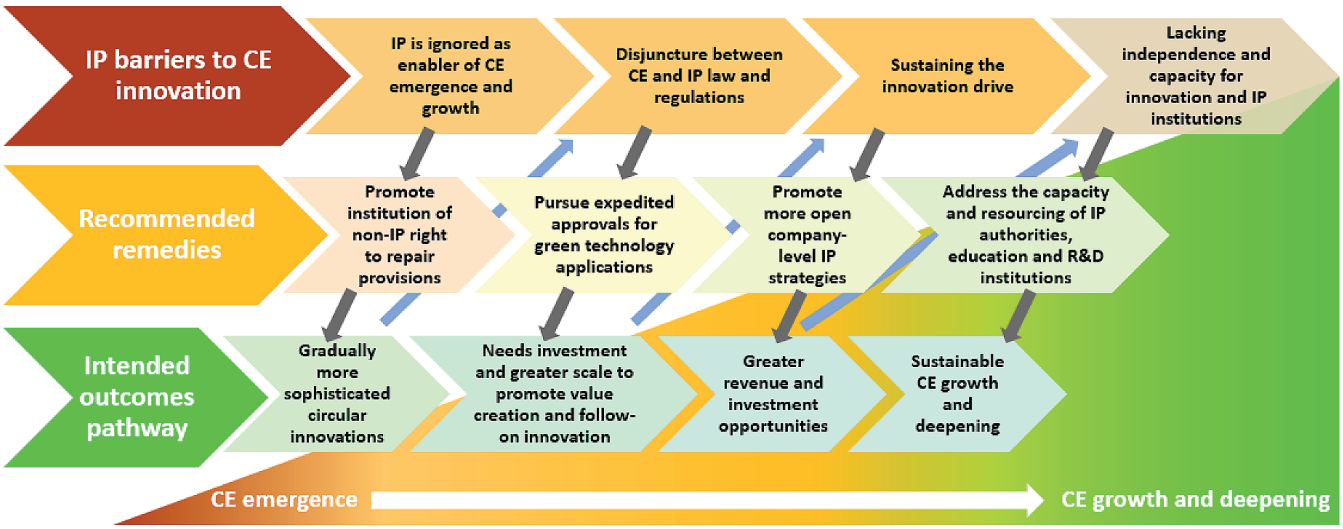
Recommendations

For the IOC to establishing IP as an enabler of CE innovation across the AIODIS will be a complex task requiring at least 8 steps as depicted in the following graphic:



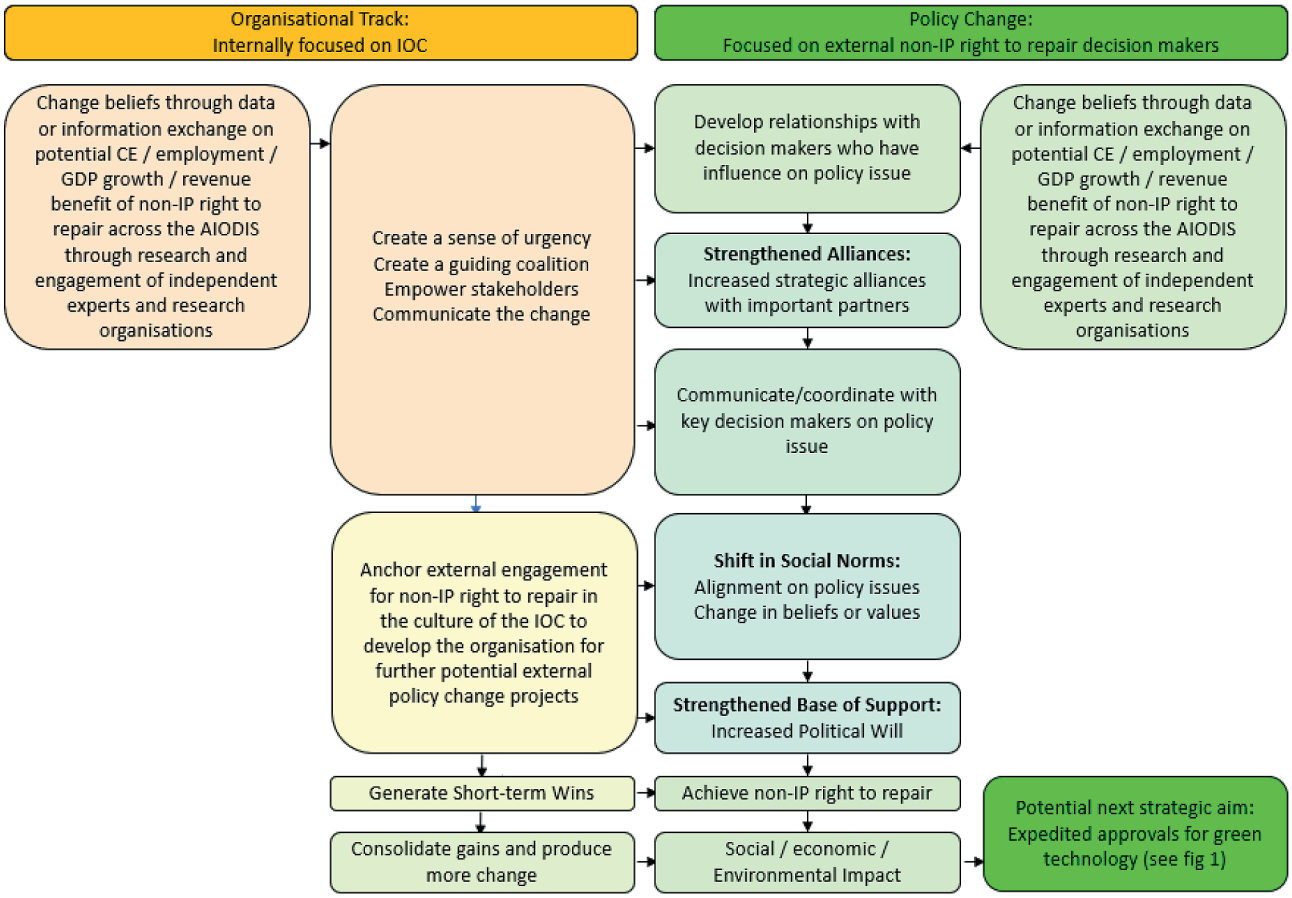
Key Solutions Proposals

- Prioritise promoting the institution of non-IP right-to-repair provisions: This could lift the ambitions of potential CE participants from subsidy-hungry, lower-level recycle and recover type activities to pursue higher value and more innovation conducive repair, refurbishing, remanufacturing and repurposing of products. It could reduce the demands for durable goods imports and grow the domestic economy, which in turn could create enthusiasm for IP as an enabler of CE growth. It would be easier to generate short-term wins through the pursuit of non-IP right to repair provisions, rather than to attempt experimental and controversial main IP interventions.
- Reserve IP interventions that are more scale-dependent for pursuit at a later stage:
  - Expedited approvals for green technology applications would only become relevant once circular innovations gain pace, possible on the back of right to repair or driven through greater domestic market scale over time;
  - Incentives or performance management to influence company-level IP models would similarly be driven by market-scale, and would probably enjoy better success once initiated to a greater degree by bigger economies where OM's are domiciled
- Propose a more detailed strategic review to AIODIS countries of institutional capacity and organisation of their respective IP authorities, as well as education and R&D investment provisions that need to be addressed to better support innovation in general, as well as circular innovation. This is necessary as it would require buy-in from the broader IP stakeholder landscape and not just those with immediate interest in CE emergence and growth. Since it may require politically complex concessions on internal institutional independence and external integration on IP governance, it should not be pursued as a mandate by the IOC given its states as a subsidiary intergovernmental organisation.



Leveraging the Regional Framework

- A synthesised theory of change to leverage the regional framework would best focus on the IOC and purposeful interactions with relevant authorities within the governments of relevant AIODIS countries to achieve the progression set out above. The synthesised theory of change is illustrated in the diagram below in terms of a flow of priorities that need to be progressed through inside the IOC (organisational track), as well as outwardly (policy change) focused on external non-IP right to repair decision-makers



A 5-Phase Action Plan that would be achievable over an 18-month period is proposed to operationalise the regional change project to institute no-IP right to repair across the AIODIS:

- Phase 1 Project initiation: Will comprise the project proposal, securing funding, recruiting consultants, and establishing a project office. These activities precede actions in the change theory mapping.
- Phase 2 Project preparation: Will include 1.) stakeholder analysis and mapping; 2.) the project narrative and key messages; and, 3.) proof point research.
- Phase 3 to repair and building a guiding coalition of the IOC and its AIODIS focal points. Outwardly, the priority will first be relationship development with key policy influencers.
- Phase 4 Alignment of objectives and legislation: Assistance is recruited to help draft model legislation for the institution of non-IP right to repair regulation across the AIODIS, which is then tabled with key stakeholders.
- Phase 5 Strategic aim achievement, project review and way forward.

Proactive steps that the AIODIS can take at country-level

There are specific pro-active steps that the AIODIS can take at country-level to aid and even simplify and shorten the regional effort to get non-IP right to repair instituted across their territories. These include:

- Prioritising and prepare to conduct research, make, and receive proposals on the institution of non-IP right to repair provisions. This should include the creation and resourcing of temporary cooperation mechanisms or working groups in governments and in legislative bodies to hear and consider proposals for IP reform to support the emergence and growth of the CE, such as non-IP right to repair.
- Conduct relevant economic research on the potential benefit of non-IP right to repair. This should commence with domestic surveys of businesses engaged in product lifespan extension activities (the reuse, repair, refurbishment, remanufacturing and repurposing of products and materials). These should by followed by analysis of the domestic economic contribution of product lifespan extension activities. Such analyses should both look at direct contribution to GDP and employment, as well as other effects such as direct youth employment and indirect general employment creation, net impact on government revenue, impact on imports and current account balances, and demand creation for public and private infrastructure and services.
- Finally, countries should conduct independent research to explore legislative options preferable at country-level to institute non-IP right to repair provisions. This could range from cursory surveys of global best practice and local preferences to full research, development, and processing of draft legislation.

1. Introduction

This document contains a revised draft version of a report on a consultancy on the assessment of intellectual property (IP) issues related to innovative projects in the field of the circular economy (CE) in the African and Indian Ocean Developing Island States (AIODIS). The study is managed by the Indian Ocean Commission and financed by the World Bank under the 'Promotion of African & Indian Ocean Island Developing States Blue Economy' component of the regional 'South West Indian Ocean Fisheries Governance and Shared Growth Project (SWIOFish2). The AIODIS are Cape Verde, Comoros, Guinea Bissau, Madagascar, Maldives, Mauritius, Réunion, São Tomé and Seychelles. While Réunion included in the analysis and review sections of the paper, no recommendations are made pertaining to its IP regime, as it is a department of France and therefore subject to French law and regulation, unlike the remainder of the AIODIS, which have autonomy over their legislative and regulatory regimes.

The report is presented in three subsequent overarching sections:

- Section 2 presents the literature review, concept definitions, and contextual insights. Here the reader is presented with the conceptions for key terms such as CE, innovation, diffusion, and IP that are employed in the research effort for the consultancy, as well as some pertinent existing knowledge on topics relating to the research.
- Section 3 reports on three key initial tasks outlined for the consultancy. This includes outlining some implications of the COVID-19 pandemic for the importance of IP issues in relation to CE, a review of relevant best practices with respect to IP rights (IPR) to promote CE worldwide and, finally, a SWOT analysis of the circular innovation landscape across the AIODIS.
- Section 4 focuses on the recommendations to address intellectual property issues to promote the emergence and growth of the CE across the AIODIS. It concentrates on key solution proposals and how to leverage the regional framework with the Indian Ocean Commission. It also outlines and action plan, indicate proactive steps the AIODIS can take at a country level and makes recommendations for adjacent consultancies and resources and capacity-building.

2. Literature Review, Definitions and Contextual Insights

This section sets out existing knowledge, definitions and contextual insights that underpinned the assessment of IP issues related to the emergence and growth of the CE in the AIODIS and the key tasks reported on in later sections. It first explores how CE contributes to sustainability and why economic and environmental issues across the AIODIS and the global ecological heritage of which AIODIS territories are custodians require it. It, secondly, sets out to define the CE, map out what CE transitions look like and why the CE needs innovation to be fully enabled. The exact role innovation plays in supporting the CE is then discussed before we define the role of the diffusion of innovation and how IPR could thwart or enable it.

2.1 How the CE contributes to sustainability

Conversion to CE models both challenge and allure developing island states. Seasonal waste spikes, lack of economies of scale, poor network connections and high transport costs complicate success prospects. However, these states have also come to understand that through CE they could also grow jobs and prosperity, enhance energy efficiency, scarce resource utilisation, ameliorate waste management capacity restrictions and reducing chances of offshore pollution (Kremilis, 2018). Indeed, there is significant concurrence across academia, intergovernmental organisations, and private sector-influenced cooperation platforms that CE could make a significant contribution in this regard. A comparative analysis outlined in table 1 below indicates this is so at least in relation to Sustainable Development Goals (SDGs) 7 (on affordable and clean energy), 8 (decent work and economic growth), 11 (sustainable cities and communities), 12 (sustainable consumption and production), 14 (life below water) and 15 (life on land).

These benefits are important within the context of the AIODIS, where biodiversity and the economic bases of island states, which are often reliant on tourism, agriculture, and fisheries, are deeply intertwined. More than half a million tonnes of fish are caught inland and off the coasts of AIODIS territories, making it an important food and biomass source (see table 2). Although fisheries and agriculture make relatively small direct contributions to the gross domestic product (GDP or gross value add or GVA in the case of Reunion) across most of the islands, they produce important inputs for manufacturing. Together with tourism, these sectors contribute upwards of 30% of the GDP of the AIODIS economies, with the less diversified economies of Guinea-Bissau, Seychelles, the Comoros, Madagascar and Sao Tomé and Principe particularly dependent on these sectors (table 3).

Sustaining these industries have not come without cost. System pressures seem particularly acute on the Maldives, the Comoros and Seychelles, Mauritius, and Cabo Verde. These countries have all registered in the bottom 90 of 180 countries of solAbility's 2020 Global Sustainability Competitiveness Index's natural capital ranking, which measures the availability of ecological support to sustain agriculture, biodiversity, water, and mineral resource needs on these islands (see table 4). From the resource intensity sub-index, it would appear there is the greatest scope for improving the efficiency of resource utilisation (use of water, fossil fuels and other raw materials to sustain GDP) in Seychelles, Cape Verde, Mauritius, and the Comoros. Given the overlap of the two sub-rankings, the potential benefits of CE appear most compelling for the densely populated, iconic tourist islands of Cape Verde, Maldives, Mauritius, and the Seychelles according to the Global Sustainability Competitiveness Index or GSCI (2020). It is likely Reunion experience similar environmental and efficiency performance challenges given its population density and tourism industry, although it is not ranked independently by virtue of being a territory of France.

Table 1: Comparison of assessments of CE contribution to SDG's

Type of stakeholder	Academia	Intergovernmental Organisations	Private sector influenced sustainability cooperation platforms
Representative source	Schroeder, Anggraeni and Weber (2018) as presented in Einarsson (2020)	United Nations (2018)	Holland Circular Hotspot (2020)
SDG 1 – No Poverty	Goals that indirectly benefit		
SDG 2 – Zero Hunger	Goals that indirectly benefit		
SDG 6 – Clean Water and Sanitation	Strongly and directly benefiting		Strongest relationships and synergies
SDG 7 – Affordable and Clean Energy	Strongly and directly benefiting	Particular promise to help achieve SDG	Strongest relationships and synergies
SDG 8 – Decent Work and Economic Growth	Strongly and directly benefiting	Particular promise to help achieve SDG	Strongest relationships and synergies
SDG 9 – Industry, Innovation, and Infrastructure	SDGs facilitating the uptake of CE practices		Lesser, but important linkages
SDG 11 – Sustainable Cities and Communities	Goals that indirectly benefit	Particular promise to help achieve SDG	Lesser, but important linkages
SDG 12 – Sustainable Consumption and Production	Strongly and directly benefiting	Particular promise to help achieve SDG	Strongest relationships and synergies
SDG 13 – Climate Action	SDGs facilitating the uptake of CE practices	Particular promise to help achieve SDG	Lesser, but important linkages
SDG 14 – Life below Water	Goals that indirectly benefit	Particular promise to help achieve SDG	Lesser, but important linkages
SDG 15 – Life on Land	Strongly and directly benefiting	Particular promise to help achieve SDG	Strongest relationships and synergies

Coding Key	CE makes strong contribution to SDG according to author assessment	CE makes lesser, but still significant contribution to SDG according to author assessment	SDG contributes to CE uptake, rather than the other way around according to author assessment

Table 2: Fisheries production

Countries	Fisheries production (tonne)
Cabo Verde	18,673
Comoros	17,021
Guinea-Bissau	6,735
Madagascar	171,724
Maldives	143,258
Mauritius	26,243
Reunion Island	2,259
Sao Tomé and Principe	10,808
Seychelles	136,178
Total	532,899

Sources: FAO (2018)

Table 3: Contributions to GDP of sectors especially dependent on natural endowments of the AIODIS

Countries	Fisheries Contribution to GDP	Agriculture Contribution to GDP	Manufacturing Contribution to GDP	Tourism Contribution to GDP	Cumulative Contribution
Cabo Verde	C. 1%[ii]	6,8%[ii]	5%[ii]	22%[ii]	34,8%
Comoros	8%[iii]	34,5%[iii]	c. 12%[iv]	c. 6%[v]	60,5%
Guinea-Bissau	c. 3%[v]	c. 60%[v]	c. 15%[vi]	c. 2%[vii]	80%
Madagascar	c.3%[viii]	23.16%[viii]	17,13%[viii]	c. 12,3%[viii]	55%
Maldives	3,9%[x]	18%[x]	1,6%[x]	24,4%[x]	47,9%
Mauritius	2,9%[xi]	0,4%[xi]	12,1%[xi]	c. 14%[xii]	29,4%
Reunion Island	1,3% (combined)[xvi]		4,4%[xvii]	n/a	n/a
Sao Tomé and Principe	7,7%[xv]	4,6%[xv]	5,9%[xv]	32,9%[xiv]	51,1%
Seychelles	20%[xiii]	C. 1.33%[xiii]	C. 6,19%[xiii]	24%[xiii]	66,3%

Sources: (i) 2015 statistics in UN ECA (2016), (ii) 2014 statistics in AFDB (2016), (iii) 2013 statistics in AFDB (2016), (iv) World Bank Group (2013), (v) Ministry of Environment and Sustainable Development, (vi) 2018 statistics from the Republic of Guinea-Bissau (2018), (vii) 2019 statistics from the UNWTO (2019), (viii) 2019 statistics from Institut National de la Statistique/Direction des Synthèses Economiques (2021) (ix) 2012 statistics in Breuil and Grima (2014), (x) (Asian Development Bank, 2019) (xi) 2019 Statistics from Stats Mauritius (2021), (xii) Mauritius Tourism estimate (2020), (xiii) 2019 statistics from the Seychelles National Bureau of Statistics (2021), (xiv) 2019 statistics from the AFDB (2020), (xv) 2019 Statistics from Instituto Nacional de Estatistica (2021), (xvi) 2019 GVA figures in TheGlobalEconomy.com (2020), (xvii) 2019 GVA figures in INSEE (2020).

Table 4: Global Sustainability Competitiveness Index Environmental Rankings for Natural Capital and Resource Efficiency

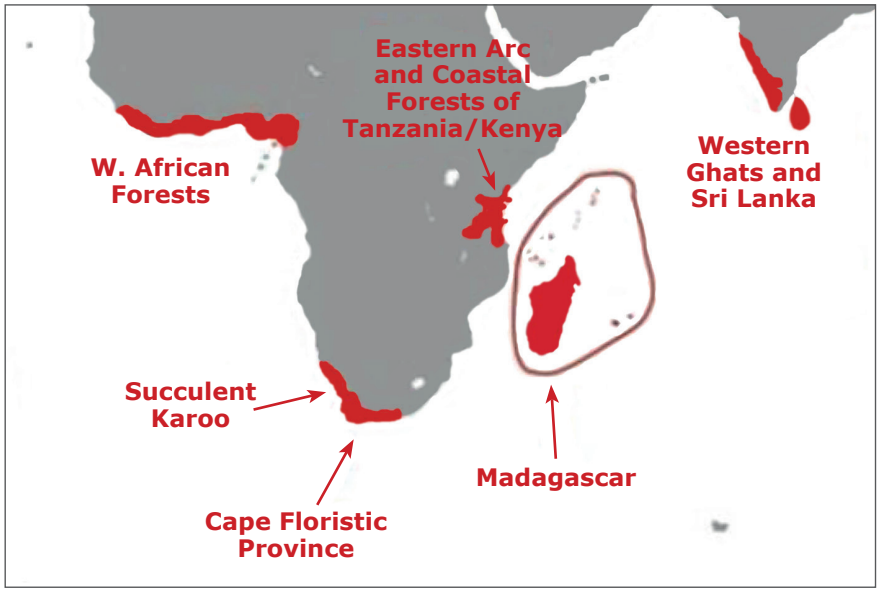
Countries	Natural Capital (Ranking out of 180 countries)	Resource Efficiency (Ranking out of 180 countries)
Cabo Verde	96	152
Comoros	119	93
Guinea-Bissau	42	61
Madagascar	25	85
Maldives	157	87
Mauritius	130	143
Reunion Island	N/A	N/A
Sao Tomé and Principe	73	73
Seychelles	134	179

Coding Key	1st Quartile	2nd Quartile
	3rd Quartile	4th Quartile

Source: SolAbility (2020)

Protecting their natural endowments of these islands are however also of international importance. Together, the AIODIS collectively preside over nearly 1 million km2 surface sensitive marine protected area (Marine Protection by Country, 2020). The African Indian Ocean Islands are also located within the Madagascar and Indian Ocean Islands global diversity hotspot. In addition, AIODIS countries are spread in relative proximity to other global diversity hotspots that fall out of their immediate territories, such as the Western Ghats of India and Sri Lanka (Maldives), the Eastern Arc and Coastal Forests of Tanzania and Kenya (Comoros, Seychelles, and Madagascar) and the West African Forests (Guinea-Bissau and São Tomé and Príncipe) (Myers et al., 2000).

Figure 1: Biodiversity hotspots in or within the vicinity of the AIODIS.

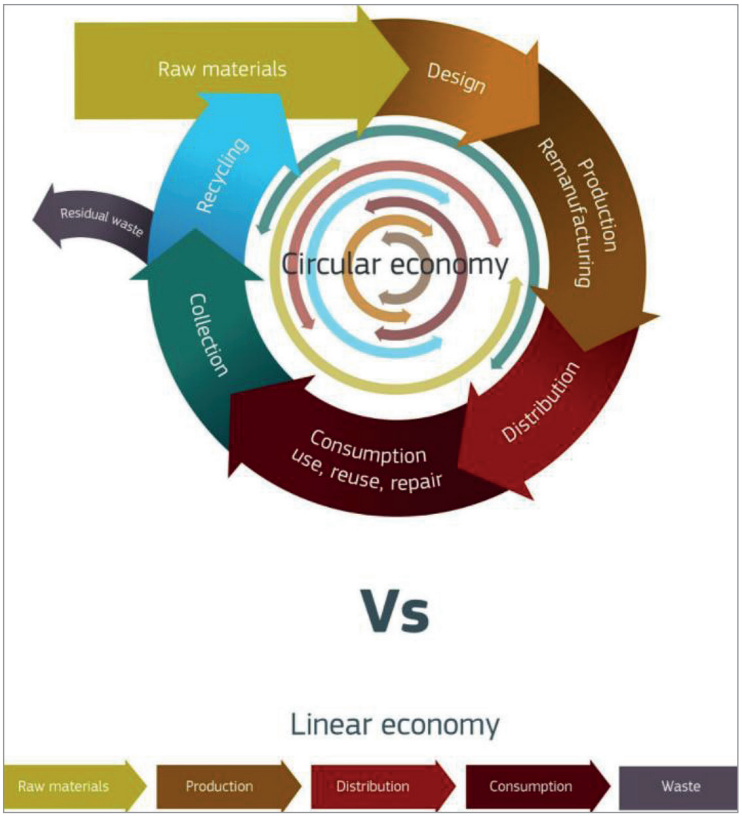


Source: Myers et al (2000).

2.2 Defining the CE and CE transitions

Given the significant sustainability risks faced by the AIODIS, and the opportunities that the emergence and growth of the CE can bring to ameliorate them, it will become increasingly important to look at ways to roll back the extent of polluting linear economic models and stimulate the former. It is therefore important that the difference between the linear economy and the CE is fully understood. This is best illustrated in figure 2 below. CE ultimately places the emphasis on reducing indiscriminate human intrusion and impact on nature. It does this by prioritising demand reduction for raw materials extraction and cultivation and diverting waste from landfill or broader polluting disposal methods. The methods through which these priorities are achieved include better product design, production processes and distribution, increasing the durability and utility of products, making product utilisation more efficient and recycling as much as possible of the product at its end-of-life stage to replace as much raw material inputs as possible in the manufacturing of the same or other products (Rani Yaduvanshi, Myana and Krishnamurthy, 2016).

Figure 2: Comparison between the CE and the linear economy.

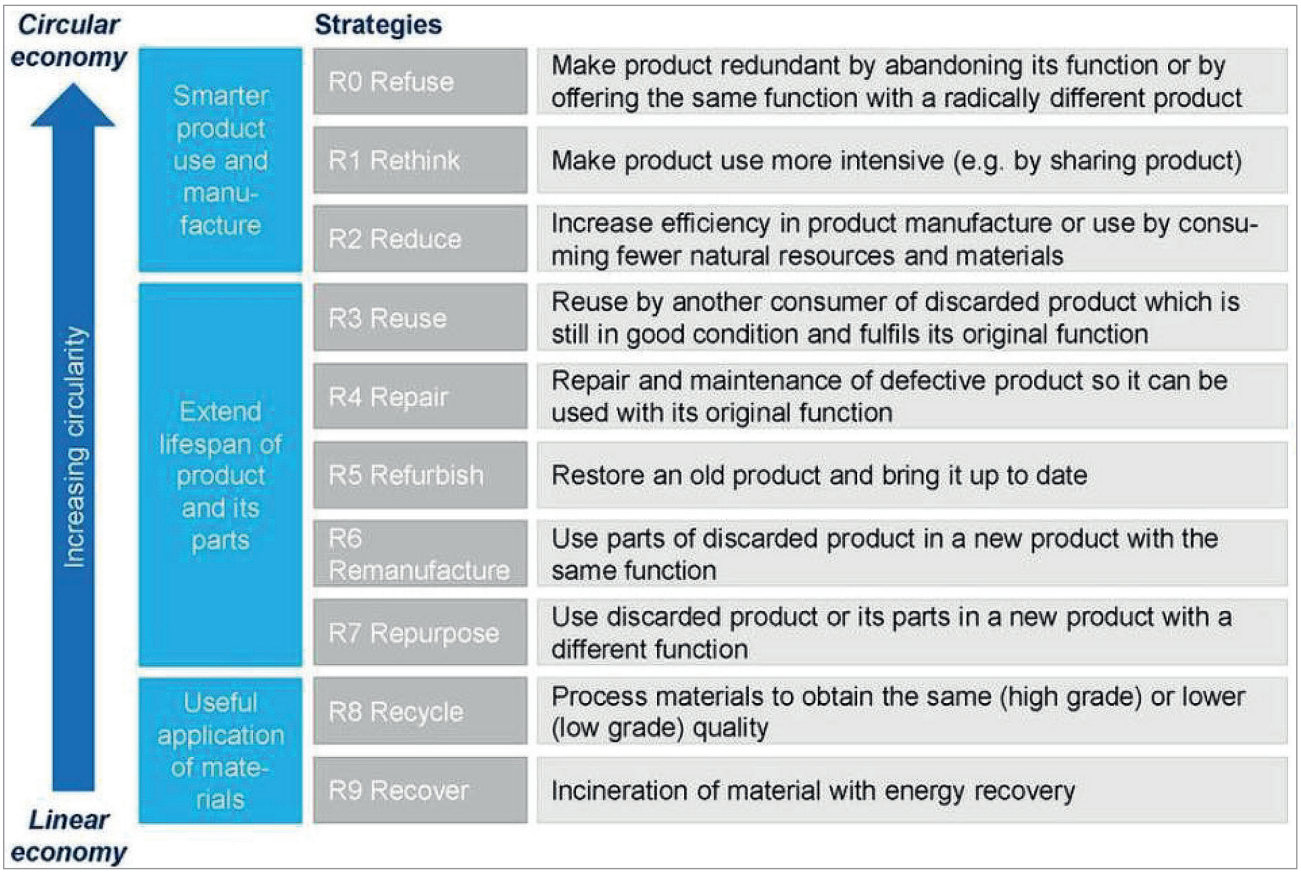


Source: Ellen McArthur Foundation (2016)

Academics have concluded that the 9R framework (illustration in figure 3) possibly presents the most nuanced conception of what CE should be seen to include to help address these challenges, if not solve them completely. It would not meaningfully impact consumption at the lowest levels of the CE (R9 and R8), at which it is about diverting waste from landfill, by putting it to use in the simplest ways, such as through incineration with energy recovery and recycling. However, progressing from the linear economy to the CE is unlikely to be instant process in any setting. It is likely to see the evolution of the production process through an intermediate stage conceived of in some quarters (and somewhat confusingly) as the reuse economy (as illustrated in the figure 4), where recycling will reach its limits before higher levels of circularity becomes more prominent.

Over the years, numerous models have been constructed to try and capture ever more comprehensively what the CE should encompass. Some of the challenges these evolving models have grappled with is that the CE as we currently conceive of it may be an insufficient solution to bring human consumption within the earth's ecological limits (Kallis et al, 2018). Its pursuit must therefore stimulate further innovation to broaden the suite of sustainability solutions that CE should belong to. Secondly, we cannot just focus on making better and more efficient products. We have to reduce consumption (Korhonen et al, 2017 p.43). This is so particularly because of what is known as Jevon's Paradox, which describes the rebound effect that occurs when improvements in efficiency due to technology and cost-efficiency are offset by growth in uptake (Valenzuela and Böhm, 2017).

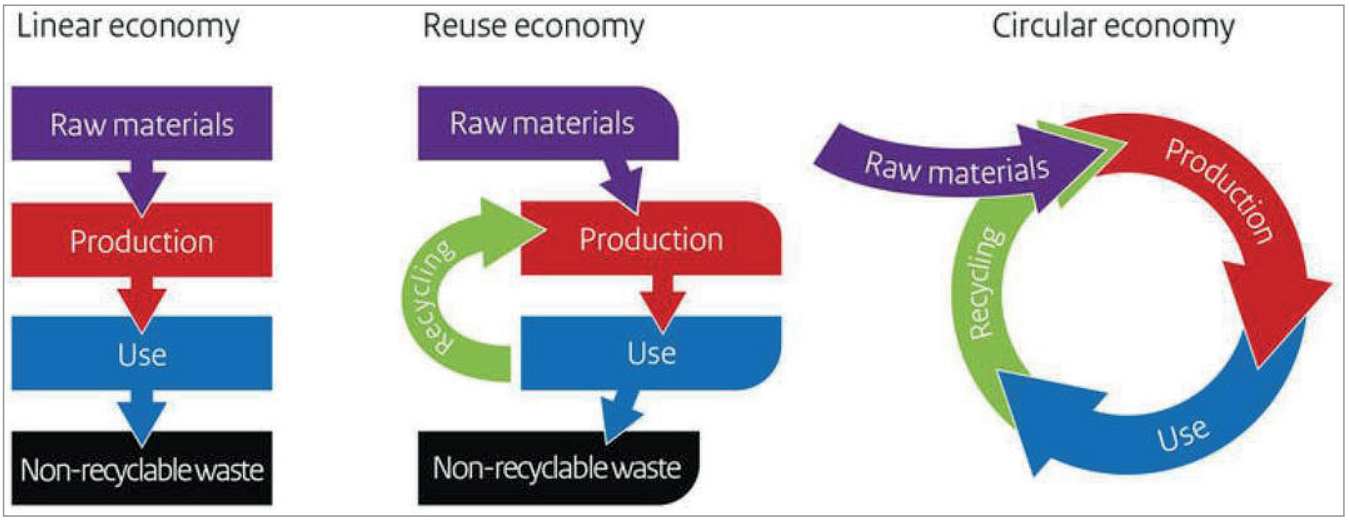
Figure 3: 9R Framework of the Circular Economy.



Source: Kirschherr et al (2017)

However, the second group of R9 framework steps (R7 through to R3) shifts the focus to product and parts lifespan extension through repurposing, remanufacturing, refurbishing, repair, and reuse. Enabling longer-lived products would imply acceptance of the necessity of slowing demand to curb resource use. The third and final level takes this further by focusing on multiplying the resource efficiency of the economy through smarter product use and manufacture, by increasing efficiency in the original manufacture, product use (i.e., through sharing) and replacing existing products with different, more efficient inventions. Thus, for the CE to meaningfully reduce resource consumption innovation would have to play a significant role to improve product use, reuse, and repair, and originate new products and business models to preserve access to required functionality, while increasing resource efficiency.

Figure 4: From a linear to a circular economy.



Source: Government of the Netherlands (2020)

2.3 CE and Innovation

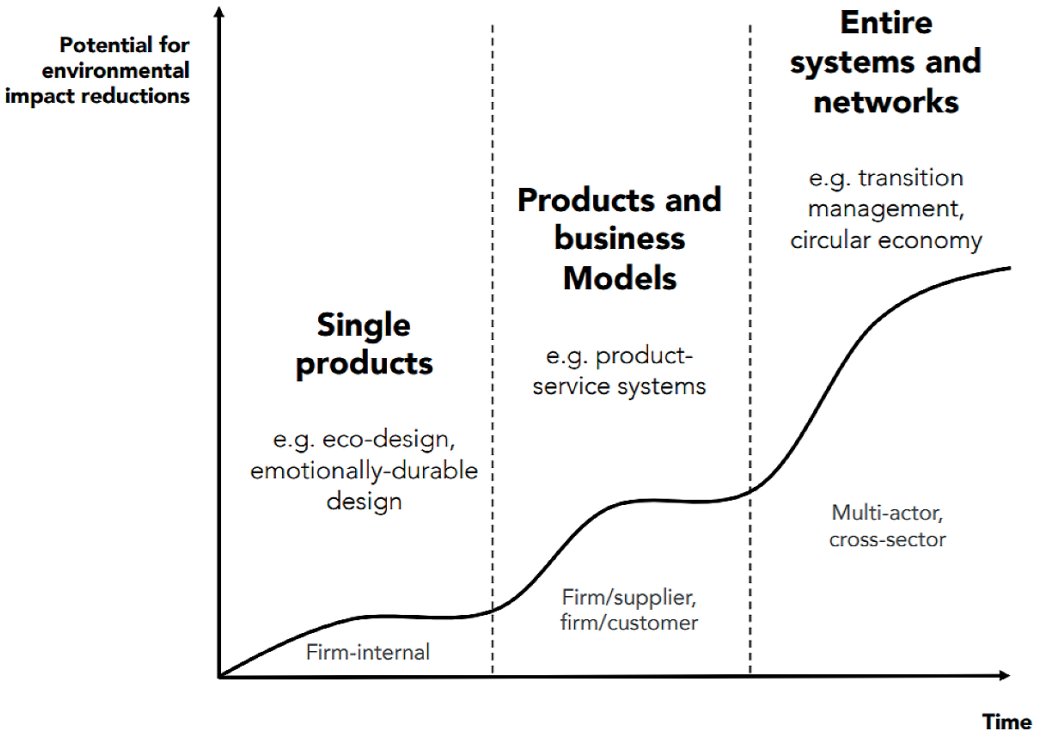
Although circular innovation can be generated anywhere, islands can be harbours of innovation precisely because they need to cultivate solutions to stimulate and grow the emergence of CE in insular conditions, to preserve their very specific natural endowments while leaning into their resource and scale constraints (Kremilis, 2018). To understand how IPR fits in as an enabler of CE, we first need to understand how innovation can stimulate CE emergence and growth.

Innovation would encompass the introduction of new goods, methods of production, new sources of supply and industry organisation (Schumpeter, 1983) to advance the emergence and growth of CE systems. Depicted in figure 2 below is the spectrum of phases that business or organisations can go through to produce circular innovation. The first stage is the development of products that are designed in a more environmentally friendly way (which could include recycling and repair). The second is the innovation of product-service systems, where product and services are combined to allow pay-per-use and so produce environmental outcomes such as more efficient use and formalised end-of-life practices, instead of outright ownership, with free use at will and voluntary end-of-life return. Popular examples of these would include (Van Ostaeyen, 2014):

- Xerox' pay-per-copy model for selling office equipment.
- Rolls-Royce's Power-by-the-Hour service package for aircraft engines, whereby maintenance, repair and overhaul services are charged per hour of flight.
- Atlas Copco's Contract Air service, whereby air compressors are sold per m^3 of compressed air delivered.
- Philips' pay-per-lux model for selling lighting equipment, whereby customers pay for a promised level of illuminance in a building; and,
- Michelin's fleet management solution whereby truck sold per kilometre driven.

The third level would be the innovation of entire system networks that may span entire value chains, human settlements (such as witnessed through the movement toward sustainable or circular cities) or territories not unlike the island states in the AIODIS.

Figure 5: Sustainable innovation spectrum.

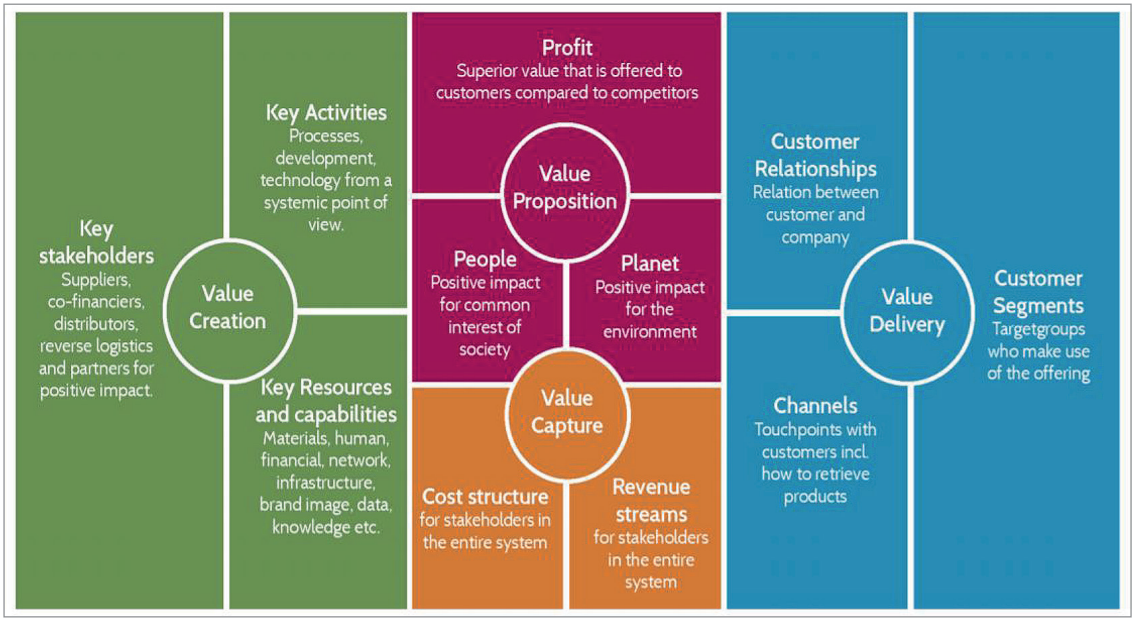


Source: Konietzko, Bocken and Hultink (2018).

Of course, circular innovation is not an end, but is supposed to enable more sustainable business models, such as illustrated in figure 8 below. Sustainable (inclusive of circular) business models differ from conventional business models, in that the value proposition is underpinned not just by profit on its own, but by profit with a purpose, or profit through positive impact on the planet and the people who inhabit it. This implies very particular considerations for how value is created, the value proposition of sustainable business models, how value is captured and delivered. These dimensions are set out in figure 6 below. In relation to linear economy business models, these dimensions in practice emphasise:

- Values and interest alignments around sustainability impacts with key stakeholders;
- Consideration for business activities and resource use from a social and environment systems point of view, rather than merely from a demand-and-supply perspective;
- A shared value rather than a profit maximisation value proposition, which is presented here as the people-planet-profit so-called triple bottom-line and has enjoyed recognition as a business performance framework since the early 1990's (Elkington, 2018);
- Value capture calculations that incorporate full life-cycle environmental impacts and cost externalities; and,
- Greater emphasis on the relationship between product and service providers and their customers for the full lifecycle of their products.

Figure 6: Sustainable business model canvas.

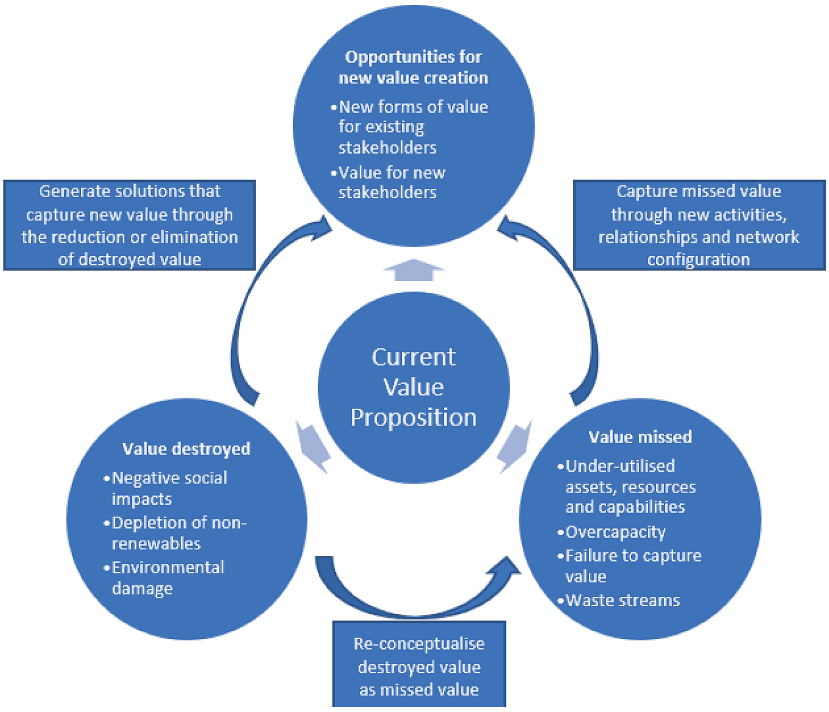


Source: Bocken, Schuit and Kraaijenhagen (2018).

Innovation is one of the key value creation activities required to give life to this sustainable value proposition, and often require rethinking the value logic that the innovation is to support. As illustrated in figure 7 below, this can be done in three ways (Bocken et al., 2013):

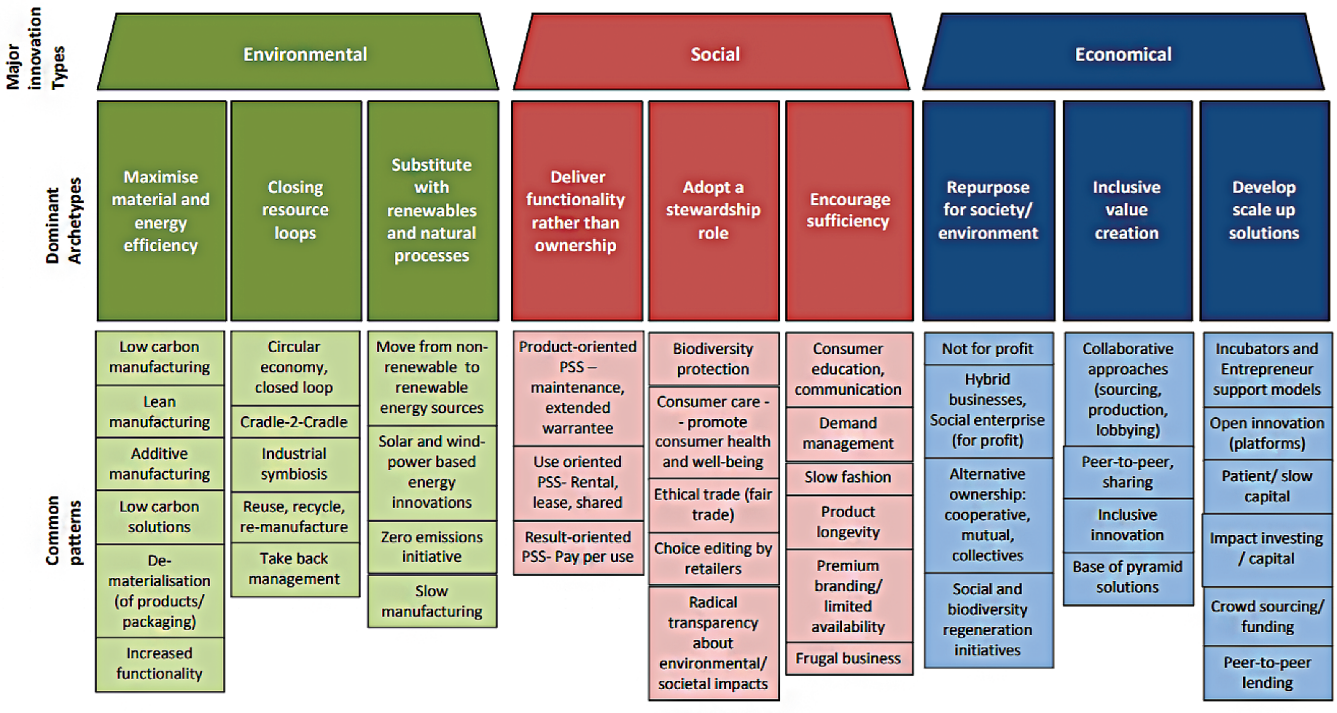
- Consider destroyed value, i.e., any potential value that the innovation may destroy (what conventionally would be referred to as negative externalities), such as damaging social and environmental impacts;
- Consider missed value, i.e., cases where stakeholders fail to capitalise on existing assets (e.g., car sharing), capabilities and resources, are operating below best practice, or fail to receive benefits they seek from the networks within which they operate; and,
- Consider new forms of value for existing and new stakeholders that could be captured, such as data harvesting and new upstream (four sourcing inputs) and downstream (for selling products or services) platforms.

Figure 7: A value mapping for sustainable innovation.



Source: Bocken et al. (2013)

Figure 8: Sustainable business model archetypes.



Source: Adapted from Bocken et al (2014).

Examples of products created in this way include fair-trade fast-moving consumables and electronics, electronics with freely available spare parts and repair information, open-source products, shared working spaces and "uberisation" or platform economy products such as e-haling, freight shipping, food delivery, small scale fishery orders etc. The best explorations in the area have identified 9 different, dominant sustainable business archetypes, which could be supported by circular innovation. These are set out in figure 8.

Clear select examples of how innovation could support CE at the hand of the archetypes above include:

- In relation to maximising material and energy efficiency, the development of production systems that eliminate waste;
- In relation to closing resource loops, offering buy-back and refurbishment programmes (e.g., electronics, furniture, and clothing), and PET collection and recycling programmes;
- In relation to the substitution of renewables and delivering functionality rather than ownership, the provision of photo-voltaic panels for household use and batteries for electric vehicles as a service; and,
- In relation to encouraging sufficiency, innovating longer-lasting, more refurbishable and upgradable products through designing for quality and slow fashion.

On the one hand circular innovation can either take the form of incremental innovation within conventional businesses and organisations to make their activities progressively less harmful to the environment from a resource management perspective. On the other it can underpin the formation of completely new business models based on express attempts to consider the forms of value circular innovation can harness. If we now reconsider the CE as set out in the 9R conception in figure 3, it becomes clear that the useful applications of materials (R9 and R8) relate mostly to the maximisation of material and energy efficiency archetype in figure 8. Extending the lifespan of products and parts (R7 through R3) relate mostly to closing resource loops and could resonate with product-service systems and business plans that encourage sufficiency. Both these latter two approaches, together with all the remaining 6 archetypes are compatible with smarter product use and manufacture activities (R2 through R0).

2.4 Circular innovation, diffusion and IPR

A challenge not adequately addressed by the R9 framework, or any other conception of the CE, however, relates to what we might call access to opportunities in relation to innovation. This has caught the attention of academics such as Schröder et al (2019) who referred to the "…open questions about the social dimension of the circular economy…inequality, power relations in corporate value chains, the role and rights of consumers, users and citizens (and how to protect them) …", but it is also borne out in how other stakeholders view CE. As the comparative analysis in table 1 shows, they may have some faith in the ability of CE to reduce deprivation of material wealth, food, water, and energy (SDG's 1,2, 6 and 7). However, they do not rate the ability of CE transitions to produce greater levels of gender equality and equality for vulnerable groups, such as the elderly, racial minorities, people with disabilities, refugees and migrants and populations of developing countries (SDG's 5 and 10), amongst which developing island territories would be included.

Table 5: Five Stages of Innovation Adoption

Stage	Definition
Knowledge or awareness	The individual is first exposed to an innovation but lacks information about the innovation. During this stage the individual has not yet been inspired to find out more information about the innovation.
Persuasion	The individual is interested in the innovation and actively seeks related information and details.
Decision	The individual takes the concept of the change and weighs the advantages and disadvantages of using the innovation and decides whether to adopt or reject the innovation.
Implementation	The individual employs the innovation to a varying degree depending on the situation. During this stage the individual also determines the usefulness of the innovation and may search for further information about it.
Confirmation and continuation	The individual finalises his or her decision to continue using the innovation.

Source: Rogers 1983

This inequity could be overcome by the diffusion of innovation, or the process for innovation to be communicated and adopted (Everett, Singhal and Quinlan, 2009). As set out by Rogers (1983), it follows five stages explained in table 5. However, as much as IPR has been brought into being to incentivise innovators to make their inventions available for use for the greater good of humankind (WTO, 2020), it does so by granting exchange rights to restrict access to information in respect of those innovations, which can in turn restrict innovation diffusion. This is done through:

- copyright restrictions on literary works related to products such as repair manuals,
- trademark restrictions, which restrict the use of products by the undertaking that produced them,
- patents, which restricts the use of industrial designs and protects trade secrets.

In fact, original manufacturers (OMs) often use IPR to disincentivise continued use of a product in favour of replacing it with a new product by restricting information that could enable its continued use. Grinvald and Tur-Sinai (2019) has identified at least four ways in which this is done:

- by maintaining an "authorized" network of repair shops for market restriction purposes – when the networks are difficult and expensive to join, often coupled with obscure repair information and withholding of replacements from the open market;
- ensuring repair parts are surreptitiously trademarked to control their importation as part of hybrid sub-assemblies for repair purposes – technically legal, but outside of the traditionally accepted purpose for trademarks, which is to promote competition and aid goods identification;
- issuing cease-and-desist letters or take down requests when consumers or independent vendors have attempted to spread the knowledge of repair by posting information online; and,
- suing replacement parts manufacturers for patent infringement or utilizing customs and border control measures to seize replacement parts at the border on the premise that the parts are counterfeit.

These examples are clearly more particular to the CE as it relates to product and parts lifespan extension strategies, such as reuse, repair, refurbish, remanufacture, and repurpose (R7 – R3). To tie it back to the stages of innovation adoption outlined in table 5, they are used to restrict implementation

and confirmation and continuation phases of innovation adoption. If we take the example of a personal electronic device such as a smart phone, product marketing and use information may encourage the purchase and initial use of the device until it reaches a state of disrepair or is succeeded by newer iterations. Should the user want to progress his or her implementation of the adoption of the smartphone to extent to its repair or repurposing of its parts, they may be restricted by the availability of repair parts or trademark restrictions on the use of its existing working parts. Because of the copyright restrictions on repair information, it would also be difficult to search and obtain for further information on it, prematurely ending the individual's continuation of product use. These dynamics are potentially also much more prejudicial against developing island territories, as authorised repair networks do not always extend to these markets for the products that are imported to them, which could mean faster discontinuation of product use and disposal, often at the cost of the environment. Whether on developing islands or beyond, Grinvald and Tur-Sinai (2019) holds that it restricts circular innovation, because it restricts the learnings potential innovators could gain through the acts and experience of effecting repairs.

IPR concerns for 'green design' related to smarter product use and manufacture (refusing, rethinking, and reducing or R2 – R0) and the useful application of product materials at end-of-life (recycling or recovery or R9 and R8) tend to be more generic (Hynes, 2019; Pearl, 2020), rather than being particular to circular innovation. In general, such inventions could most probably be as well incentivised with non-IPR policy instruments such as taxes, incentives, penalties, standards and environmental certifications, waste management policy, extended producer responsibility (EPR), state facilitation of cross-sectoral partnerships and education and awareness campaigns (Fullerton and Wu, 1998; Calcott and Walls, 2005; Hong, Lee, and Chang, 2014; Ghose and Kapur, 2019; Ellen Macarthur Foundation, 2015).

However, even for the 'green design', the developing island context often complicates implementation of some of these non-IPR solutions because of scale and capacity constraints (Agamuthu and Herat, 2014). Over the last decade, law discourse has looked increasingly to the interplay between environmental and economic systems to incentivise take-up of CE business models more spontaneously than through state mediation. This has grown the conviction that the addition of an IPR approach can foster the CE more holistically than solely through public law interventions (Ballardini, Kaisto and Similä, 2020). This aligns with the IOC's belief that stimulating the CE across the AIODIS could benefit from appropriate IPR enablement for entrepreneurs and researchers to unlock growth opportunities through innovation and knowledge diffusion.

2.5 The business case for IPR as an enabler of circular innovation

The business case for IPR as an enabler of circular innovation has at least four dimensions: concurrence, causality, opportunity cost and the limits of OM-level take-back schemes.

2.5.1 Concurrence

As we have seen, the AIODIS face challenges because of their economic dependence on their natural endowments and for their sustainability competitiveness performance, which could both benefit better performance on the CE (as set out in tables 2, 3 and 4). Table 5 lists projected economic growth for 2020. The economies of tourism-driven São Tomé and Príncipe (-6,5% of GDP), Cape Verde (-6,8%), Seychelles (-13,8%), Mauritius (-14,2%) and Maldives (-18,6%) were hit exceptionally hard by the COVID-19 pandemic. Only the Comoros will bounce back to their pre-pandemic position in 2021, but this is off a low pre-pandemic growth trajectory (1,9% of GDP in 2019). Only Cape Verde and the Maldives exhibited truly rapid growth prior to the pandemic (both around 5,7% of GDP in 2019), which they will struggle to regain soon (IMF Datamapper - Real GDP Growth, 2020).

Table 6: GDP growth, current account deficits and unemployment statistics.

Countries	GDP Growth (2020 Projection)	Current Account Deficits % of GDP	Unemployment	Youth Unemployment
Cabo Verde	-6,8%	-0.3% (2019)	12,2% (2019)	50,4% (2019)
Comoros	-1,8%	-2.4% (2018)	4,3% (2019)	9,9% (2019)
Guinea-Bissau	-2,9%	-3,7% (2018)	2,5% (2019)	3,9% (2019)
Madagascar	-3,2%	0.6% (2018)	1,8% (2019)	3,1% (2019)
Maldives	-18,6%	-26,2% (2019)	6,1% (2019)	16,8% (2019)
Mauritius	-14,2%	-5,4% (2019)	6,4% (2018)	23,9% (2019)
Reunion Island	n/a	-1,7% (2018)	20.1% (2019)	52,4% (2015)
Sao Tomé and Principe	-6,5%	-20,8% (2019)	13,4% (2019)	20,7% (2019)
Seychelles	-13,8%	-16,4% (2019)	3% (2019	15,4% (2019)

Sources: IMF Data Mapper (2020), World Bank (2020) for all other countries and Fitch (2020) and INSEE (2020) for Reunion

2.5.2 Causality

Remanufacturing, refurbishing, repairing, and reusing could lead to significant reductions in the use of new materials (upwards of 80%) and more jobs (Nasr et al., 2018). While only Madagascar runs a small current account deficit and all AIODIS territories could benefit from balance of trade support, unsustainable deficits in at least the Maldives (at 26,2% of GDP for 2019), São Tomé and Príncipe (20,2%) and the Seychelles (16,4%) could benefit from spending reductions (of the group, only Madagascar runs a small trade surplus) on goods and materials. On the unemployment front, all the islands (except for the least developed of the AIODIS territories of Comoros, Guinea-Bissau, and Madagascar) face high youth unemployment, with Reunion and Sao Tomé and Principe also featuring high overall unemployment rates – more economic downsides which could be ameliorated through CE adoption.

2.5.3 Opportunity Cost

The opportunity cost is underpinned by lost opportunities for GDP growth, reduce poverty and improve human development. Appropriate IPR interventions could incentivise research and development (R&D) spending, which is known to correlate positively with increases in GDP growth (upwards of 0.75% in GDP growth for a 1% increase in R&D expenditure over the long term could be likely) (Tuna, Kayacan and Bektaş, 2015). Improved technology diffusion through spare parts and repair information availability could stimulate the innovativeness of AIODIS populations to overcome some typical small islands obstacles such as scale and insularity. This would benefit the human development, future market sophistication and market size of these territories. All AIODIS countries could benefit, but it would be of especial benefit to territories where upliftment opportunities and inclusive growth opportunities are especially needed, such as Cabo Verde, the Comoros, Sao Tomé and Principe, Guinea-Bissau, and Madagascar.

Table 7: GDP growth, current account deficits and unemployment statistics.

Countries	Gini Index	Poverty Headcount	HDI Rankings out of 189 Countries
Cabo Verde	42,4 (2014)	15% (2015)	126
Comoros	45,3 (2014)	40% (2014)	156
Guinea-Bissau	50,7 (2010)	85% (2010)	178
Madagascar	42,6 (2012)	91% (2012)	162
Maldives	31,3 (2016)	0% (2009)	104
Mauritius	36,8 (2017)	2% (2017)	66
Reunion Island	N/A	N/A	N/A
Sao Tomé and Principe	56,3 (2017)	65% (2017)	137
Seychelles	65,8 (2013)	3% (2013)	62

Sources: World Bank (2020) and UNDP (2020)

2.5.4 The limits of OM-level take-back schemes

Original manufacturers (OM's) may be enticed into product and parts life extension in the same way for their own profit (Rehfeld, Rennings and Ziegler, 2007), but how effective this could be outside of OM-level take-back schemes appears not to be addressed. Large OM's have however proven unable to reliably repatriate their product to centralised recycling facilities at end-of-life, even on their home continents (Wiens, 2014). For more insular island state economies, technology diffusion therefore becomes more important. This insularity would most likely mitigate against IPR routes that seek to shore up OM's by granting exclusivity in exchange for greater parts remanufacturability or OM commitments to remanufacture, such as proposed in Krystofik, Wagner and Gaustad (2015). To be sure, appropriate IPR protections for OM's need to be nurtured in developed and developing markets alike. This is so not least because the proliferation of imitation goods in the latter undermine the circular economy as they suffer from shorter lifespans (Kojima, Yoshida, and Sasaki, 2009). As an objective for IPR enablement of CE innovation and diffusion to promote CE in developing island states, extending product and parts life extensions still seem the most appropriate though.

3. Reporting on Key Consultancy Tasks

This section reports on the key consultancy tasks, exclusive of the final recommendations that they also inform. The specific tasks entailed outlining implications of the COVID-19 pandemic, identifying and explaining barriers to innovation and diffusion across the AIODIS, examining global best practice with regards to IP for CE, and finally, mapping out and providing a SWOT analysis of innovation and IP in the AIODIS.

3.1 Implications of the COVID-19 pandemic for investigating IP issues in relation to CE

Important dimensions of the business case for the for IPR as an enabler of circular innovation was set out under subsection 2.5. However, there is an important fifth dimension, which was also specified in the inception meeting of the consultancy: that which would relate to any implications of the COVID-19 pandemic for investigating IP issues in relation to the CE. In essence, this would view putting in place appropriate IPR measures as an important preparedness step to support the emergence and growth of the CE across the AIODIS.

3.1.1 The relevance of the COVID-19 pandemic for circular innovation

Lessons from responses to the COVID-19 pandemic suggest IP measures could be structured to anticipate and be helpful at junctures where large-scale action by many actors across sectors may be needed to achieve a common goal. With the COVID-19 pandemic, these actions related to mobilising resources to develop responses and manufacture action-critical products that could arrest infection rates, support treatment capacity, and ameliorate the economic fall-out. In the case of the CE, the risks would not relate to the challenges of a pandemic, but to the economic and environmental sustainability risks that could materialise across the AIODIS if timeous transitions away from polluting linear economies where not pursued. These risks were identified under subsection 2.1 and in summary related to the destruction of habitats and biodiversity that preserved globally important natural heritage and supported the important tourism, fishery, and agricultural industries, which produced important sources of food and feedstocks for energy production and other industrial processes.

3.1.2 General lessons from COVID-19 for promoting CE

There is a growing and relevant body of literature on the general lessons that can be learnt from COVID-19 for action on sustainability. It is rooted, firstly, in the concern that not enough is being done to ameliorate the impact of anthropogenic climate change (i.e., climate change as an outcome of human intrusion into the natural world to extract and dispose of resources), and, secondly, in the idea that better progress will require that countries confront their socio-economic paradigms afresh through, amongst other things, transition to CE. A clear apex benchmark justifies the concern over lacking climate change action: at the time of writing, 194 countries and the EU have signed the 2015 Paris climate agreement, committing them to limit the increase in the global average temperature to well below 2°C above pre-industrial levels or face havoc on sustainable poverty eradication efforts (UNTC, 2020; United Nations, 2015). Four iterations of the United Nations Climate Change Conference later (or COP25), there has been insufficient progress on action consistent with achievement of the Paris agreement target (Hood, 2019).

As this suggests, transitions to CE are squarely located within the need for an economic "reset" – both are notions that may predate the coronavirus (Glenday, 2019), but their relevance is also underscored by the pandemic in clear ways (Weston, 2020; Moyo, 2020; Klenert, Funke, Mattauch and O'Callaghan, 2020; Schwab and Malleret, 2020):

- like sustainability risks and their associated potential economic consequences, the pandemic is a result of indiscriminate human intrusion into nature that presents universal peril, requiring globally minded rather than inward-looking responses;
- both begs "rapid remediating government interventions" and "face similar challenges in addressing institutional and societal barriers against effective action";
- the pandemic may now be demonstrating some of economic fall-out a fully-fledged sustainability crisis could entail;
- both the pandemic and climate change are known systemic risks that propagate very fast in an interconnected world, thus exacerbating other less known risks;
- both phenomena are non-linear, presaging catastrophic effects beyond certain tipping points;
- the probabilities and distribution of their impacts are highly variable, complicating policy responses; and,
- they both affect already vulnerable populations disproportionately.

COVID-19 may indeed be a sustainability crisis "parable (Gilder and Rumble, 2020), but it does have some characteristics that are relatable, which should be taken note of if to advance IPR as an enabler circular innovation as well. These would extend to (Schwab and Mallert, 2020):

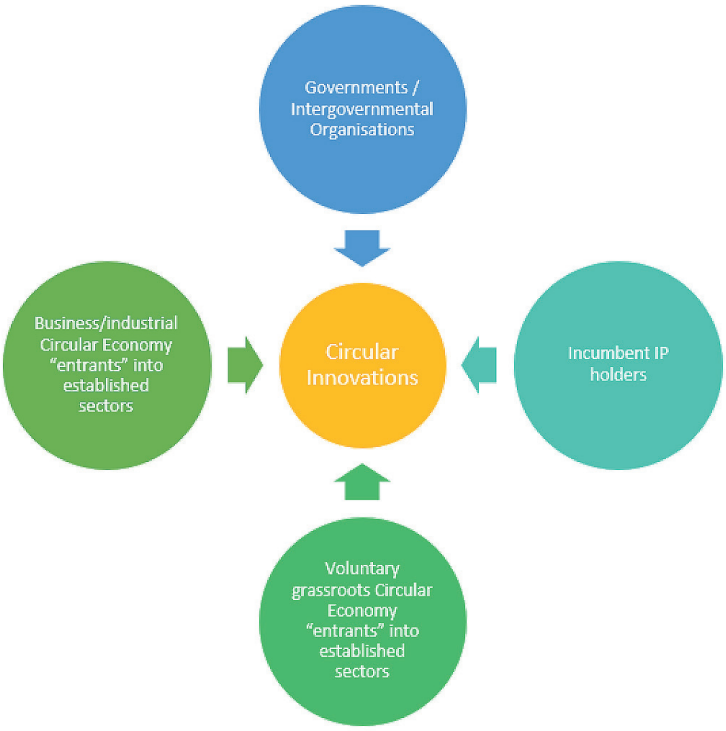
- what UN Special Envoy for Climate Action and Finance Mark Carney referred to as a "tragedy of the horizon": while both required immediate action, the future reward with climate change would only materialise over a much longer period;
- the causality dichotomy: people accepted SARS-CoV-2 caused COVID-19 readily enough for businesses and civil society to acquiesce to more coercive remedies, but the causes of sustainability risks are varied, less emphatically connected to individual destructive climate events and in some instances disputed; and finally, and more fundamentally,
- More fundamentally, "fighting a pandemic does not require a substantial change of the underlying socio-economic model and of our consumption habits".

3.1.3 Specific lessons from COVID-19 responses on IPR to promote CE

There are also more specific lessons to learn about the role that IPR played in facilitating helpful responses to the COVID-19 pandemic, which can be applied to better enable circular innovation to support the emergence and the growth of the CE as a specific response to sustainability risks. Tietze et al (2020) suggests that to do so successfully, innovation diffusion should be enabled timeously and mindful of the relevant stakeholder groupings and likely scenarios (Tietze, Vimalnath, Aristodemou and Molloy, 2020). During the pandemic, this included digital innovations ranging from complex epidemiological models, to artificial intelligence (AI) methodologies and open data platforms for prevention, diagnosis, and treatment of COVID-19. In relation to the latter, the various national projects around the world to set up manufacturing capacity to meet the rapid increase in demand for ventilators serve as examples. Many life sciences companies were willing to permit others to access their IP to help increase supply of equipment and development of new treatments during the COVID-19 pandemic. In view of the urgency of the situation, this went beyond permitting access to IP. Leading medical device innovators as American Irish-domiciled company, Medtronic, for instance enabled others to copy some or all its ventilator product by releasing full design specifications (Courage, 2020).

In respect of ensuring IPR enabled innovation diffusion for COVID-19, Tietze et al (2020) identified the prioritisation of the needs of four main stakeholder: governments, incumbent IP holders, voluntary grassroots "entrants" to established medical tools (hardware and software) and protection equipment (PPE) sectors and business and industrial "entrants" into these sectors. To this exercise, these four main stakeholder groupings have been adapted to reflect the circular innovation theme and set out as in figure 7 below.

Figure 7: Four main stakeholder groups that are concerned with IP for circular innovations.



Source: Adapted from Tietze et al (2020)

The ways in which these stakeholders may need to engage with one another are illustrated through the following three scenarios:

- **Scenario 1: When a business or industrial entity not yet an IP holder in an established sector, may wish to gain access to repair information or wish to manufacture or remanufacture an existing product under patent for the purpose of promoting circularity.** In this instance the first option may be to wilfully traffic repair information or infringe on patent rights by reverse-engineering patented products, leaving them vulnerable to being prosecuted. The second option would be to design new parts from scratch at huge expense, effort, and risk. The third option would be to partner with the incumbent firm to gain access to spare parts and repair information from incumbent IP holders at agreed prices in exchange for not infringing on their IPR.
- **Scenario 2: When a voluntary grassroots entity not yet an IP holder in an established sector, may wish to gain access to repair information or wish to manufacture, or remanufacture an existing product under patent for the purpose of promoting circularity.** In these instances, the probability that infringements may occur are most often mitigated by the generally lower technology capabilities of the stakeholders. They would most likely be limited to the option of partnering with incumbent IP holders where the products at hand are more complex, as they may lack reverse-engineering or development capabilities.

- **Scenario 3: When an incumbent IP holder in an established sector could be developing circular innovation or protecting linear IP from being adapted for greater circularity by another party, they may want to restrict repair information and parts availability to prevent the diffusion of information or innovation based on their IP**.

3.2 Barriers to innovation and diffusion in the CE across the AIODIS

Drawing on these scenarios, as well as earlier insights in this paper and initial data gathered from stakeholders across the AIODIS, at least four potential barriers to innovation and diffusion to circular innovation are discernible.

3.2.1 Institutional Independence and Capacity

The first set of barriers stems from the lack of independence and consolidation the AIODIS IP institutions. All the AIODIS countries have industrial property (concerned with patents, trademarks, and commercial names, amongst other) and copyright (which is also relevant to educational material) authorities vested in joint or separate institutions. All AIODIS industrial property authorities, aside from Cape Verde and Reunion, are internal to a government department, rather than operating on a parastatal basis (see table 9 below), implying a risk that executive authorities may act as both the rule-makers and adjudicators. Bar Reunion, which would fall under France, only Mauritius generates enough scale and a complete enough suite of reliable statistics to be featured in the annual ranking of total IP filing activity by origin of the World Intellectual Property Organisation (WIPO, 2019)

All the IP authorities of the AIODIS are members of the World Intellectual Property Office, where they access services such as the International Patent System, the International Trademark System and the International Design System, and Reunion through France is affiliated to the European Union Intellectual Property Office. However, there is no subsidiary intergovernmental arrangement across the AIODIS, or another regional intellectual property organisation of which all or a significant number of the AIODIS have membership in common. The Comoros and Guinea-Bissau are both members of the Organisation Africaine de la Propriété Intellectuelle, a regional intellectual property organisation of 17 Francophone African states. Sao Tomé and Principe are a member of the African Regional Industrial Property Organisation, a body with 19 members states spread mostly across Southern and Eastern Africa, along with Sudan, Ghana, Liberia, Sierra Leone, and the Gambia.

3.2.2 IP and CE disjuncture

A disjuncture between IP and CE disjuncture is presented as the second barrier to innovation and diffusion in the CE across the AIODIS. It is premised on the fact that there are no legislation or regulations either directly related to IP or adjacent to IP law, such as implementation rules or regulations, that either pronounce on or is known to take sustainability or circular innovation into account in the IP regimes of any of the AIODIS nation states. It could be argued that the provisions post the World Trade Organization's 1994 Agreement on Trade-Related Aspects of Intellectual Property Rights (or TRIPS) in relation to geographical indications and new plants varieties – such provisions were enacted by Cape Verde, Madagascar, Mauritius, Reunion (through France), Sao Tome and Principe and Seychelles (as set out in Table 8 below) – could come close to making this connection.

Geographical indications are touted to promote sustainability through localised food production (Belletti et al, 2017), and IP protection for new plants seen as necessary for the demanding undertakings of developing new varieties of crops to produce food sustainably for growing populations (Lence et

al., 2015; Smith et al., 2016). In response to some criticism at the time, there were efforts such as the Doha Declaration on the TRIPS Agreement and Public Health of 20001, to promote the TRIPS as necessary to achieve the standardised IP safeguards that could allow universal access to critical R&D-intensive goods like medicines (WTO, 2001). However, as part of the overall package of TRIPS measures, critics have gestured at the advantage to nations with large traditional and scientific knowledge endowments, the related wealth concentration and artificial scarcity effects and therefore anti-sustainability impacts of IP rights that are too restrictive to technology transfer (Xiong, 2012; Stiglitz, 2006).

Table 8: AIODIS IP regulatory development

Regulations	Relationship to TRIPS	Cape Verde	Comoros	Guinea-Bissau	Madagascar	Maldives	Mauritius	Reunion	São Tomé and Príncipe	Seychelles
Geographical Indications	Required	X			X		X	X	X	X
Industrial Designs;	Required	X	X		X		X	X	X	X
Integrated Circuit Layout-Designs;	Required	X					X	X	X	X
Patents	Required	X	X		X		X	X	X	X
New Plant Varieties;	Required						X	X		X
Trademarks;	Required	X	X		X	X	X	X	X	X
Trade Names	Required	X			X	X	X	X	X	X
Confidential Information	Required									
Digital Rights	TRIPS+	X						X		
Stricter Patent licences	TRIPS+									X

Source: Summary of information presented in Annexure 1 (WIPO, 2020)

European legislators concluded that intervention was required. This triggered a process resulting in the European Commission in 2019 ratifying new "right to repair" regulations, which will make the repair of domestic appliance easier. These rules will come into power in 2021 and would also cover Reunion, because of its allegiance to France. The regulations will require manufacturers to design longer-lasting machines and to make spare parts easily and readily available for up to a decade in a bid to reduce waste. These rules are only set to apply to washing machines, dishwashers, refrigerators, televisions, and lighting, but efforts are also afoot to expand this to electronic devices and other products. (Bonifacic, 2020; Harrabin, 2020). On the other hand, Reunion is also one of two AIODIS members who opted for even stricter IP rights in relation to digital rights (the other is Cape Verde), while Seychelles enacted stricter patent licences provisions. These provisions beyond what was required by the TRIPS agreement, resulted from bilateral agreements (Morin and Thériault, 2018; Ho, 2011).

Table 9: Institutional independence, global affiliations, and innovation support for IP

Countries	IP institution a separate agency vs a departmental office	Regional and International Affiliations	Technology and Innovation Support Centres
Cabo Verde	Agency	World Intellectual Property Organisation	No
Comoros	Departmental	World Intellectual Property Organisation African Intellectual Property Organisation	No
Guinea-Bissau	Departmental	World Intellectual Property Organisation African Intellectual Property Organisation	No
Madagascar	Departmental	World Intellectual Property Organisation	Yes
Maldives	Departmental	World Intellectual Property Organisation	No
Mauritius	Departmental	World Intellectual Property Organisation	Yes
Reunion Island (statistics for France)	Agency	World Intellectual Property Organisation European Union Intellectual Property Office	Yes
Sao Tomé and Principe	Departmental	World Intellectual Property Organisation African Regional Industrial Property Organisation	No
Seychelles	Departmental	World Intellectual Property Organisation	No

Source: Summary of information presented in Annexure 1 (WIPO, 2020)

3.2.3 Sustaining Innovation Drive

Sustaining the innovation drive on the CE across the AIODIS is identified as a barrier because of its perceived underperformance on sustainable innovation, disadvantages in terms of educational and research support and typical SIDS disadvantages such as lack of scale and insularity. The AIODIS register mostly uncompetitive rankings on intellectual capital and innovation subindex of the Global Sustainability Competitiveness Index. Only Mauritius just edges into the first quartile of the 180 ranked countries, with the Seychelles and Maldives a distant second position high in the third quartile (see table 9). This indicates that in general, the AIODIS territories are perceived to be at a disadvantage insofar education outcomes, R&D expenditure, IP outputs, enterprise activity and manufacturing capacity is concerned (see table 12 and annexure 2).

Education outcomes and financial resources for people active in CE activities may indeed be insufficient to enable their robust pursuit of circular innovation. The poverty headcounts and HDI rankings documented in table 7 indicate that outside of Mauritius, Seychelles, and Reunion all other AIODIS countries experience severe challenges in relation to income equality and human development in their communities. In addition, significant further development work is required to bring about an enabling ecosystem for circular innovation. This would include the development of scientific research and academic institutions, innovation hubs or technology support and innovation support centres. Only Madagascar, Mauritius, and Reunion are reported to have indicated they have such facilities to the World Intellectual Property Office (see table 9).

Table 9: IPR protection, intellectual capital, and R&D investment in the AIODIS

Countries	GDP per capita as per the World Bank	Intellectual Capital and Innovation ranking out of 180 countries in the Global Sustainable Competitiveness Index	IPR Protection Ranking out of 141 countries in the Global Competitiveness Report	Investment in R&D as a % of GDP according to the World Bank
Cabo Verde	US$ 3604 (2019)	103	97	N/A
Comoros	US$ 1394 (2019)	152	N/A	N/A
Guinea-Bissau	US$ 698 (2019)	172	N/A	N/A
Madagascar	US$ 522 (2019)	176	129	0,11% (2011)
Maldives	US$ 10,790 (2019)	78	N/A	N/A
Mauritius	US$ 11,204 (2019)	35	56	0,36% (2005)
Reunion Island (statistics for France)	(US$ 40,493)(2019)	(19)	(14)	(2,2%)(2018)
Sao Tomé and Principe	US$ 1,995 (2019)	93	NA	N/A
Seychelles	US$ 17,401 (2019)	77	54	0,2%(2005)

Sources: World Bank (2020), SolAbility (2020) and WEF (2020)

Innovation performance does not stand out as a competitive advantage of these economies in global competitiveness and innovation performance rankings in general, it does not mean that there are not significant variances. There are and they manifest mostly along developmental fault lines. Reunion, for instance, benefits from its allegiance to France, which in turn has a GDP per capita more than double than the most affluent AIODIS countries. France ranks in the top 20 countries globally on IP protection and innovation and invests around 2,2% of its GDP per annum in R&D (WIPO, 2020; SolAbility, 2020; World Bank, 2020). It is however unclear how much or this investment is allocated to R&D in Reunion, but it does not detract from the implication especially the lower-income islands may face tough trade-offs to prioritise IP and R&D investment.

Amongst the upper middle-income countries, Mauritius is the best performer. It invests much less than France in R&D (0,36% of GDP), but seemingly significantly more than other AIODIS countries, of which Seychelles (0,22%) is the next best performer. These two countries are also distinct from the rest of the AIODIS cohort for enjoying relatively good recognition for IP protection standards (54th and 56th out of 141 countries, respectively) (WEF, 2020). Amongst the lower middle-income group Sao Tomé and Principe fairs the best and the Comoros the worst, with Cabo Verde in the middle. This is then followed by the low-income countries, Guinea- Bissau and Madagascar, which rank close to last out for intellectual capital and innovation out of 180 countries (respectively 173rd and 177th) in the Global Sustainable Competitiveness Index (GCSI).

While the relative performance of the AIODIS on innovation in general may not be completely out of kilter with its peers, their performance still signifies there is significant room and opportunity for improvement. Not represented in table 9, because of its limited coverage is the Global Innovation Index (GII) published by the World Intellectual Property Organisation, Cornell University, and international business school INSEAD. They cover only France, Cabo Verde, Madagascar, and Mauritius, but the findings make a fair proxy for some broader expectations:

- First is the French example: France ranks 15th in the GII and performs above expectations even in the high-income group of nations. It is very possible that Reunion might not reach the same high score if judged on its own, but it would be in a good position to be placed higher than other AIODIS countries. It also represents an opportunity for Reunion to leverage to improve its own performance on CE innovation as a department and for the other AIODIS as platform partners on CE innovation via the Indian Ocean Commission.
- Second, even though Mauritius is a star performer on IPR and R&D in the AIODIS context, it is a middling performer on innovation in relation to other high middle-income countries and is outperformed by other small countries in that income group, such as Costa Rica, Jamaica, and North Macedonia. It also means that the Seychelles and Maldives could quite possibly be ranked as underperforming higher middle-income countries if they were to be covered by the GII.
- Third, if this logic was applied to the lower middle-income AIODIS, Sao Tomé and Principe may be performing above expectations on innovation relative to its developmental level and peers like Cabo Verde and the Comoros.
- Finally, in relation to the low-income group: the GII does designate Madagascar an above average performer on innovation relative to low-income countries, despite ranking 115th out of 131 countries. This suggests that Guinea-Bissau may perform at a similar level, given its similar performance to Madagascar on intellectual capital and innovation for sustainability (see table 10).

Table 10: Global Innovations Index Rankings and Proxy Expectations

	Countries	Overall	Performance	Institutions	Human Capital & Research	Infra-structure	Market sophistication	Business Sophistication	Knowledge & Technology Inputs	Creative Inputs
Global Innovations Index (rankings out of 131 countries)	France (Parent of Reunion)	12	Above expectations for High-income group	19	13	16	18	21	16	13
	Cabo Verde	100	In line with lower-mid income group	87	96	86	128	65	117	73
	Madagascar	115	Above expectations for low-income group	108	116	127	115	121	109	93
	Mauritius	52	In line with upper-mid income group	22	69	64	16	117	79	43
Proxy Expectations	Comoros	Possibly in line or below average for lower-mid income group given inferior reputation on intellectual capital and innovation for sustainability than Cabo Verde (see table 9)								
	Guinea-Bissau	Above expectations for low-income group given similar performance to Madagascar on intellectual capital and innovation for sustainability (see table 9)								
	Maldives	Possibly underperformer in upper-mid income group given relative disadvantage to Mauritius in terms of innovation on infrastructure and that Mauritius is already outperformed in this income group by other small countries such as Costa Rica, Jamaica, and North Macedonia								
	Reunion	Possibly outperforms other AIODIS countries due to being a French Department and France's good performance amongst even high-income countries								
	Sao Tomé and Principe	Possibly in line or above average for lower-mid income group given better reputation on intellectual capital and innovation for sustainability than Cabo Verde (see table 9)								
	Seychelles	Possibly underperformer in upper-mid income group given relative disadvantage to Mauritius in terms of innovation on infrastructure and that Mauritius is already outperformed in this income group by other small countries such as Costa Rica, Jamaica, and North Macedonia								

Source: WIPO (2020)

Although not expressly suggested by primary or secondary data related to the AIODIS in particular, broader literature does suggest that the insularity and lack of market scale associated with small developing island states could be significant contributors to the challenge of sustaining the innovation drive on these islands. This would firstly be in relation to the lack of opportunities to partner with incumbent firms to gain access to usable parts and repair information and secondly in relation to barriers to entry to repair and maintenance opportunities for repairers and potential innovators active in the CE across the AIODIS. These barriers would no doubt be exacerbated by the lack of OM representation, whether directly or through agents, across the AIODIS, thus complicating diffusion of technology further. It also ties back in particular to the international experience as documented by Tietze et al (2020) in relation to lessons on the enabling role of IP in supporting responses to the COVID-19 pandemic and Grinvald and Tur-Sinai (2020) in relation to the obstacles faced by independent repairers across the world. These experiences have been set out under sections 2.4 and 3.1.3 respectively.

3.2.4 Low levels of CE adoption

Levels of CE adoption across the AIODIS are still low, with most islands still at the awareness stage. Low CE adoption results in low appetite for innovation and diffusion of IP to develop new growth opportunities. On most of the islands, there are no formal incentives for entities to increase the pace of green innovation, to convert to sustainable business models or to prioritise issues such as environmental concerns, competition, and consumer autonomy. There are however exceptions such as Reunion, Mauritius, and the Maldives, which is discussed in greater lengths under section 3.4.

Commercial players in waste collecting, recycling and recovery are too few, too small in scale to wield policy influence, and too focused on low-level circular economy activities (recycling and recovery) despite the pressure of cheap consumer goods upstream of them and the depleting landfill capacity and lack of export opportunities downstream of them (Malabar, 2020). A survey of CE activities across the AIODIS revealed

- In Comoros stakeholders do report some small-scale recycling of plastic into craft. The biggest initiative however is the procurement of services from South African firm G3S to recycle paper, glass, organic matter, plastics, and textiles. Amongst these services would count setting up a plastic to oil pyrolysis plant (Eddine, 2021).
- In Madagascar, there is around a dozen companies involved in the recycling of plastics and other packaging materials (Charbuillet et al, 2018; Gevalor, 2012; Gevalor, 2015).
- In the Maldives, single-use plastics have been banned in some offices and all school premises. Some cafés and restaurants in the capital have also stopped using straws and plastic bottles. Many tourist resorts, NGOs and government initiatives are pro-active in support of circular economy or related initiatives. PET bottles are also collected and extensively recycled for export (Nasfha, 2016).
- In Mauritius there are more than 25 companies engaged plastics recycling (WeCycle, 2018). There are also various small enterprises that specialise in the upcycling of non-plastic materials and textiles (Annooar, 2021). Business Mauritius has however launched the Signe Natir sustainability pact in 2020, which commits the Mauritian business community to the circular economy and the therefore could promote higher levels of CE adoption over time (Signe Natir Brochure, 2020).
- In Sao Tome and Principe, the government committed to an integrated Waste Management Plan in 2018. The plan emphasis what it calls catalytic investment to foster a circular economy by "valuing waste". This would include measures to reinforce existing activities, such as composting, reuse and recycling (Ministério das Infraestruturas, 2018).

- In the Seychelles, the European Union-sponsored Solid Waste Masterplan for Seychelles (2020-2035) prioritises biogas production from waste (Cowing et al, 2020), but not much beyond that in relation to the circular economy. Stakeholders have related anecdotal evidence of small-scale collection and recycling activities, but that it is insufficient given that landfill facilities are at capacity.

3.3 Global best practice with respect to IP for the CE

A survey of global best practice with respect to IP for the CE has suggested four options to make legislative interventions. These four are expedited examination for green technology, company-level IP strategies to accelerate sustainability transitions, non-IPR right to repair legislation and main IP law right to repair options. They are set out in greater detail in the following four sections.

3.3.1 Expedited examination for green technology

Commercial law practice punt IP as essential for new innovations in smarter product use and manufacturing and the promotion of the useful application of product materials at end-of-life in anticipation of demand growth for these activities (Hynes, 2019; Pearl, 2020). A particular difficulty it could help to ameliorate, is the lag between innovation and technology adoption in the CE. Amongst the areas in the CE where this is most evident is in relation to plastics recycling.

Huge variances exist within material types for what is accepted for recycling by specific recycling centres. This could mean that of materials like specific types of plastic, say PET bottles versus plastic coffee cups, one could be recyclable in a specific location, while the other may have to be transported a long distance for it to be recycled. Bioplastics have for instance been patented since the 1970's and could help simplifying some of these inefficient recycling difficulties, but adoption has been slow. Ironically, IP could potentially assist in remedying this slow rate of adoption, by leveraging the potential of bioplastics to assist with circular transition.

For example, some bioplastics can be recycled alongside petrochemical-based plastics. These may provide the transitory material required as we work towards using more bioplastics, as they do not contaminate plastic recycling batches in the way that some biodegradable plastics do. This could be rapidly adopted, as the infrastructure is either in place or the technology known and available. If such an innovation is protected with IP, it means that the patentee would have a strong monopoly with the potential for uptake in many countries. Materials innovation is not the only area in which this can be done. Recycling centre sorting technology is developing alongside innovation in new materials. This includes many smart ideas including grinding down recyclable materials into a sludge to separate the biodegradable from the non-biodegradable; using lasers to detect colours and thereby classifications of whole plastic, metal, or glass articles; and using magnets to separate iron from a stream of waste. Having strong IP in this area will foster investment and generate potentially lucrative licensing opportunities.

A significant amount of effort and financial investment is required to bring new innovations to market. Akin to a break in a recycling loop, in the absence of intellectual property to safeguard investment, competitors may copy innovations, reducing the funds that the innovators can obtain and recycle into their innovations. Each patentable component may effectively increase the value of the innovation, and it is therefore crucial that as new inventions are devised, they are captured and protected. Companies must be encouraged and incentivised to factor intellectual property development into their overall business strategy planning. In this regard, administrative incentivisation has emerged as an area of best practice (Explainer: How Intellectual Property Rights Encourage Green Innovation, 2020).

Several IP offices offer accelerated examination for qualifying patents for green technologies, with the aim of helping these technologies to reach the market more quickly and promoting further R&D. In the UK, for example, the Green Channel (introduced in 2009) allows applicants to request accelerated processing if the invention has an environmental benefit. The application must show how the application is environmentally friendly and which actions they wish to accelerate (search, examination and/or publication). Requests that are clearly unfounded will be refused. So far, more than 2,200 published patents have used the Green Channel and applications take around 11 months from filing to grant, rather than more than two years is as normally the case.

The United States Patent and Trademark Office (USPTO) Green Technology Pilot Program, launched in 2009, finished after 3,500 qualifying applications were received. However, patent applicants can still use the Prioritized Examination (Track I) Program or the accelerated examination program, which advance examination and set a target of reaching final disposition within 12 months of advancement being initiated. Other offices that offer expedited examination for qualifying green technology patent applications include those in Australia, Brazil, Canada, Israel, Japan, and the Republic of Korea.

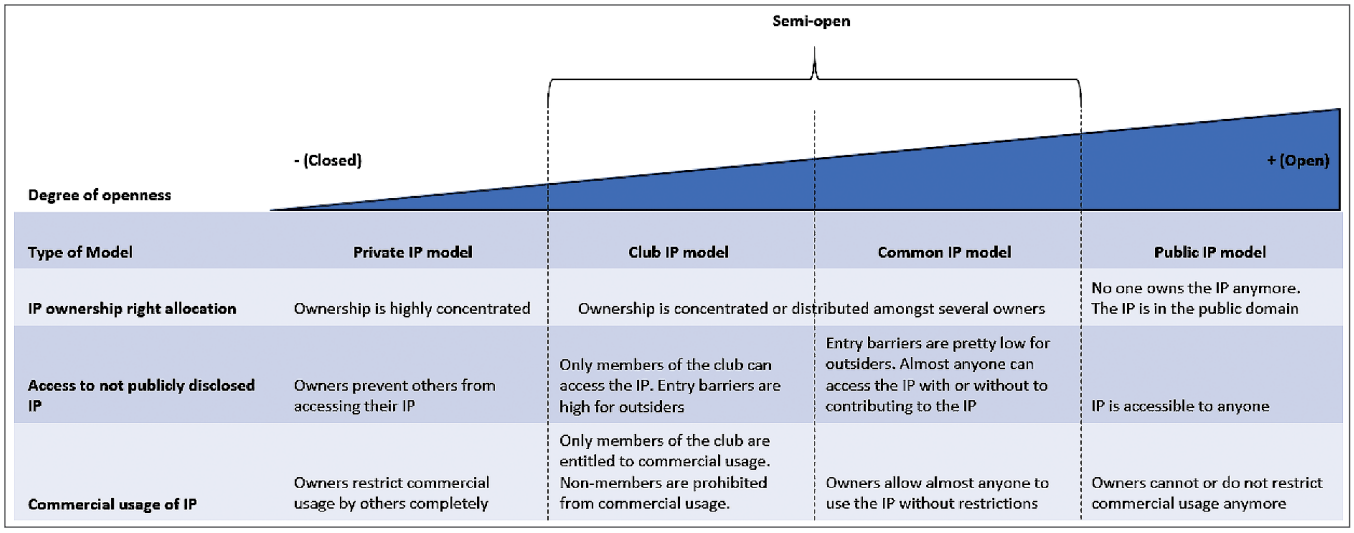
3.3.2 Company-level IP strategies to accelerate sustainability transitions

The second area of best practice is to focus on company-level IP strategies to accelerate sustainability transitions, with a focus on sustainable business models that prioritise maximising material and energy efficiency, creating value from waste and substituting with renewables or delivering functionality without ownership (i.e., product-service system models).

To obtain formal IP rights, disclosure of the IP is a legal requirement that is intended to help society by allowing others to use and build upon that IP after the legal protection has expired (incentives to disclose). In general, all IP rights are negative rights legally allowing the owner to exclude others from making, using, or selling the IP without prior permission from the owner for a limited period. The strength of IP protection varies across the different IP types, but also across countries and jurisdictions. Not the least due to that definition, IP and its associated property rights are often misunderstood as protective mechanism to keep IP to oneself. However, IP rights essentially assign ownership rights and do not prescribe any, i.e., protective behaviour. As we know from economic theory, ownership rights allocation is a fundamental prerequisite for efficient markets and transactions among agents. In a similar manner, companies claiming IP ownership only enable them to make decisions of what to do with their IP (govern usage). This can range all the way from not sharing their IP (i.e., excluding others) to free licensing for all (e.g., through patent pledges or open-source licensing).

For instance, being able to demonstrate IP ownership without sharing it can be particularly helpful in an early stage of a business to attract funding. In a later business stage, it might however be of advantage to share IP through out-licensing thereby encouraging adoption and further development by others and generating additional income from royalty payments. Hence, IP rights and claiming IP ownership does not per se slow down or hinder any diffusion of new technologies, which potentially could negatively impact sustainability transitions. Claiming IP ownership however puts owners in the position to make decisions and control the usage of their IP. While companies that claim IP ownership can decide to keep IP for themselves (see figure 8 below) using trade secrets, they can also engage in collaborations without the threat of imitation by collaborators, i.e., share IP openly by clarifying existing (background) IP and collaboratively develop new (foreground) IP in collaboration contracts. In addition, organisations can be at the giving end (e.g., sharing out the internally owned IP through out-licensing) or the receiving end (e.g., externally accessing IP owned by others through in-licensing).

Figure 8: Spectrum of IP models by degree of openness.



Type of Model	Private IP model	Club IP model	Common IP model	Public IP model
IP ownership right allocation	Ownership is highly concentrated	Ownership is concentrated or distributed amongst several owners		No one owns the IP anymore. The IP is in the public domain
Access to not publicly disclosed IP	Owners prevent others from accessing their IP	Only members of the club can access the IP. Entry barriers are high for outsiders	Entry barriers are pretty low for outsiders. Almost anyone can access the IP with or without to contributing to the IP	IP is accessible to anyone
Commercial usage of IP	Owners restrict commercial usage by others completely	Only members of the club are entitled to commercial usage. Non-members are prohibited from commercial usage.	Owners allow almost anyone to use the IP without restrictions	Owners cannot or do not restrict commercial usage anymore

Source: Vimalnath et al (2019)

Important is to note that if IP is not properly looked after, others cannot be prevented from using that IP, which can have potential negative impact on circular transitions. For instance, a CE start-up not claiming IP ownership might not be able to attract funding for its novel and more sustainable technology. Funders might be afraid the technology could be adopted also by competitors. This could result in a catch 22 preventing a sustainable technology to get off the ground at all. If the company would claim ownership for its IP it then can exercise a selective approach on who can and who cannot use the technology. It can prevent competitors from adopting their technology but share it with other green start-ups working in the same space, e.g. on complementary technologies.

A company follows a series of steps in building and maintaining its IP portfolio. Employees within the company generate ideas as a part of their R&D process, as spill-overs from their regular activities or as a serendipity. Ideas can also be generated through acquisitions and collaborations. Those ideas worthy some economic value to the firm and eligible for formal IP protection can be considered for obtaining IP protection. The company should ideally build its IP portfolio strategically and in alignment with its business goals. The company can choose to strategically exploit their protected IP as well as unprotected IP through licensing mechanisms. Licensing can be exclusive (to a single licensee) or non-exclusive (to many licensees) in exchange of licensee's IP (cross-licensing), one-off payment, periodic royalty payments or even for free (free licensing).

Whether organisations want to share their IP widely (open model), with a selected group of others (semi-open model) or not at all (closed model), knowing their IP (see Fig. 2) and claiming IP ownership (e.g., through a patent) is the fundamental basis that puts them in a position to make decisions and control the usage of their IP. In other words, claiming ownership of IP is nothing bad or good as such. It is only the basis to make decisions, which could very well be to let all others use their IP for free. There might then be situations, where one would want to exclude others from using own IP, such as not licensing to the defence industry or companies that one regards as unethical. Unfortunately, there are also situations where others are excluded from using IP, which has negative social impact (e.g., valuable knowhow being kept secret and not being shared; patented IP not being licensed in the pharmaceutical sector). If IP owners want to share their IP they own and let others use it, legal IP rights do not prevent them from doing so. Rather in contrast, IPR allocation enables them to do exactly that and collaborate in joint development processes.

Real-world examples of companies following different IP strategies include the following (The International Institute for Industrial Environmental Economics, 2020):

- Electric vehicle manufacturer Tesla in 2014 made its patents available for use by other vehicle manufacturers, ostensibly in the spirit of the open-source movement prevalent in the software industry. The key motivation for this open IP model is however to enable a critical mass of electric vehicle suppliers to bring forward investment tipping points for public electric vehicle charging infrastructure and grow the total market for electric vehicles, which was under risk of stagnation.
- Consumer products company Colgate-Palmolive in 2020 made available the IP of a newly developed recyclable toothpaste tube for use to other toothpaste manufacturers. The purpose is presumably to enable better toothpaste industry sustainability outcomes and avoid tougher waste management policies such as the introduction or increases in waste pricing for toothpaste tubes. Additionally, it would also strengthen the company's social license to operate, while allowing for the continuation of its toothpaste business without any.
- Patent pools in the medical arena is a key tool to promote the development and availability of life-saving medicines at manageable cost to low-and middle-income countries through voluntary licensing or patent pooling. It relies mostly on cross-licencing, where two or more IP-holders will allow each other access to one or more of their patents in exchange for access to patents of the other. It is not applicable only in the medical arena and can broadly be suitable to situations where complex technologies require complimentary patents to be brought to market. This is an example of a **club IP model**.
- An example of a **closed IP model** ostensibly to preserve access to innovation is French famine relief product company Nutriset. It protects both its invention, Plumpy'Nut, and its entire business model by patents. Plumpy'Nut is a peanut-based paste for the treatment of severe malnutrition and can be administered at home rather than through a supervised hospital treatment. As a result, it can treat more patients. Nutriset says that it uses patents to enable the development of local production plants for Plumpy'Nut and to protect those in emerging nations from being taken over by global manufacturing sites in more developed countries. The local production of Plumpy'Nut helps with creating skills and employment in the regions where Nutriset's product is most needed.

3.3.3 Non-IPR right to repair legislation

The third approach is from the right to repair angle. In this section we will discuss legislative and policy interventions that bring in right to repair provisions without direct amendments to main IPR legislation or implementation regulations. It will also be discussed in terms of three different examples: right to repair interventions in the United States of America, the European Union and in South Africa.

3.3.3.1 United States of America

Buoyed by consumer autonomy, and competition concerns, a social movement demanding a "right to repair" sprung up in the US in the early 2010's, gained steam and focuses on the right to fair repair through state legislatures. The aim of the right to repair legislation was to require manufacturers of consumer electronics to enable consumers and independent repair shops to repair consumer products by making available, on fair and reasonable terms, repair information, parts, and tools. This repair social movement has cross-sectoral routes, including industries like agriculture (who lobby for farmers to be able to fix their own equipment) and consumer-rights groups. It was inspired by a 2012 Massachusetts automobile repair law, which required OM's to work with independent repair shops. The OM's in turn leverage growing product complexity to resist.

Repair movement model legislation has translated into bills in at least 20 state legislatures. Companies like Apple, Samsung, Dyson, Wahl, and LG have resisted. Large manufacturers have been restricting the aftermarket since at least the 1950's. However, the "technologization" of consumer products have in recent years been leveraged to intensify the capture of the aftermarket by withholding repair information and authorisation. So too has litigation on the grounds of intellectual property. This has included using trademarks to term hybrid sub-assembly parts created from a mix of non-OM and refurbished OM equipment as counterfeit goods, or getting patents on replacement parts, making repair more expensive to incentivise quicker replacement.

The model legislation advanced by the repair movement tries to limit compliance evasion through broad definitions encompassing all goods with electronics embedded or attached to it and all vehicles (except motorhomes and motorcycles), with the definition of owner including outright owners or lessees. OEM's are required to:

- disclose "documentation" required to diagnose, maintain, or repair digital electronic equipment to independent repairers or owners;
- make available replacement parts (as parts are sometimes patented, but not the tools);
- provide information to reset software security locks, which are allowed under copyright legislation, but often illegally hacked; and
- not include terms in their agreements with their authorized repair providers that would "purport to waive, avoid, restrict, or limit an original equipment manufacturer's obligation to comply with the model legislation", but does not extend to sale or lease agreements.

In recognition that external interests could be negatively impacted, the law is not absolute in pursuing intellectual property benefits but seeks a balance. Therefore, even to the extent that the social interests underlying a right to repair are external to the values underlying intellectual property rights, this does not mean that static efficiency considerations (competition in repair markets), environmental concerns, and consumers' rights in their products cannot be accorded significant weight in intellectual property policymaking. Ways this is already done include limiting the period of exclusivity under various intellectual property regimes to restore competition in the market once it expires, the implementation of measures by various patent offices around the world to fast-track green patent applications, mandatory licensing scheme for patented inventions relating to devices for reducing air pollution and the patent exhaustion doctrine to protect consumer rights.

3.3.3.2 European Union example

The European Commission adopted a package of legislation under the Ecodesign Directive (2009/125/EC) setting out EU wide rules on reparability, availability of spare parts and access to repair and maintenance information for certain energy related products (including amongst others: refrigerators, dishwashers, washing machines and washer-dryers). The package was adopted on 1 October 2019 and will apply from 1 March 2021 (for most affected product groups).

The new measures aim to facilitate reparability and increase the lifespan of products. Under the new EU-wide rules:

- Manufacturers, importers, or authorised representatives must make certain spare parts available for a minimum period after the last unit has been placed on the EU market. This period varies by product group and the particular spare part. For household dishwashers: the minimum period is 7 years for certain spare parts listed in the legislation (for which access can be restricted to professional repairers) and 10 years for other specified spare parts (which must be made available to end-users or professional repairers);

- Spare parts must be delivered within 15 working days following a request;
- Manufacturers must also ensure that spare parts can be replaced with the use of commonly available tools and without permanent damage to the appliance;
- Certain repair and professional maintenance information must be made available to professional repairers; and
- A list of the spare parts and the procedure for ordering them must be displayed on a free access website by the manufacturer, distributor, or authorised representative.

In addition, the package of legislation also sets out other ecodesign requirements for specific product groups, such as on energy efficiency and information requirements (i.e., certain information that must appear on the product, the packaging, the user, and installation instructions or online). For eight product groups, the existing ecodesign requirements have been revised (refrigerators, washing machines, dishwashers, electronic displays (including televisions), light sources and separate control gears, external power suppliers, electric motors, and power transformers). Two other product groups are being regulated for the first time (welding equipment and refrigerators with a direct sales function e.g., fridges in supermarkets).

The European Parliament has also called on the European Commission to consider extending the ecodesign requirements on reparability and the availability of spare parts to other durable non-energy related consumer products. Members of the European Parliament (MEPs) in October of 2020 called on the Commission to grant consumers a "right to repair" by making repairs more appealing, systematic, and cost-efficient, whether by extending guarantees, providing guarantees for replaced parts, or better access to information on repair and maintenance in relation to electronic consumer goods in particular. They requested that priority go to increasing support for second-hand goods markets, called for measures to tackle practices that shorten the lifetime of a product, and endorse sustainable production. MEPs reiterate their demand for a common charger system to reduce electronic waste and want products to be labelled according to their durability (e.g. a usage meter and clear information on the estimated lifespan of a product).

To encourage sustainable business and consumer choices, MEPs pushed for more sustainable public procurement as well as responsible marketing and advertising. For example, when environmentally friendly claims are made in advertisements, common criteria should be applied to support such a claim – like obtaining ecolabel certifications. The resolution also calls for the role of the EU ecolabel to be boosted so that it is used more by industry and to raise awareness among consumers. Finally, the adopted text proposes new rules for waste management and the removal of legal obstacles that prevent repair, resale, and reuse. This will also benefit the secondary raw material market.

3.3.3.3 South African example

Just as in the United States, the emergence of the right to repair movement in South Africa was driven not so much by environmental concerns as it was for consumer autonomy and democratising economic opportunities in the aftermarket, particularly in the automotive sector. Right to Repair SA was founded by the Motor Industry Workshop Association (MIWA) representing 2500 independent workshops and automotive aftermarket distributors and parts manufacturers. Its viewpoint is that the consumer must have freedom of choice out of the various offerings by a multitude of independent companies which offer him the combination of service and price that caters to his individual needs. In respect of this, they view full access to technical information, the freedom to source and supply replacement parts as well as diagnostic tools and test equipment is most crucial for all market operators to exert their professions and to be able to offer their competitive products and services for the benefit of motoring consumers.

South Africa's Competition Commission in December of 2020 published guidelines for the automotive sector to steer it towards the adoption of pro-competitive measures in the automotive aftermarket and to promote greater participation of small businesses as well as historically disadvantaged individuals (this would encompass designated genders and racial groups disadvantaged under the country's pre-democratic era apartheid policies) in independent repair and other services in the market. In line with the MIWA position, this includes making available spare parts and repair information and making it anti-competitive to void vehicle warranties for repairs with independent repairers. The publication of the guidelines is a culmination of extensive consultation and advocacy work that the Commission has conducted since 2017, following numerous complaints from various independent players as well as members of the public.

Instead of introducing specific right to repair legislation, the power of the Competition Commission may well be leveraged by independent repairers and services providers in other sectors of the economy to issue similar guidelines for their industries. In the process, it is quite certain that the environmental lobby in South Africa may develop an interest and seek to support these actions. It would likely fall outside of the Commission's mandate to respond to environmental or sustainability concerns per se. It may be at this point that regulatory or legislative intervention outside the Competition Commission's ambit may be considered. It is furthermore instructive that the Competition Commission guidelines acknowledges the IP of the OMs and places an onus of responsibility with independent repairers and other service providers to respect the IPR in the knowledge diffusion process. However, there is no further acknowledgement in the guidelines of IP implications.

3.3.4 Main IP law right to repair options

There is no known example of executed main IP law interventions to promote right to repair or any other type of aspect that could be enabling to the diffusion of innovation for the promotion of CE, broader sustainability outcomes or any other purposes. In academic circles, there is however there is agreement that that sustainability values should be embedded into the fundamentals of IPR (Ballardini et al, 2020). Grinvald and Tur-Sinai (2019) premise their proposals in this regard on at least two factors. Firstly, that in a situation where a subsidiary or activist entity may be seeking to promote non-IPR right to repair legislation, such efforts may stall in the target jurisdictions because of the counter-advocacy the effort may attract from industry, as happened in the United States. Secondly, that the primacy of intellectual property law needs to be considered in any fair repair lobbying efforts.

They view IP law from the point of view that patent and copyright systems for providing R&D and original authorship incentives are valued not as ends in themselves, but to enhance human well-being and progress, which can only occur if people adopt and use the proceeds and enjoy social goods such as increased employment or better lives. Postmodern conceptions of "progress" incorporates "ecologically-based limits to economic growth, as well as the need for the redistribution of existing material wealth within present and between present and future generations", views copyright and patent law incentives only important insofar it preserves and nurtures the knowledge required to honour these components. Dynamic interpretations of progress would therefore see intellectual property applied:

- in a way consistent with environmental outcomes required in times of climate crisis;
- that OM's can benefit from their intellectual property without denying others opportunity or wasting resources; and,
- without denying the legitimate interests of consumers to be enabled to choose between repair and replacement, the desirability of aftermarket job creation and environmental benefits.

Their main justification for right to repair to be intrinsic to IPR is that innovation is not only the preserve of OMs. They argue that there should be space preserved for users and independent repair people to tinker and experiment free from fear of infringement promotes user innovation, making right-to-repair an essential component to an intellectual property environment conducive to innovation and progress. They further argue that the incentive to disclose innovations in exchange for IPR does not extend to information that would enable repair, but only "the manner and process of making and using the invention". This should notably not preclude independent repairers from innovating. In this way repair information could also remain accessible if the intellectual property owner ceases production, distribution and repair services and could stimulate follow-on innovation.

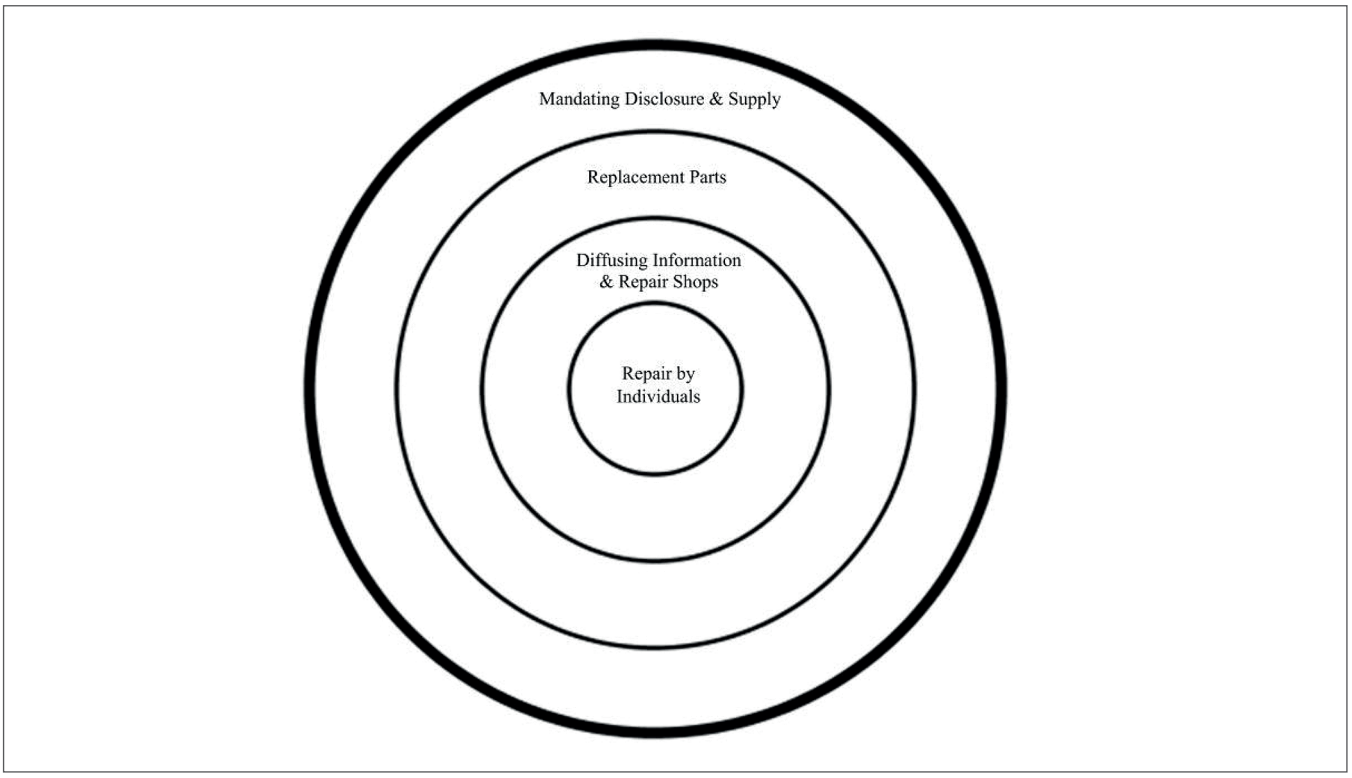
To bring about these remedies, Grinvald and Tur-Sinai proposes an incremental approach to right to repair promotion through main IP lay, seeking to test and amend the conduciveness of relevant legislation in four distinct "layers", which are presented in order of escalating contestability: the right to repair by individual consumers, repair by repair shops and the diffusion (as opposed to the trafficking) of repair information, enabling competition of replacement parts and enabling the disclosure of repair information and the reliable supply of replacement parts. These areas are represented from the centre outward in figure 9 below. The arguments for interventions in these layers are now presented in the order that they are proposed.

3.3.4.1 Right to repair by individual consumers

For this right to be meaningful, IP legislation must state that OM's must not interfere with the exercise of consumers' entitlement to repair. They do not have to take affirmative action to enable it, and it does not negatively impact the primary market for any protected invention embodied in a product if already sold once under authorisation of the OM. However, in the insertion of such provisions, there are at least three concerns that should be monitored for carefully:

- Lack of clarity on the patent exhaustion doctrine and the repair-reconstruction dichotomy, where what is regarded as reconstruction rather than permissible repair may classify as patent infringement. Such clarifications should be sought in law and should extended to license subscriptions lest OM's sought to disguise the true economic nature of transactions to avoid triggering the patent exhaustion doctrine.
- Concerns that exercising the right to repair despite post sale-restrictions on repair may result in patent law infringement should be addressed by declaring such restrictions void and unenforceable in law.
- Copyright law could be incompatible with a right to repair insofar it prohibits the disabling of digital locks that protect copyrighted software. This might be so, even if the purposes of the action were to enable diagnosis, maintenance, or repair. Solutions include exemptions (limited or full) on these grounds.

Figure 9: Incremental approach to promoting right to repair through main IP law interventions, with the order of contestability and proposed order of intervention from the inside out.



Source: Grinvald and Tur-Sinai (2020)

3.3.4.2 Diffusing information and right to repair by repair shops

Regarding repair by repair shops and the diffusion (as opposed to the trafficking) of repair information the scope of permitted activities expands beyond the repair itself. It also includes the advertising of repair activities and the diffusion of repair information (whether digitally or in hard copy). In this regard, the following needs to be controlled for in any legislative interventions:

- The "normative fair use doctrine" recognises the need for third parties to use OEM trademarks to the extent necessary to communicate service or product information regarding their businesses to consumers (e.g., for sake of comparison or to convey repair capabilities).
- The doctrine should manifest in law either directly or be addressed through a cause of action to address abusive threats. Copyright legislation should provide exemption to independent from antitrafficking provisions in relation to repair information, including the disabling of digital locks, to prevent these businesses from being vulnerable to lengthy litigation.

3.3.4.3 Enabling competition for replacement parts

Enabling competition for replacement parts is essential for reliable and competitively priced supply. However, OM's often resort to patent law or trademark law to forestall competitors from producing and selling competitive replacement parts. Therefore, the following checks are proposed for any legislative interventions in this area:

- Where it concerns patented replacement parts, repair promotion legislation could exempt parts used for repairs instead of for use in competitor products from patent infringement, or by restricting the granting of patents for repair parts completely.
- Where it concerns the use of trademark law, trademarks should not be granted on parts of products. Where such trademarks are in place, the burden to make a compelling case of counterfeit goods should be on the OM and not on the product importer, transporter, or purveyor.

3.3.4.4 Compelling disclosure of repair information and the supply of replacement parts

Compelling OMs to mandate disclosure of repair information and the supply of replacement parts ventures into affirmative requirements that normally run counter to intellectual property rights. This is particularly why this layer of intervention is deemed the most contestable. To broach interventions in this area, the following two considerations are suggested:

- The first would concern cases where replacement parts are not excluded from patent or trademark protection or independent suppliers lacks sufficient information to make non-patented or trademarked products available. In these cases, promoting reliable and competitive parts supply would require a duty be imposed on OMs to make parts available on fair and reasonable terms or be subject to compulsory licensing. Provisions could also be considered to withdraw patents or trademarks if the OM ceased production and supply of the parts on which they were awarded.
- The second would concern where repair information is subject to trade secrets. In these cases, legislation either should introduce penalties for falsely claiming the information is subject to trade secrets to curb abuse and allow trade secret protection only when OMs have taken reasonable precautions to keep the repair information secret (including withholding it from authorised repair affiliates). Otherwise, it is suggested that no exemptions should be granted.

3.3.4.5 Potential criticisms of main IP law interventions

As was indicated, the promotion of right to repair through main IP law interventions remains untested in practice. It is remiss of any discussion of options in this regard, not to consider the potential criticisms of such an approach. In this regard, Grinvald and Tur-Sinai (2020) anticipates three sticking points:

- The first is that **competition would not necessarily incentivise quality repair standards**. In this regard they point out that the principle of consumer autonomy would come down in favour of consumers being allowed the choice of standard of repair at the price they can afford or are willing to pay. In turn, safety concerns could be addressed through tort law or direct regulation.
- The second is in relation to the likelihood of that **competition in repair could undermine innovation and the creation of IP**. In this regard they suggest that the necessary exceptional justifications for instances in which competition in repair should not be pursued has yet to be presented. They recognised that OM's may need to make some adjustments to their business models but suggest that it may incentivise them to find other creative ways, which are simultaneously beneficial to society, to boost their profits.

- The final potential criticism that **the diffusion of repair information relating to repair, along with parts and tools, would increase intellectual property theft**. This is dismissed as a scare tactic and part of the rhetoric that does not seem to have a basis in reality

3.4 Innovation and IP in the AIODIS

As explained under 3.2.4, levels of CE adoption across the AIODIS are still low, with most islands still at the awareness stage. At least Mauritius, Madagascar and Reunion's governments have progressed to actively studying opportunities to advance CE adoption, while Cape Verde has reported commenced with some implementation under its Strategic Plan for Sustainable Development (Commission de l'océan Indien, 2019). Where CE innovations have been pursued, they have occurred mostly in the domains of recycling and recovery, but there are three exceptions:

- Recent developments because of its status as a French Overseas Territory has however put Reunion Island at an advantage. In terms of performance of the countries regarding CE policy development, Reunion Island can be considered the most advanced. A stronger circular economy, through an action plan with measures to achieve the "zero waste" objective, and by implementing 22 circular economy projects has been initiated (EU, 2020). The total amount invested came to €1.5m in across bioenergy, materials recycling, bioplastics production, plant fibre materials development and mobile phone repair (Ademe, 2018).
- Mauritius is a further exception: The apex organised business structured in Mauritius, Business Mauritius, has together with the United Nations conducted studies into industrial symbiosis and has set up a Waste Management within the Sustainable Development and Inclusive Growth Commission, Committee that promotes circular economy in the Mauritian private sector (Prosper, 2018). The Mauritius Standards Bureau have developed local standards in respect of PET recycling for the post-consumer polyethylene terephthalate (PET) bottle and for a positive list of constituents of polyalkylene terephthalates (Dookhun, 2021). Mauritius also does have an intellectual property promotion scheme under the Mauritius Research and Innovation Council, where financial assistance is provided for the registration of new intellectual property (MRIC, 2021). The Mauritian government has also conducted banana fibre extraction for handicrafts manufacture, thus opening opportunities for innovation in the use of this material (Govmu.org., 2021).
- In the Maldives, the representatives of the tourism industry in 2015 signed the Male 3R declaration. The declaration amongst others enjoins the signatories to develop the appropriate technologies to reduce, reuse and recycle (Regional 3R Forum in Asia, 2015).

The potential for less resource-intensive or more durable products are largely however still being ignored, which means growth opportunities are forgone, while the economy is more resource intensive. Besides the above three examples, the status quo around CE innovation is to prioritise awareness campaigns, pursue collaboration, leverage the CE notion to access external funding, or to procure services externally, without necessarily seek technology diffusion.

A SWOT analysis of the innovation and IP landscape as it relates to CE was conducted across the AIODIS. A summary of the findings for the AIODIS as a region is represented in table 12 below. It represents a summary of:

- SWOT analysis of the innovation and IP landscapes of the individual AIODIS set out in annexure 2; which in turn were drawn from,
- the findings of the analysis on barriers to innovation and diffusion in the CE across the AIODIS as set out under section 3.2;

- conclusions drawn from the mapping of the country IPR institutional arrangements as set out under annexure 1;
- a summary of the SWOT analysis of innovation and mapping of country IPR and institutional arrangements;
- influential indexes such as the World Economic Forum Global Competitiveness Report (WEF, 2020), the Global Sustainable Competitiveness Index (solAbility, 2020) and the Global Innovation Index (2020); and,
- feedback from AIODIS in-country stakeholders.

Table 12: SWOT analysis of innovation and IP landscape across the AIODIS

Strength	Weakness
- Relatively stable economies - Young populations - Biomass availability	- Low R&D investment and financing - Various nascent CE activities under way - Lacking university education options - Poor innovation linkages - Low IP activity - Institutional capacity and resourcing - No policy linkage between IP and sustainability or CE - Low levels of CE adoption, focused mostly on recovery and recycling
Opportunities	**Threat**
- Alignment with SDG's - Leveraging green financing options - Existing IP authorities - Existing IP laws in place - EU linkage via Reunion, where right to repair regulations have been passed	- Variable reputations as investment and IP destinations - Insularity - Institutional capacity - No common regional IP organisations - Low appetite for innovation

In general, it indicates that low CE adoption results in low appetite for innovation and diffusion of IP to develop new growth opportunities. There are no formal incentives for entities to increase the pace of green innovation, to convert to sustainable business models or to prioritise issues such as environmental concerns, competition, and consumer autonomy. Commercial players in waste collecting, recycling and recovery are too few and too small in scale to wield policy influence, despite the pressure of cheap consumer goods upstream of them and the depleting landfill capacity and lack of export opportunities downstream of them (Malabar, 2020).

At the same time, there is the wisdom from the coronavirus pandemic, which suggests that it would be beneficial to have IP arrangements conducive to innovation and diffusion in place timeously. CE transitions can be complicated in the developing island context, but necessary to aid the sustainability and competitiveness of the AIODIS. IP interventions will not overcome all these challenges but could ease the growth of certain CE activities These provisions often take immense time and effort to bring about and could just prove very burdensome to expedite should an urgency arise. This would not necessarily be required should an environmental crisis result because of slow CE adoption but could also be helpful should CE adoption accelerate. There are at least significant strengths and opportunities to leverage in this regard.

Overall, the situation would align with an expectation that while a conducive IP environment would not necessarily be a panacea to the emergence and growth of the CE, it could be a helpful enabler of a potential non-linear trajectory CE acceleration into the future across these territories. Such interventions are unlikely to solve institutional, education and fiscal inadequacies, but could stimulate innovation diffusion of technology, whether through expedited approvals for new CE products or production process IP, or because of CE practices related to product and parts lifespan extension, such as through repurposing, remanufacturing, refurbishing and repairing activities.

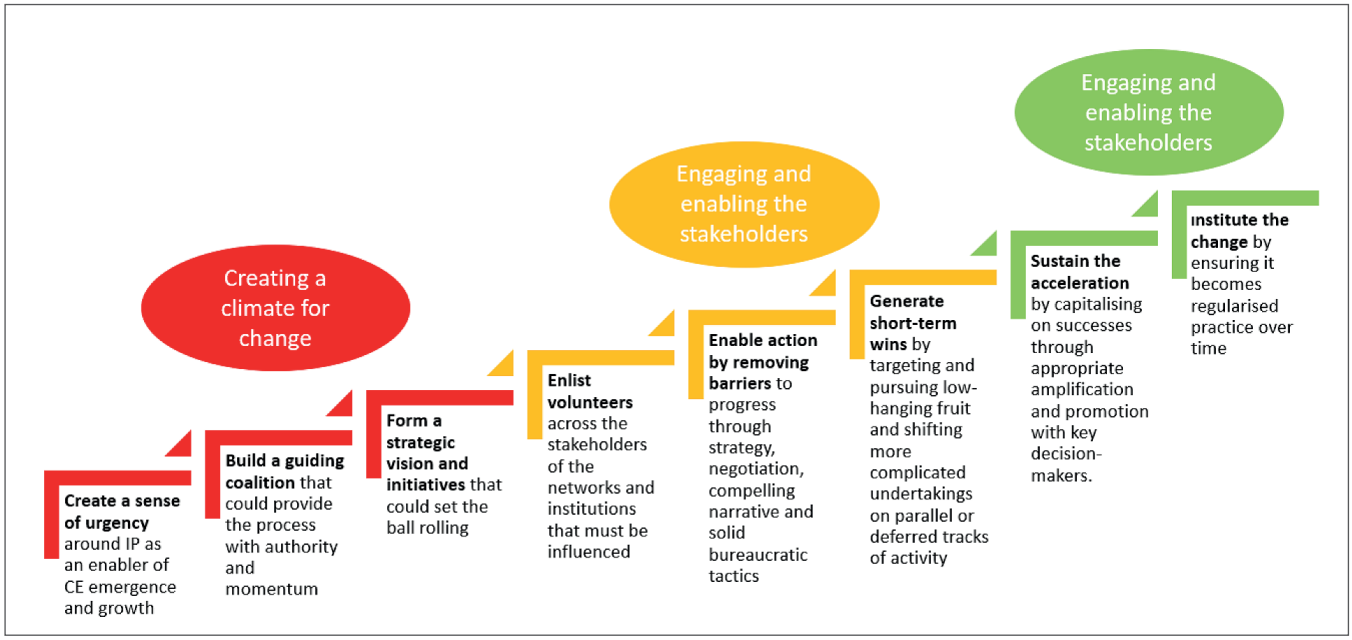
4. Recommendations

This section sets out the recommendations produced from the assessment of intellectual property issues related to the emergence and growth of the CE across the AIODIS. It commences with a change model rationale on which the key solutions proposals are set out, which themselves are set out in the second section. The headline proposal for the promotion of the institution of non-IP right to repair provisions across the AIODIS. A third section focuses on how the position of the IOC as a key and appropriate regional framework entity needs to be leveraged to achieve this. The fourth section sets out the guardrails of a high-level action plan proposal to achieve the proposed change project to promote the institution of non-IP right to repair provisions across the region and is followed by consideration of proactive country-level steps that the AIODIS can take to advance this mission. The final two sections respectively consider opportunities for the IOC to build strategic partnerships and access resources in the process and implications for adjacent consultancies to the one reported on here.

4.1 Change model rationale for key solution proposals

The IOC wants to use its reputation, broader blue economy mandate and established AIODIS platform to promote interventions related to IP to enable the CE. It wants to do this for environmental preservation and inclusive growth purposes, for the further pursuit of which they want to attract additional funded project mandates. Working back from the barriers identified under section 3.2, this implies extensive and complicated change processes. These processes are complicated by the articulated and reticulated nature in which the IOC as a subsidiary governmental organisation, and the AIODIS as a subsidiary platform within that organisation, covering a broader remit than just the immediate voting membership of the IOC, operates. In broad terms, the requirements for such changes are described well by Kotter (1996) and are adopted for the purposes of establishing IP as an enabler of CE innovation in figure 10 below.

Figure 10: 8-step description of change to establish IP as an enabler of CE innovation across the AIODIS



Source: Adapted from Kotter (1996)

A sense of urgency to build appetite for this process is needed around IP as an enabler of innovation and diffusion in the CE. Ass indicated in section 3, across the AIODIS tendency is to prioritise awareness campaigns, seek collaboration and leverage the notion of CE to access funding opportunities. There is a danger that this leads to rent-seeking to support lower-level CE activities in the low volume and insular developing island context, rather than possibly more productive, lucrative, attainable and innovation conducive CE activities such as repair, refurbishing, remanufacturing and repurposing of products (R's 4 to 7 as discussed under section 2.2 and discussed in section 3).

Due to the geographical isolation of these islands, the supplies of durable goods, all of which are imported, are not as free flowing as they are in contiguous markets. There could therefore still be significant potential to explore prospects for IP regimes that are more favourable to right to repair. To illustrate in the absence of similar statistics for AIODIS markets, some estimates put the repair market in the United States at 3% of GDP (Grinvald and Tur-Sinai, 2020). A lack of reliable, relevant data means it is not possible to obtain a corresponding estimate for the AIODIS, but it could quite easily approach something similar across the or even exceed it across the AIODIS, as anecdotally it appeared that there may not be many businesses exclusively involved in repair, many do engage in repair activities in some form or other; and, many of these businesses are in the informal sector or do not require licensing, which means that this is a potential future source of revenue and unaccounted for economic growth. The potential of the expansion of the repair economy could therefore prove a solid enough footing to generate enthusiasm for such IP change.

4.2 Key Solution Proposals to Address IP barriers to innovation and diffusion in the CE across the AIODIS

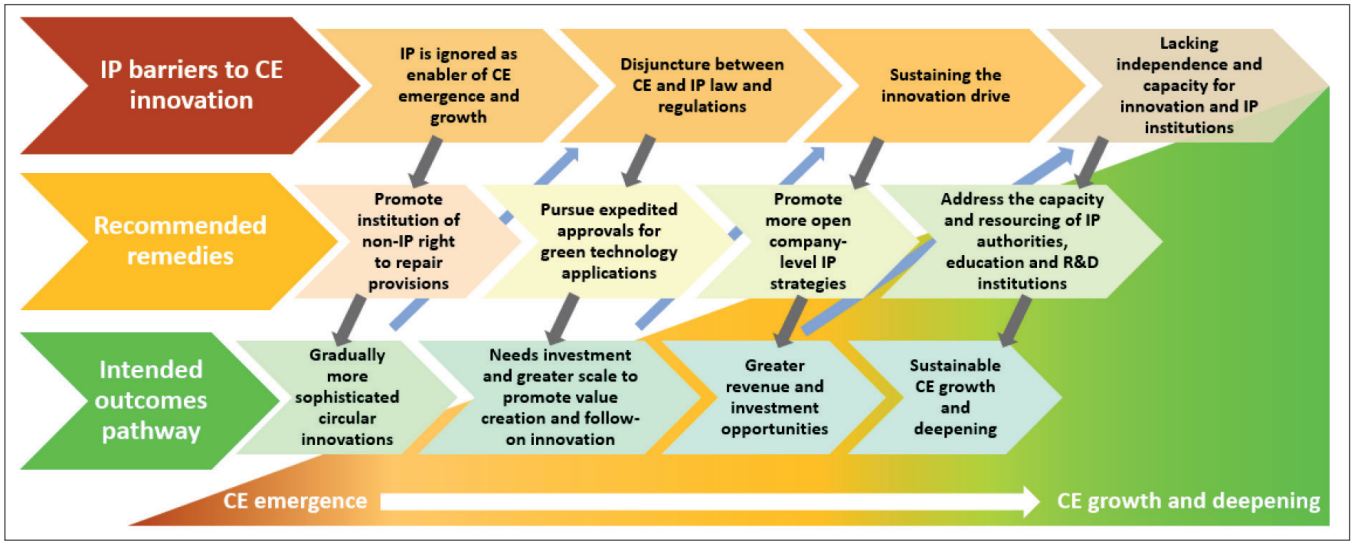
This suggests some form of right to repair legislation would best serve the IOC's quest to promote CE conducive IP reform. A key success requirement for complex change processes is the ability to generate short-term wins. An experimental main IP intervention would therefore be too risky. A mentioned example of a non-IP intervention is under way in the EU, which also has jurisdiction over AIODIS

participant, French possessed Reunion. The EU is also an observer member of the IOC, which could be leveraged to secure their support to generate and promote the implementation of model non-IP right to repair legislation. It is also appropriate that the IOC is informed by a policy and governance-led example of right to repair intervention, as the IOC serves under the principle of subsidiarity, which would make the promotion of right to repair activism (such as led to the actions in the USA and South Africa) inappropriate as a route to change.

The remaining barriers are longer term projects. The institutional independence and capacity of IP authorities are not likely going to be addressed solely from a sustainability perspective, as it would require buy-in from the broader IP stakeholder landscape as well and may require politically complex concessions on internal institutional independence and external integration on IP governance. In turn, improving the broader ecosystem to sustain innovation drive would take significant longer-term investments in education and R&D, amongst other.

This does not mean that IP interventions outside of right to repair may not be feasible within the AIODIS context, it just means that they should be appropriately sequenced. Should circular innovations gain pace in future, expedited examination of environmentally friendly patent applications may well become more pertinent. In turn, company-level IP strategies are probably more likely to be influenced by social and general licence to operate requirements, inclusive of right to repair interventions. The rationale for how non-IP right to repair could trigger the promotion of CE emergence and growth in this way is represented schematically in figure 11 below

Figure 11: How non-IP right to repair could trigger the promotion of CE emergence and growth through the resolution of IP barriers to innovation and diffusion across the AIODIS



Legend: Grey arrows indicate remedial flow. Blue arrows indicate graduation to next priorities.

Source: Author's conception.

In summary, therefore, the three solution proposals in order of primacy are:

- Prioritise promoting the institution of non-IP right-to-repair provisions: This could lift the ambitions of potential CE participants from subsidy-hungry, lower-level recycle and recover type activities to pursue higher value and more innovation conducive repair, refurbishing, remanufacturing and repurposing of products. It could reduce the demands for durable goods imports and grow the domestic economy, which in turn could create enthusiasm for IP as an enabler of CE growth.

It would be easier to generate short-term wins through the pursuit of non-IP right to repair provisions, rather than to attempt experimental and controversial main IP interventions.

- Reserve IP interventions that are more scale-dependent for pursuit at a later stage. This could include:
  - expedited approvals for green technology applications would only become relevant once circular innovations gain pace, possible on the back of right to repair or driven through greater domestic market scale over time;
  - incentives or performance management to influence company-level IP models would similarly be driven by market-scale, and would probably enjoy better success once initiated to a greater degree by bigger economies where OM's are domiciled
- Propose a more detailed strategic review to AIODIS countries of institutional capacity and organisation of their respective IP authorities, as well as education and R&D investment provisions that need to be addressed to better support innovation in general, as well as circular innovation. This is necessary as it would require buy-in from the broader IP stakeholder landscape and not just those with immediate interest in CE emergence and growth. Since it may require politically complex concessions on internal institutional independence and external integration on IP governance, it should not be pursued as a mandate by the IOC given its states as a subsidiary intergovernmental organisation.

4.3 Key Issues in Relation to Solution Proposals

The following issues are discussed in response to stakeholder concerns raised during consultations for this project.

4.3.1 Addressing Low Levels of IP Awareness

Low levels of awareness on IP as an enabler of CE is acknowledged throughout the report and it may be prudent to reflect on how this would be addressed as part of the key proposal of instituting non-IP right to repair rather than proposing an awareness campaign as an outright solution. Although IP awareness is a necessary step towards the adoption of IP as an enabler of CE, it is not an end in itself. Stakeholders need to be enticed to use IP to facilitate circular innovation. In this regard the institution of non-IP right to repair would function as a proxy – it would offer stakeholders both the opportunity to learn about the significance of IP as an enabler of circular innovation as well as reap the material availability of repair information and spare parts to promote innovation through experiential learning.

4.3.2 Stimulating Demand for IP as an Enabler of Circular Innovation: Are Incentives Required

There were numerous stakeholder inputs pointing out the administrative and cost barriers for registering IP by local firms, particularly from the Comoros, Seychelles and Madagascar. In relation to the question of administrative and financial IP incentives for the promotion of circular innovation: Businesses engaged in CE will not necessarily be motivated to register with IP authorities if they do not have a demand to register IP by virtue of being likely to innovate new products. In the absence of this demand, it is unlikely to be meaningfully stimulated by financial and administrative incentives. It would therefore be potentially much more impactful to try and build a critical mass of demand for IP services by promoting innovation momentum through the promotion of non-IP right to repair. Again, this would work by promoting innovative momentum through the experiential learning that can be gained from the improved availability of repair information and spare parts.

4.3.3 Company-level IP strategies in relation to small developing island states

Open IP strategies are mostly deployed by companies where they see it enabling significant improvements in the market ecosystem into which they sell their products or services. A common example is Tesla making available free licenses for their electric vehicle drivetrain technology to promote greater investment in rapid expansion of charging infrastructure, so the overall market for electric vehicles can provide greater room for volume growth. In relation to environmental outcomes, the IP in many cases have yet to be developed. However, there has already been cases of companies making available IP in this regard. A key, recent example is Unilever's recyclable toothpaste tube, which it brought to market early in 2021 and simultaneously made the IP available to competitors. They key disadvantage small developing island states face in promoting more open company-level IP strategies to promote environmental outcomes through performance management mechanisms are issues of insularity – chiefly small market scale. However, this does not mean that SIDS such as the AIODIS cannot negotiate with individual companies about collaboration on developing new patents, providing access to existing patents or to develop products from open-source components.

4.3.4 IP for circular innovation, trade negotiations and environmental requirements for IP protection

IP has formed part of the negotiations on EPA's between the EU and the designated regional groupings with which it intends to conclude these agreements for some time. This includes the Cariforum (Caribbean Community and Dominican Republic) grouping. Discussing IP within the context of the promotion of CE emergence and growth has however yet to be done. While it may be counterproductive from an environmental point of view to withdraw protection for existing IP on environmental grounds, measures such as corporate environmental, social and governance requirements and standards, energy use regulations and emissions and waste regulations probably provide greater incentives to innovate for the sake of sustainability. This would also apply to local subsidiaries of international companies.

It is true that the AIODIS should be able to exploit millions of patents that are not registered with their national IP authorities for the purposes of domestic technology diffusion. However, if this extended to the reverse engineering of products or copycat designs on any scale it could lead to political, trade and investment complications with bigger trade partners. In general, it does not constitute a barrier to innovation that needs to be addressed through IP measures.

4.3.5 Linkage between IP regulation and EPR

In general, IP opportunities in relation to EPR are highlighted by IP lawyers to mostly involve the registration of new sorting and processing technologies to secure new revenue opportunities. In this regard, the AIODIS should probably be better focused on developing sorting and processing technologies that are suited to lower volume markets out of open source components.

IP concerns in relation to EPR relate to preventing IP theft through extra-company take-back and recycling schemes. This is more prevalent amongst more technology intensive waste streams such as e-waste and automotive recycling. For insular territories non-IP right to repair would go some distance in ensuring longer product usage cycles for these technologies.

4.3.6 Access to Finance for Circular Innovation

The World Bank deploys Development Marketplace scheme which was relatively simple and could perhaps be adopted to simplify processes such as those of the SeyCCAT - Seychelles Conservation and

Climate Adaptation Trust - and the Blue Bond at the Developing Bank of Seychelles or DBS for the type of local innovations required. The SWIOFish3 project could potentially provide support to prospective applicants in putting an application together for the Blue Investment Fund. The SeyCCAT funding can also be used to prepare an application to the DBS (feasibility development of a business model, etc.), which shows the complementarity between the funds supported by the Blue Bond as part of the Blue Finance. These examples are with respect to Seychelles but equivalents for other AIODIS territories also exist. There are numerous international 'impact funds' and other schemes which target innovation in the CE. Some are competitive funds. These products will generally be equipped with IP expertise.

4.3.7 One-stop Shop Patenting and the Introduction of a Patent Courts

It is true that the modernization of design rights will expedite the democratization and use of technologies. To encourage and incentivize innovation where there is already significant innovation momentum, innovators benefit from having access to fast, effective, and affordable protection tools for their inventions. In this regard, a patent system, which will create a one-stop shop for businesses, considerably simplifying patenting, boosting transparency, and facilitating licensing, would be a priority. The introduction of a Patent Court could then further improve legal certainty and reduce litigation costs. Fostering data sharing and technology transfers while sharing them in a secure way without the risk of their sensitive business data being acquired, used or disclosed unlawfully, would then also act as a catalyst in the further development and uptake of green initiatives.

Such a scenario would relate to outcomes that may be presaged by the proposal for more detailed strategic review to AIODIS countries of institutional capacity and innovation landscape that could be advanced by the Indian Ocean Commission as detailed under section 4.2 of this report. It should however be noted that one-stop shop patenting services are generally provided by private sector legal service providers and that patent courts, where they have been introduced, are mostly prevalent amongst developed economies that have significant scale in relation to IP production, such as the EU, Germany, Switzerland, Japan, the United Kingdom and the US.

4.4 Leveraging the Regional Framework

To address these barriers coherently, the IOC needs to adopt a theory of change that leverages the regional framework adequately. This sections first sets out an overarching theory of change concerning the promotion of IP as an enabler of CE emergence and growth across the AIODIS. We will then consider theoretical approaches on how to engage more tactically with the regional framework and how to synthesise these approaches into the most appropriate theory of change

It needs to be done by working back through an outcomes pathway through which it could occur (Centre for Theory of Change, 2021). The IP barriers to innovation and diffusion in the CE and the global best practice with respect to IP for the CE were used to determine what these pathways could be. They are illustrated in figure 11 below. As per the key proposals above, it illustrates how non-IP right to repair could trigger the promotion of CE emergence and growth through the resolution of IP barriers to innovation and diffusion across the AIODIS.

In concrete terms the theory is: if AIODIS countries can get non-IP right to repair laws enacted, more people will be involved in the repair, refurbishing and remanufacturing of products. This will increase the diffusion and adoption of technology, which will gradually lead to more sophisticated innovations. The greater demands this will exert on the AIODIS IP regimes will in due course stimulate government appetites to pursue more ambitious direct IP reforms.

4.4.1 Theoretical Approaches to Leveraging the Regional Framework for Change

The theoretical approach for leveraging the regional framework for change to achieve non-IP right to repair as a trigger for broader IP reform will consider three bodies of theory of change: organisational change in public bodies, global political theories of change and theories about advocacy strategies and tactics for policy change. Here follow the proposals on the most appropriate approach in each respect:

- **An emergent approach to organisational change in public bodies** – An emergent (rather than a planned or contingent) theory is judged the most suitable. It provides for sequences of actions with deliberate feedback loops to increase the chances of desired change being effected in dynamic situations, rather than for overt top-down rigidity (such as with planned theory) or just pandering to situational variables (contingent theory) (Barnard, 2010). The IOC requires such a hybrid approach for promoting right to repair across the AIODIS. The dearth of data on CE and innovation across the AIODIS, implementation during COVID-19 recovery and the cultural diversity and developmental variances of the member territories require a degree of change readiness on the one hand. On the other, sticking to time-linked objectives and deliverables agreed with funders suggests the IOC needed to reserve provision for push back against situational variables.
- **An advocacy coalition framework for regional change** – The proposed external change of achieving right to repair was in line with generic policy objectives (AIODIS governments generally prioritise employment creation, the emergence of IP policy and the promotion of the CE), but stakeholders had yet to connect it widely to the notion that it would specifically promote IP enablement of circular innovation and diffusion for CE emergence and growth. In terms of the comparison of global theories of policy change it would translate as them trying to address the "who" and the "what", but not the "how" (see table 13 below). In this regard, the Advocacy Coalition Framework shows the biggest convergence with the proposed IOC project and emergent organisational theories of change: a change that needs to happen through coordination by individuals with the same policy belief (common vision, a guiding coalition and broad-based action in Kotter's (1996) terms) and a sympathetic administration (or strong leadership). The other two theories are less well-suited: enacting right to repair would hardly pass as a large-scale policy change (as Punctuated Equilibrium Theory would be suited to); and, the notion of a policy window (as Kingdon's Agenda Setting would want) is moot when it involves 9 disparate small island territories and a loose cooperation platform such as the AIODIS.

Table 13: Global theories of policy change

Theory	How Change Happens	Suitability
1. Punctuated Equilibrium Theory (Baumgartner & Jones, 1993)	Significant policy changes can occur when the right conditions are in place.	• For large-scale policy change • Strong capacity for media advocacy
2. Advocacy Coalition Framework (Sabatier, 1999)	Change happens through coordination by individuals with the same policy beliefs.	• A sympathetic and aligned administration
3. Agenda Setting (Kingdon, 1995)	Policy can be changed during a window of opportunity when two of policy problem definition, policy solutions and/or political climate align.	• Internal capacity exists to create, identify, and act on policy windows

Source: Adapted from Stachowiak (2009)

- **A Power Elites approach to strategic and tactical advocacy** – To integrate the "how" in our theory of change, we turn to strategic and tactical advocacy theories of change. Here, the Power Elites Theory of change make the most sense because the objective is incremental change – non-IP right to repair as opposed to changing main IP law. This also aligned with stakeholder responses stating that commercial players in waste collecting, recycling and recovery are too few and too small in scale to wield policy influence; and, that awareness promotion as a tactical cornerstone (key to the Prospect and Community Organising theories as set out vis-à-vis the Power Elites Theory in table 14 below) was spent – it only encouraged rent-seeking to support lower-lever CE activities (recovery and recycling) rather than possibly more productive, lucrative, attainable and innovation conducive CE activities such as repair, refurbishing, remanufacturing and repurposing of products.

Table 14: Strategic and tactical theories of change

Theory		How Change Happens	Suitability
1.	Prospect Theory (Tversky et al, 1981)	Individuals' openness to policy change will depend on how the change is presented to them.	• Situations where increasing awareness, agreement on problem definition, or problem salience is key
2.	Power Elites Theory (Mills, 2000; Domhoff, 1990)	Working directly with decision-makers	• The focus is on incremental policy change (e.g., administrative or rule changes)
3.	Community Organizing Theory (Alinsky, 1989; Biklen, 1983)	Through collective community action.	• Where a community "convener" or "capacity-builder" rather than a "driver" function needs to be fulfilled

Source: Adapted from Stachowiak (2009)

4.4.2 A Synthesised Regional Approach for Instituting non-IP Right to Repair

An integration theory of change for the proposed institution of right to repair provisions across the AIODIS is attempted in figure 12 below. The defining features draw on the preceding theory as follows:

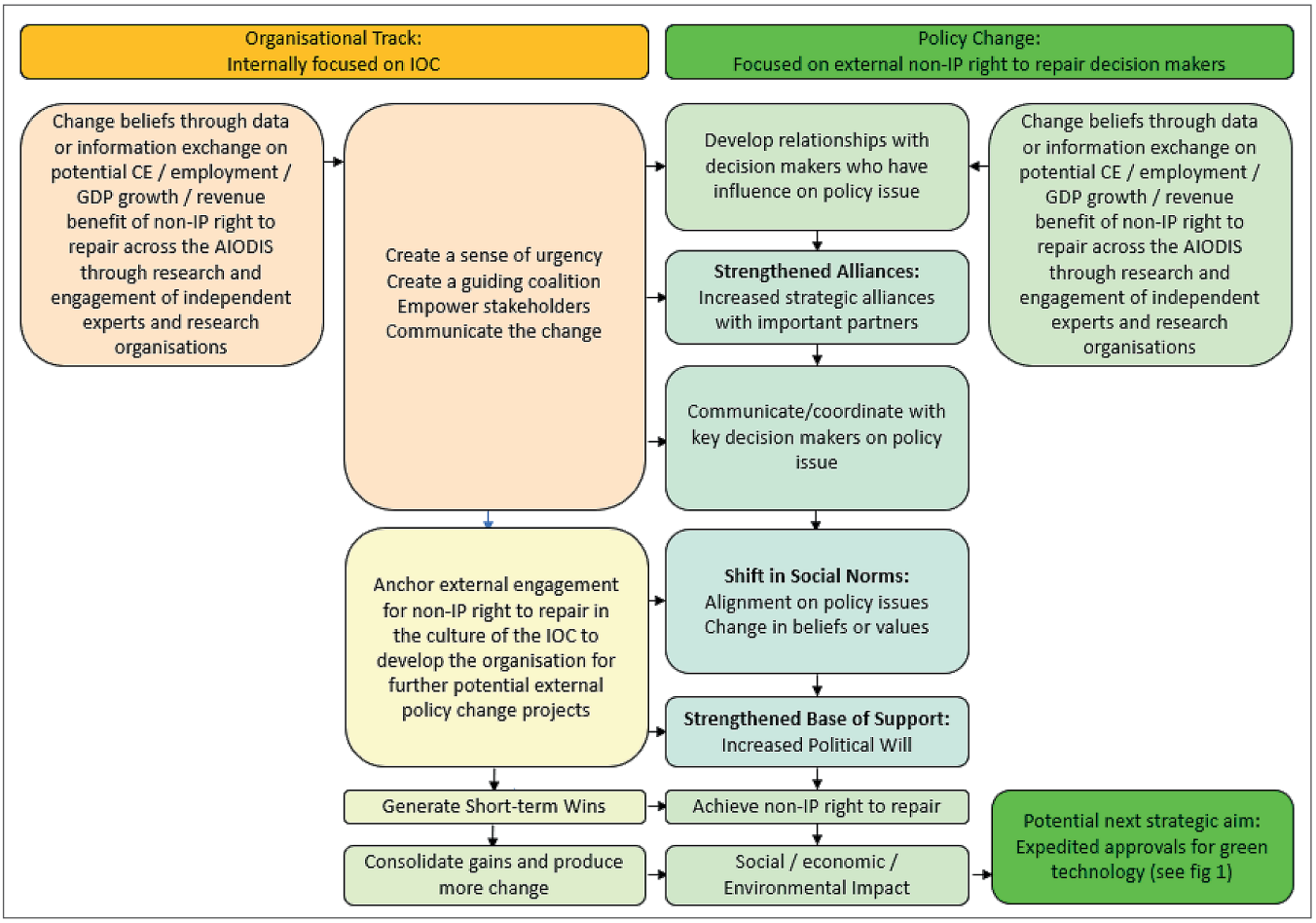
- A distinction between a policy change and a corresponding organisational change tracks recognises making a change as an opportunity for the organisation to become better at it and draws on emergent theory viewing change in public bodies both from a system and organisational point of view (Barnard, 2010).
- From the Advocacy Coalition Framework (Sabatier, 1999) the use of data and information exchange is integrated to align understandings and build a common vision with key stakeholders.
- From the Power Elites Theory (Mills, 2000; Domhoff, 1990) the determining role of building relationships with key policy influencers is integrated.

The Unilever (2011) method was used to identify levers for change to aid achievement of the policy change. This relies on the systematic identification of barriers to the desired regulatory change, triggers that could aid buy-in and support and motivators, to ensure enthusiasm for the overall cause. In the process, four levers for change were identified:

- **Enabling information:** Quality and easily accessible independent data and research proof points that support the institution of non-IP right to repair for any CE, growth, employment and revenue multipliers.

- **Empathetic relationship building:** Stakeholder engagement that works backword from the key motivations of stakeholders across the AIODIS.
- **Conscientious communication:** Accordingly structuring and effectively delivering compelling narratives and key messages.
- **Model regulation:** Setting the ball rolling with model regulation that could simplify the task of instituting non-IP right to repair regulations for AIODIS governments and legislators.

Figure 12: Synthesised change theory mapping for the IOC and the proposed non-IP right to repair project



4.5 High-level Action Plan Proposal

A 5-Phase Action Plan is proposed to operationalise the regional change project to institute no-IP right to repair across the AIODIS as set out above:

- Phase 1 Project initiation: Will comprise the project proposal, securing funding, recruiting consultants, and establishing a project office. These activities precede actions in the change theory mapping.
- Phase 2 Project preparation: Will include 1.) stakeholder analysis and mapping; 2.) the project narrative and key messages; and, 3.) proof point research.
- Phase 3 to repair and building a guiding coalition of the IOC and its AIODIS focal points. Outwardly, the priority will first be relationship development with key policy influencers.

- Phase 4 Alignment of objectives and legislation: Assistance is recruited to help draft model legislation for the institution of non-IP right to repair regulation across the AIODIS, which is then tabled with key stakeholders.
- Phase 5 Strategic aim achievement, project review and way forward.

It is expected that roll-out of the plan would be achievable over an 18-month period and an indicative action plan is set out in Annexure 3 of this document. The plan is inclusive of key regional and country-level stakeholders, proposed project timelines for each of the phases; structured key actions, actors, timelines, and milestones; and, consideration of potential risks, barriers, and mitigations.

4.6 Pro-active Country-level Steps that the AIODIS can take

There are specific pro-active steps that the AIODIS can take at country-level to aid and even simplify and shorten the regional effort to get non-IP right to repair instituted across their territories. These include the following:

- Prioritise and prepare to conduct research, make, and receive proposals on the institution of non-IP right to repair provisions. This should include the creation and resourcing of temporary cooperation mechanisms or working groups in governments and in legislative bodies to hear and consider proposals for IP reform to support the emergence and growth of the CE, such as non-IP right to repair. At a minimum, this should include (see Annexure 3A):
  - National Focal Points (NFPs): The National Focal Points are AIODIS civil servants who act as representatives, facilitators, and coordinators for and advisors to AIODIS projects for the IOC. They assist on an ex-officio basis.
  - National Consultants (NCs): National consultants are AIODIS residents who are contracted on a paid basis to act as representatives, facilitators, and coordinators for and advisors to AIODIS projects for the IOC in addition to the NFPs.
  - Responsible Ministers (RMs): The Responsible Ministers are government ministers of the AIODIS who serve in portfolios responsible for innovation promotion and intellectual property governance across the AIODIS. In most cases, they are the ministers tasked with trade and industry portfolios.
  - Responsible Secretaries (RSs): The Responsible Secretaries are the head civil servants or agency heads for the national IP authorities of the AIODIS.
  - Responsible Legislators (RLs): The Responsible Legislators are the members of the AIODIS national legislative bodies who serve on legislative committees concerned with innovation promotion and IP. In most cases, these are the legislative committees that are tasked with trade and industry portfolios.
- Conduct relevant economic research on the potential benefit of non-IP right to repair. This should include:
  - Conduct a domestic survey of the businesses, informal and formal (whether required to be licensed or not) that are engaged in product lifespan extension activities (the reuse, repair, refurbishment, remanufacturing and repurposing of products and materials). The surveys should take care to include both businesses that are engaged exclusively in these activities or alongside the provision of other services and goods.
  - Conduct an economic analysis of the domestic economic contribution of product lifespan extension activities. Such analyses should both look at direct contribution to GDP and

employment, as well as other effects such as direct youth employment and indirect general employment creation, net impact on government revenue, impact on imports and current account balances, and demand creation for public and private infrastructure and services.

- Conduct independent research to explore legislative options preferable at country-level to institute non-IP right to repair provisions. This could range from cursory surveys of global best practice and local preferences to full research, development, and processing of draft legislation.

4.7 Opportunities for the IOC to build strategic partnerships and access resources

The IOC already has significant funding partnerships in place and some of these will be relevant for approach in relation to the funding proposed project. These include the following:

- African Development Bank
- Agence Française de Développement
- European Union
- Food and Agricultural Organisation
- Fonds Fraincais Pour L'Envrionnement Mondial
- Green Climate Fund
- World Bank

Further funding partners which should be considered include the following:

- African Climate Foundation
- China International Development Aid Agency
- The Commonwealth
- Private Investors for Africa
- UNDP
- USAID

4.8 Recommendations for adjacent project consultancies

This consultancy was conducted as part of a package of three concurrent consultancies undertaken under the AIODIS component of SWIOFISH2. The intention was that the three consultancies should cooperate and inform one another. Recommendations in relation to the other two consultancies are made under their topics below:

- **The preparation of AIODIS frameworks through the identification of existing initiatives, lessons as well as bottlenecks for the emergence of entrepreneurs in favour of the circular economy, and the preparation of a guide for the circular economy** (undertaken by Professor Pierre Failler of the University of Portsmouth). Key recommendations for this consultancy are as follows:
  - The sections in this report with the greatest relevance for Prof Failler's research are: (2.5) The business case for IPR as an enabler of circular innovation; (3.2) Barriers to innovation and diffusion in the CE across the AIODIS; and, (3.4) Innovation and IP in the AIODIS.

- It could be helpful to include the finding (set out under 3.4) that while a conducive IP environment would not necessarily be a panacea to the emergence and growth of the CE, it could be a helpful enabler of a potential non-linear trajectory CE acceleration into the future across the AODIS. Such interventions are unlikely to solve institutional, education and fiscal inadequacies of their own accord, but could stimulate innovation diffusion of technology, whether through expedited approvals for new CE products or production process IP, or because of CE practices related to product and parts lifespan extension, such as through repurposing, remanufacturing, refurbishing and repairing activities.
- Figure 11 in the introduction under section 4.2 gives a clear overview of how non-IP right to repair could trigger the promotion of CE emergence and growth through the resolution of IP barriers to innovation and diffusion across the AIODIS. This could potentially be helpful in considering how to address institutional constraints related to CE, and opportunities in adopting a circular economy.

- **The preparation of a sensitisation strategy and a communication plan for the reduction of the use of plastics to promote the circular economy, and to fight against marine pollution in the AIODIS** (undertaken by Mr Kieran Kelleher, an independent consultant on oceans and fisheries). Key recommendations for this consultancy are as follows:
  - When addressing regulations in respect of the circular economy to reduce MPP, it could be helpful to include the finding (set out under 3.4) that while a conducive IP environment would not necessarily be a panacea to the emergence and growth of the CE, it could be a helpful enabler of a potential non-linear trajectory CE acceleration into the future across the AODIS. Such interventions are unlikely to solve institutional, education and fiscal inadequacies of their own accord, but could stimulate innovation diffusion of technology, whether through expedited approvals for new CE products or production process IP, or because of CE practices related to product and parts lifespan extension, such as through repurposing, remanufacturing, refurbishing and repairing activities.
  - Figure 11 in the introduction under section 4.2 gives a clear overview of how non-IP right to repair could trigger the promotion of CE emergence and growth through the resolution of IP barriers to innovation and diffusion across the AIODIS. It could be helpful if any communications going to AIODIS nations could sensitise them to the change required to achieve this helpful regulatory change.

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Annexure 1: Country IPR institutional arrangements

Annexure 1a: Cape Verde

Institutional Component	Relevant Details
National IP Offices	Institute for Quality Management and Intellectual Property (IGQPI)
Website	**http://www.igqpi.cv/**
Accounting Authority (Head of Office)	Joana Flor - Executive Administrator
Agency of departmental?	Agency
Executive Authority (Line Minister)	Ministry of Industry, Trade and Energy Eng. Alexandre Dias Montero
Key International Memberships and Treaties	World Intellectual Property Organisation

National IP Laws			
Year of Version	**Type of Text**	**Title**	**Subject Matter**
2018	Implementing Rules/ Regulations	Ordinance No. 9/2018 of March 19, 2018, on Approval of the Regulation on the Registration of Literary, Artistic and Scientific Works	Copyright and Related Rights (Neighboring Rights), Enforcement of IP and Related Laws, IP Regulatory Body
2017	Main IP Laws	Decree-Law No. 2/2017 of November 16, 2017	Copyright and Related Rights (Neighboring Rights)
2017	Main IP Laws	Decree-Law No. 2/2017 of November 16, 2017, on the First Amendment to Decree-Law No. 1/2009 of April 27, 2009, on the Revision of Copyright Law	Copyright and Related Rights (Neighboring Rights)
2016	Main IP Laws	Law No. 118/VIII/2016 of March 24, 2016, on Fair Compensation for Private Copying	Copyright and Related Rights (Neighboring Rights), IP Regulatory Body
2010	Constitution / Basic Law	Constitution of the Republic of Cabo Verde (as amended up to Constitutional Law No. 1/VII/2010 of May 3, 2010)	Other

National IP Laws			
Year of Version	**Type of Text**	**Title**	**Subject Matter**
2010	Implementing Rules/ Regulations	Resolution No. 25/2010 of May 24, 2010, establishing the Institute for Intellectual Property of Cape Verde (IPICV)	IP Regulatory Body
2010	Main IP Laws	Statutes of the Intellectual Property Institute of Cape Verde	Enforcement of IP and Related Laws, IP Regulatory Body, Other
2009	Main IP Laws	Decree-Law No. 1/2009 of April 27, 2009, on the Revision of Copyright Law	Copyright and Related Rights (Neighboring Rights), Enforcement of IP and Related Laws, Traditional Cultural Expressions, IP Regulatory Body
2008	Main IP Laws	Decree-Law No. 13/2008 of April 7, 2008, establishing the Cultural Creation Grant and approving its Regulations	Copyright and Related Rights (Neighboring Rights)
2007	Main IP Laws	Code of Advertising (Decree-Law No. 46/2007 of December 10, 2007)	Trademarks, Geographical Indications, Trade Names, Competition, Enforcement of IP and Related Laws
2007	Main IP Laws	Decree-Law No. 33/2007 of September 24, 2007, on the Use of Digital Signatures	Copyright and Related Rights (Neighboring Rights)
2007	Main IP Laws	Decree-Law No. 59/2006 of December 26, 2006, on Medicinal Products	Patents (Inventions), Trademarks, Other
2007	Main IP Laws	Industrial Property Code (approved by Decree-Law No. 4/2007 of August 20, 2007)	Patents (Inventions), Utility Models, Industrial Designs, Trademarks, Geographical Indications, Trade Names, Layout Designs of Integrated Circuits, Copyright and Related Rights (Neighboring Rights), Enforcement of IP and Related Laws, IP Regulatory Body, Industrial Property
2007	IP-related Laws	Law No. 71/VII/2010 of August 16, 2010, amending Decree-Law No. 10/93 of June 29, 1993, regulating the Broadcasting Activities	Trademarks, Copyright and Related Rights (Neighboring Rights), Other

National IP Laws			
Year of Version	**Type of Text**	**Title**	**Subject Matter**
2007	Main IP Laws	Law No. 8/VII/2007 of March 26, 2007, on the Delegation Powers to the Government for the Establishment of the Legal Regime Applicable to the Promotion and Protection of Industrial Property Rights and its Regulations	Enforcement of IP and Related Laws, IP Regulatory Body, Industrial Property
2007	Implementing Rules/ Regulations	Ordinance No. 22/2007 of August 27, 2007, on Trademarks	Trademarks
2006	Implementing Rules/ Regulations	Resolution No. 16/2006 of May 22, 2006, on Approval of the Government Program for the 7th Legislature 2006-2011	Other
2003	IP-related Laws	Penal Code (approved by Legislative Decree No. 4/2003 of November 18, 2003)	Trademarks, Enforcement of IP and Related Laws, Other
1998	IP-related Laws	Law No. 56/V/98 of June 29, 1998, on Medias	Copyright and Related Rights (Neighboring Rights), Other
1998	IP-related Laws	Law No. 57/V/98 of April 28, 1998, on Television	Copyright and Related Rights (Neighboring Rights)
1998	IP-related Laws	Law No. 59/V/98 of April 30, 1998, on the Status of Journalist	Copyright and Related Rights (Neighboring Rights)
1997	IP-related Laws	Civil Code (approved by Ordinance No. 68-A/97 of September 30, 1997)	Enforcement of IP and Related Laws, Other
1993	Main IP Laws	Decree-Law No. 10/93 of June 29, 1993, Governing the Exercise of the Broadcasting Activity	Copyright and Related Rights (Neighboring Rights), Other

Annexure 1b: Comoros

Institutional Component	Relevant Details
National IP Offices	• Copyright: Ministry of Youth, Employment, of the Workforce Development, Culture, and Sport • Industrial Property: Comorian Office of Intellectual Property (OCPI), Ministry of Economy, Planning, Energy, Tourism, Private Sector of the Investments and Land Affairs
Website	
Accounting Authority (Head of Office)	Director- General of the OCPI: Ms Nadjat Ali Mchangama
Agency of departmental?	Departmental
Executive Authority (Line Minister)	Minister of Youth, Employment, of the Workforce Development, Culture, and Sport Minister of Economy, Planning, Energy, Tourism, Private Sector of the Investments and Land Affairs
Key International Memberships and Treaties	World Intellectual Property Organisation African Intellectual Property Organisation

National IP Laws			
Year of Version	**Type of Text**	**Title**	**Subject Matter**
2016	IP-related Laws	Customs Code (Law N° 15-016/AU of December 28, 2015 promulgated by Decree No. 16-251/PR)	Enforcement of IP and Related Laws, Other
2009	Constitution / Basic Law	Constitution of the Union of the Comoros	Other
1995	IP-related Laws	Law No. 082P/A.F - Law No. 95-012/AF on the Penal Code (Crimes and Offenses)	Copyright and Related Rights (Neighboring Rights), Enforcement of IP and Related Laws, Other
1965	Implementing Rules/ Regulations	Decree No. 65-621 of July 27, 1965, on Trade Marks	Trademarks, Industrial Property
1964	Main IP Laws	Law No. 64-1360 of December 31, 1964, on Trademarks and Service Marks	Trademarks
1957	Main IP Laws	Law of March 11, 1957, on Literary and Artistic Property	Copyright and Related Rights (Neighboring Rights), Enforcement of IP and Related Laws

National IP Laws			
Year of Version	**Type of Text**	**Title**	**Subject Matter**
1954	Implementing Rules/ Regulations	Decree No. 53-970 of September 30, 1953, Amending and Supplementing the Law of July 5, 1844, on Patents for Inventions and Instituting the so-called Compulsory Licenses	Patents (Inventions), Enforcement of IP and Related Laws, IP Regulatory Body
1913	Implementing Rules/ Regulations	Decree of February 12, 1913, on Designs and Models	Industrial Designs, Enforcement of IP and Related Laws
1913	Main IP Laws	Law of July 14, 1909, on Designs and Models (as amended by the Decree of February 12, 1913)	Industrial Designs, Enforcement of IP and Related Laws, IP Regulatory Body
1911	Implementing Rules/ Regulations	Decree of June 26, 1911, on Designs and Models	Utility Models, Industrial Designs
1844	Main IP Laws	Law of July 5, 1844, on Patents for Inventions	Patents (Inventions), Enforcement of IP and Related Laws, IP Regulatory Body

Annexure 1c: Guinea-Bissau

Institutional Component	Relevant Details
National IP Offices	• Guinean Copyright Society, Ministry of Education, Culture, Science, Youth and Sports • General Directorate of Industrial Property, Ministry of Energy, Industry and Natural Resources
Website	
Accounting Authority (Head of Office)	• Director of Copyright: M. Duarte Ióia • President of the Guinean Copyright Society: M. Guilherme Sa Filipe • Director General of Culture and Sport: M. José da Cunha • Director of Industrial Property: Mr. M. Carlos Sanca
Agency of departmental?	Departmental
Executive Authority (Line Minister)	Minister of Education, Culture, Science, Youth and Sports Minister of Energy, Industry and Natural Resources
Key International Memberships and Treaties	World Intellectual Property Organisation African Intellectual Property Organisation

National IP Laws			
Year of Version	Type of Text	Title	Subject Matter
1997	Main IP Laws	Customs Code (Law N° 15-016/AU of December 28, 2015 promulgated by Decree No. 16-251/PR)	Enforcement of IP and Related Laws, Other
1996	Constitution / Basic Law	Constitution of the Union of the Comoros	Other
1972	Main IP Laws	Law No. 082P/A.F - Law No. 95-012/AF on the Penal Code (Crimes and Offenses)	Copyright and Related Rights (Neighboring Rights), Enforcement of IP and Related Laws, Other

Annexure 1d: Madagascar

Institutional Component	Relevant Details
National IP Offices	• Malagasy Copyright Office, Ministry of Communication and Culture (OMDA) • Malagasy Industrial Property Office, Ministry of Industry, Trade and Craft (OMAPI)
Website	• http://www.omda.mg/index.html • http://www.omapi.mg/
Accounting Authority (Head of Office)	• Copyright Director: Mr. Andriamiharimanana Haja Ranjarivo • Industrial Office Director-General: Ms. Lalaina Priscilla ANDRIANARIVO
Agency of departmental?	Departmental
Executive Authority (Li ne Minister)	Minister of Communication and Culture (OMDA) Minister of Industry, Trade and Craft (OMAPI)
Key International Memberships and Treaties	World Intellectual Property Organisation
Technology and Innovation Support Centres	• 52 designated regional and sectoral entities

National IP Laws			
Year of Version	**Type of Text**	**Title**	**Subject Matter**
2015	IP-related Laws	Customs Code (updated in 2015)	Trademarks, Geographical Indications, Enforcement of IP and Related Laws, Other
2006	Implementing Rules/ Regulations	Inter-ministerial Order No. 12226/2006 laying down Measures for Strengthening the Fight against Counterfeiting of Literary and Artistic Works	Copyright and Related Rights (Neighboring Rights), Enforcement of IP and Related Laws
2005	IP-related Laws	Law No. 2005-020 of July 27, 2005, on Competition	Competition, Undisclosed Information (Trade Secrets), Enforcement of IP and Related Laws
1998	Main IP Laws	Decree No. 98-434 of June 16, 1998, on the Status and Functioning of the Malagasy Copyright Office (OMDA)	Copyright and Related Rights (Neighboring Rights), IP Regulatory Body
1998	Main IP Laws	Decree No. 98-435 of June 16, 1998, on General Rules for the Collection of Copyright and Neighboring Rights	Copyright and Related Rights (Neighboring Rights), IP Regulatory Body

National IP Laws			
Year of Version	**Type of Text**	**Title**	**Subject Matter**
1995	Implementing Rules/ Regulations	Decree No. 92-993 of December 2, 1992, implementing Ordinance No. 89-019 of July 31, 1989, establishing Arrangements for the Protection of Industrial Property in Madagascar (as amended by Decree No. 95-057 of January 17, 1995)	Patents (Inventions), Industrial Designs, Trademarks, Trade Names, Enforcement of IP and Related Laws
Patents (Inventions), Industrial Designs, Trademarks, Trade Names, Enforcement of IP and Related Laws	Main IP Laws	Law No. 94-036 of September 18, 1995, on Literary and Artistic Property	Copyright and Related Rights (Neighboring Rights), Enforcement of IP and Related Laws, Traditional Cultural Expressions, IP Regulatory Body
1993	Main IP Laws	Decree No. 92-994 of December 2, 1992, on the Creation and Organization of the Malagasy Industrial Property Office (OMAPI)	IP Regulatory Body
1992	Main IP Laws	Ordinance No. 89-019 of July 31, 1989, establishing Arrangements for the Protection of Industrial Property	Patents (Inventions), Industrial Designs, Trademarks, Trade Names, Competition, Enforcement of IP and Related Laws
1990	Main IP Laws	Decree No. 90-260 of June 21, 1990, modifying and completing the provisions of Decree No. 84-389 of November 13, 1984, establishing the Malagasy Copyright Office (OMDA)	Copyright and Related Rights (Neighboring Rights), IP Regulatory Body
1984	Main IP Laws	Decree No. 84-389 of November 13, 1984, creating the Malagasy Copyright Office	Copyright and Related Rights (Neighboring Rights), IP Regulatory Body
1984	Implementing Rules/ Regulations	Decree No. 84-390 of November 13, 1984, on Regulation of Copyright Royalties	Copyright and Related Rights (Neighboring Rights)

Annexure 1e: Maldives

Institutional Component	Relevant Details
National IP Offices	Intellectual Property Unit, Ministry of Economic Development
Website	http://www.trade.gov.mv/
Accounting Authority (Head of Office)	• Director: Mr. Ahmed Migdhad
Agency of departmental?	Departmental
Executive Authority (Line Minister)	Ministry of Economic Development
Key International Memberships and Treaties	World Intellectual Property Organisation

National IP Laws			
Year of Version	**Type of Text**	**Title**	**Subject Matter**
2010	Implementing Rules/ Regulations	Copyright Regulation	Copyright and Related Rights (Neighboring Rights), Enforcement of IP and Related Laws, IP Regulatory Body
2010	Main IP Laws	The Copyright & Related Rights Act	Copyright and Related Rights (Neighboring Rights), Enforcement of IP and Related Laws, IP Regulatory Body
2008	Constitution / Basic Law	Constitution of the Republic of Maldives	Other
2007	Implementing Rules/ Regulations	Cable Television Service Regulation 2007	Trade Names, Transfer of Technology, Other
1997	Implementing Rules/ Regulations	Regulation for the Approval and Registration of Business Names	Trademarks, Trade Names, Industrial Property
1997	IP-related Laws	The Companies Act of the Republic of Maldives	Trade Names, Other
1991	IP-related Laws	Law on Trade	Trademarks, Trade Names, Enforcement of IP and Related Laws

Annexure 1f: Mauritius

Institutional Component	Relevant Details
National IP Offices	• Mauritius Society of Authors (MASA), Ministry of Arts and Cultural Heritage • Industrial Property Office (IPO), Regional Integration and International Trade, Ministry of Foreign Affairs
Website	• http://masa.intnet.mu • http://culture.govmu.org • http://foreign.govmu.org/English/AboutUs/Pages/International-Trade-Division.aspx
Accounting Authority (Head of Office)	• Director of Culture : Mr. Islam Bhugan • Officer in-charge (MASA) : Mrs. R. Lafleur • Permanent Secretary (Arts and Cultural Heritage): Mrs. M. J. Jaunbocus • Acting Controller, IPO: Mr. Ranjive Beergaunot
Agency of departmental?	Departmental
Executive Authority (Line Minister)	Minister of Communication and Culture (OMDA) Minister of Industry, Trade and Craft (OMAPI)
Key International Memberships and Treaties	World Intellectual Property Organisation

National IP Laws			
Year of Version	**Type of Text**	**Title**	**Subject Matter**
2021	Implementing Rules/ Regulations	Copyright (Fees) Regulations 2020	Copyright and Related Rights (Neighbouring Rights)
2020	Implementing Rules/ Regulations	Customs (Amendment) Regulations 2020	Other
2020	IP-related Laws	Customs Act 1988 (as amended up to Act No. 1 of 2020)	Patents (Inventions), Industrial Designs, Trademarks, Copyright and Related Rights (Neighbouring Rights), Enforcement of IP and Related Laws
2019	IP-related Laws	The Code de Commerce (Amendment) Act 2018 (Act No. 9 of 2018)	Other, Industrial Property

National IP Laws			
Year of Version	**Type of Text**	**Title**	**Subject Matter**
2019	Main IP Laws	The Industrial Property Act 2019 (Act No. 15 of 2019)	Patents (Inventions), Utility Models, Trademarks, Geographical Indications, Trade Names, Layout Designs of Integrated Circuits, Competition, Plant Variety Protection, Enforcement of IP and Related Laws, IP Regulatory Body, Industrial Property
2018	Main IP Laws	The Copyright (Amendment) Act 2017 (Act No. 13 of 2017)	Copyright and Related Rights (Neighbouring Rights), Enforcement of IP and Related Laws, IP Regulatory Body
2016	Implementing Rules/ Regulations	Consumer Protection (Consumer Goods) (Maximum Mark-Up) Regulations No. 150 of 1998 (as amended up to 2016)	Trade Names
2015	IP-related Laws	Consumer Protection (Price and Supplies Control) Act 1998 (as amended up to Act No. 9 of 2015)	Trade Names
2014	Implementing Rules/ Regulations	Customs Regulations 1989 (as amended up to Regulations No. 84 of 2014)	Other, Industrial Property
2014	Main IP Laws	The Copyright Act 2014 (Act No. 2 of 2014)	Copyright and Related Rights (Neighbouring Rights), Enforcement of IP and Related Laws, Traditional Cultural Expressions, IP Regulatory Body
2013	IP-related Laws	Business Registration Act 2002 (Act No. 40 of 2002, as amended up to Regulation No. 231 of 2012)	Trade Names, Other
2013	IP-related Laws	Consumer Protection Act 1991 (as amended by Act No. 27 of 2013)	Trademarks
2011	Constitution / Basic Law	The Constitution (Amendment) Act 2011 (Act No. 35 of 2011)	Other
2010	IP-related Laws	The Open University of Mauritius Act 2010 (Act No. 2 of 2010)	Other

National IP Laws			
Year of Version	**Type of Text**	**Title**	**Subject Matter**
2009	Implementing Rules/ Regulations	Competition Commission Rules of Procedure 2009	Competition, Undisclosed Information (Trade Secrets)
2009	IP-related Laws	Mauritius Institute of Training and Development Act 2009	Industrial Property
2008	IP-related Laws	International Arbitration Act 2008	Alternative Dispute Resolution (ADR)
2008	Associated Non-IP Law	Mauritian Civil Code	Other
2008	Constitution / Basic Law	The Constitution of 1968	Other
2007	IP-related Laws	Competition Act 2007 (Act No. 25 of 2007)	Patents (Inventions), Industrial Designs, Trademarks, Competition, Other
2007	IP-related Laws	Fair Trading Act 1979 (as amended up to Act No. 25 of 2007)	Trademarks, Other
2006	IP-related Laws	Criminal Code	Enforcement of IP and Related Laws, Other
2005	Implementing Rules/ Regulations	Commodities (Indication of Origin) Regulations 1981 (as amended by Regulations No. 50 of 200)	Trademarks
2004	IP-related Laws	Data Protection Act 2004	Copyright and Related Rights (Neighbouring Rights), Enforcement of IP and Related Laws
2004	IP-related Laws	Genetically Modified Organisms Act 2004	Other
2004	Implementing Rules/ Regulations	Patents, Industrial Designs and Trademark Regulations 2004	Patents (Inventions), Industrial Designs, Trademarks, Industrial Property
2003	IP-related Laws	Computer Misuse and Cybercrime Act 2003	Enforcement of IP and Related Laws, Other
2003	IP-related Laws	National Heritage Fund Act 2003	Other
2003	IP-related Laws	The Protection Against Unfair Practices (Industrial Property Rights) Act 2002	Trademarks, Competition, Undisclosed Information (Trade Secrets

National IP Laws			
Year of Version	**Type of Text**	**Title**	**Subject Matter**
2002	Main IP Laws	Patents, Industrial Designs and Trademarks Act 2002	Patents (Inventions), Industrial Designs, Trademarks, Enforcement of IP and Related Laws, IP Regulatory Body
2001	IP-related Laws	Information and Communications Technologies Act 2001	Copyright and Related Rights (Neighbouring Rights), Enforcement of IP and Related Laws
2001	IP-related Laws	The Companies Act 2001 (Act No. 15 of 2001)	Other
2000	IP-related Laws	University of Technology, Mauritius Act 2000	Other
1998	IP-related Laws	Information Technology (Miscellaneous Provisions) Act 1998	Patents (Inventions), Enforcement of IP and Related Laws, Other
1809	IP-related Laws	Commercial Code	Other

Annexure 1g: Reunion

Reunion IPR is subject to 360 IP laws inclusive of implementing rules and regulations, IP-related laws, and constitutional law provisions. The table below sets out the main IP laws only. A full list of laws is available from WIPO (2020).

Institutional Component	Relevant Details
National IP Offices	• Office of Literacy and Artistic Property, Under-Directorate of Legal Affairs, Directorate of General Administration, Ministry of Culture and Francophone Affairs • National Institute of Industrial Property (INPI)
Website	• http://www.droitsdauteur.culture.gouv.fr/index-pla.htm • http://www.inpi.fr
Accounting Authority (Head of Office)	• Head of Office of Literary and Artistic Property: Ms. Anne Le Morvan • Deputy Director of Legal Affairs: Mr. Hugues GHENASSIA DE FERRAN • Director General: Mr. Pascal Faure
Agency of departmental?	Agency
Executive Authority (Line Minister)	Minister of Culture and Francophone Affairs, Roselyne Bachelot Minister of Economy and Finance, Bruno le Maire
Key International Memberships and Treaties	World Intellectual Property Organisation European Union Intellectual Property Office

National IP Laws			
Year of Version	**Type of Text**	**Title**	**Subject Matter**
2020	Main IP Laws	Intellectual Property Code (consolidated version as of May 22, 2020)	Patents (Inventions), Utility Models, Industrial Designs, Trademarks, Geographical Indications, Trade Names, Layout Designs of Integrated Circuits, Competition, Undisclosed Information (Trade Secrets), Plant Variety Protection, Copyright and Related Rights (Neighbouring Rights), Enforcement of IP and Related Laws, Alternative Dispute Resolution (ADR), Genetic Resources, Transfer of Technology, IP Regulatory Body, Industrial Property

National IP Laws			
Year of Version	**Type of Text**	**Title**	**Subject Matter**
2020	Main IP Laws	Ordinance No. 2020-116 of February 12, 2020, on the Creation of a Right of Opposition to Patents	Patents (Inventions), Trademarks, IP Regulatory Body
2019	Main IP Laws	Intellectual Property Code (consolidated version as of October 24, 2019)	Patents (Inventions), Utility Models, Industrial Designs, Trademarks, Geographical Indications, Trade Names, Layout Designs of Integrated Circuits, Competition, Undisclosed Information (Trade Secrets), Plant Variety Protection, Copyright and Related Rights (Neighbouring Rights), Enforcement of IP and Related Laws, Alternative Dispute Resolution (ADR), Genetic Resources, Transfer of Technology, IP Regulatory Body, Industrial Property
2019	Main IP Laws	Law No. 2006-961 of August 1, 2006, on Copyright and Neighbouring Rights in the Information Society (as amended on June 1, 2019)	Copyright and Related Rights (Neighbouring Rights), IP Regulatory Body
2019	Main IP Laws	Law No. 2019-775 of July 24, 2019, on the Creation of Neighbouring Rights for the Benefit of Press Agencies and Publishers	Copyright and Related Rights (Neighbouring Rights), IP Regulatory Body
2013	Main IP Laws	Law No. 2018-670 of July 30, 2018, on the Protection of Trade Secrets)	Undisclosed Information (Trade Secrets), Enforcement of IP and Related Laws
2012	Main IP Laws	Law No. 2011-1898 of December 20, 2011, on Private Copying Remuneration (as amended up to January 17, 2013)	Copyright and Related Rights (Neighbouring Rights)
2011	Main IP Laws	Law No. 2012-287 of March 1, 2012, on the Digital Exploitation of Unavailable Books of the Twentieth Century	Copyright and Related Rights (Neighbouring Rights)

National IP Laws			
Year of Version	**Type of Text**	**Title**	**Subject Matter**
2011	Main IP Laws	Law No. 2011-1843 of December 8, 2011, on Certificates of New Plant Variety	Patents (Inventions), Plant Variety Protection
2011	Main IP Laws	Law No. 2011-1898 of December 20, 2011, on Private Copying Remuneration	Patents (Inventions), Plant Variety Protection
2009	Main IP Laws	Law No. 2006-961 of August 1, 2006, on Copyright and Neighbouring Rights in the Information Society (as amended on June 14, 2009)	Copyright and Related Rights (Neighbouring Rights)
2009	Main IP Laws	Law No. 2009-1311 of October 28, 2009, on the Criminal Protection of Literary and Artistic Property on the Internet	Copyright and Related Rights (Neighbouring Rights), IP Regulatory Body
2009	Main IP Laws	Law No. 2009-669 of June 12, 2009, on the Promotion of the Dissemination and Protection of Creation on the Internet	Copyright and Related Rights (Neighbouring Rights), Enforcement of IP and Related Laws
2009	Main IP Laws	Law No. 2009-669 of June 12, 2009, on the Promotion of the Dissemination and Protection of Creation on the Internet (as amended up to October 30, 2009)	Copyright and Related Rights (Neighbouring Rights), IP Regulatory Body
2009	Main IP Laws	Law No. 97-283 of March 27 1997, on the Transposition into the Intellectual Property Code of the Council Directives of the European Communities No. 93/83 of 27 September 1993 and No. 93/98 of 29 October 1993 (as amended up to June 14, 2009)	Copyright and Related Rights (Neighbouring Rights
2006	Main IP Laws	Law No. 2006-236 of March 1, 2006, on Plant Varieties	Plant Variety Protection
2006	Main IP Laws	Law No. 2006-961 of August 1, 2006, on Copyright and Neighbouring Rights in the Information Society	Copyright and Related Rights (Neighbouring Rights), IP Regulatory Body

National IP Laws			
Year of Version	**Type of Text**	**Title**	**Subject Matter**
2004	Main IP Laws	Law No. 2004-1338 of December 8, 2004, on the Protection of Biotechnological Inventions	Patents (Inventions)
2003	Main IP Laws	Law No. 2003-517 of June 18, 2003, on the Remuneration of Library Loans and the Strengthening of the Social Protection of Authors	Copyright and Related Rights (Neighbouring Rights)
2002	Main IP Laws	Decree No. 2002-1064 of August 7, 2002, on the Public Service of Publication of Law through the Internet	Copyright and Related Rights (Neighbouring Rights), Other
2001	Main IP Laws	Law No. 98-536 of July 1, 1998, on the Transposition into the Intellectual Property Code of Directive 96/9/EC of the European Parliament and of the Council of March 11,1996, on the Legal Protection of Databases (as amended on July 13, 2001)	Copyright and Related Rights (Neighbouring Rights), Enforcement of IP and Related Laws
1998	Main IP Laws	Law No. 98-536 of July 1, 1998, on the Transposition into the Intellectual Property Code of Directive 96/9/EC of the European Parliament and of the Council of March 11,1996, on the Legal Protection of Databases	Copyright and Related Rights (Neighbouring Rights), Enforcement of IP and Related Laws
1997	Main IP Laws	Law No. 97-283 of March 27 1997, on the Transposition into the Intellectual Property Code of the Council Directives of the European Communities No. 93/83 of 27 September 1993 and No. 93/98 of 29 October 1993	Copyright and Related Rights (Neighbouring Rights)
1996	Main IP Laws	Law No. 95-4 of January 3, 1995, Supplementing the Intellectual Property Code and Relating to the Collective Management of the Reprographic Reproduction Rights (as amended on May 1, 1996)	Copyright and Related Rights (Neighbouring Rights), IP Regulatory Body

National IP Laws			
Year of Version	**Type of Text**	**Title**	**Subject Matter**
1996	Main IP Laws	Law No. 96-1106 of December 18, 1996, on Amendments to Intellectual Property Code pursuant to the Agreement Establishing the World Trade Organization	Patents (Inventions), Trademarks, Trade Names, Layout Designs of Integrated Circuits, Undisclosed Information (Trade Secrets), Copyright and Related Rights (Neighbouring Rights)
1994	Main IP Laws	Law No. 94-102 of February 5, 1994, on the Counterfeiting Repression and Amending Some Provisions in the Intellectual Property Code	Industrial Designs, Copyright and Related Rights (Neighbouring Rights), Enforcement of IP and Related Laws, IP Regulatory Body
1992	Main IP Laws	Law No. 92-597 of July 1, 1992, on the Intellectual Property Code (Legislative Part)	Patents (Inventions), Industrial Designs, Trademarks, Geographical Indications, Trade Names, Layout Designs of Integrated Circuits, Competition, Plant Variety Protection, Copyright and Related Rights (Neighbouring Rights), Enforcement of IP and Related Laws, IP Regulatory Body
1975	Main IP Laws	Decree No. 75-762 of August 6, 1975, on the Publication of the Paris Convention for the Protection of Industrial Property, the Nice Agreement Concerning the International Classification of Goods and Services for the Purposes of the Registration of Marks, the Lisbon Agreement for the Protection of Appellations of Origin and their International Registration, the Madrid Agreement Concerning the International Registration of Marks, revised in Stockholm on July 14, 1967, and the Additional Act of Stockholm to the Madrid Agreement for the Repression of False or Deceptive Indications of Source on Goods, signed in Stockholm on July 14, 1967	Trademarks, Geographical Indications, Industrial Property

National IP Laws			
Year of Version	**Type of Text**	**Title**	**Subject Matter**
1975	Main IP Laws	Decree No. 75-890 of September 22, 1975, on the Publication of the Locarno Agreement Establishing an International Classification for Industrial Designs (and its Annex and Resolution), signed in Locarno on October 8, 1968	Industrial Designs
1975	Main IP Laws	Decree No. 75-908 of October 2, 1975, on the Publication of the Complementary Act of Stockholm of July 14, 1967 to the Hague Agreement Concerning the International Deposit of Industrial Designs of November 6, 1925, as revised in London on June 2, 1934 and in the Hague on November 28, 1960, and supplemented by the Additional Act of Monaco of November 18, 1961	Industrial Designs
1974	Main IP Laws	Decree No. 74-743 of August 21, 1974, on the Publication of the Berne Convention for the Protection of Literary and Artistic Works of September 9, 1886, completed at Paris on May 4, 1896, revised at Berlin on November 13, 1908, completed at Berne on March 20, 1914, revised at Rome on June 2, 1928, revised at Brussels on June 26, 1948, revised at Stockholm on July 14, 1967, and concluded at Paris on July 24, 1971	Copyright and Related Rights (Neighbouring Rights)

National IP Laws			
Year of Version	**Type of Text**	**Title**	**Subject Matter**
1974	Main IP Laws	Decree No. 74-842 of October 4, 1974, publishing the Universal Copyright Convention (and its two Protocols), signed in Geneva on September 6, 1952, and as revised in Paris on July 24, 1971	Copyright and Related Rights (Neighbouring Rights)
1974	Main IP Laws	Decree No. 74-976 of November 20, 1974, on the Publication of the Convention Establishing the World Intellectual Property Organization, signed in Stockholm on July 14, 1967	IP Regulatory Body
1951	Main IP Laws	Decree No. 51-458 of April 19, 1951, on the Publication of the Berne Convention for the Protection of Literary and Artistic Works, signed on September 9, 1886, completed in Paris on May 4, 1986, revised in Berlin on November 13, 1908, completed in Berne on March 20, 1914, revised in Rome on June 2, 1982 and revised in Bruxelles on June 26, 1948	Copyright and Related Rights (Neighbouring Rights)

Annexure 1h: São Tomé and Príncipe

Institutional Component	Relevant Details
National IP Offices	• National Intellectual Property and Quality Service under the Secretary of State for Trade and Industry and the Ministry of Tourism, Culture, Commerce and Industry (SENAPIQ-STP)
Website	
Accounting Authority **(Head of Office)**	• Director of Industry and SENAPIQ-STP: Mr. Domingos da Silva da Trindade • Executive Director of SENAPIQ-STP: Mr. Adérito dos Ramos Bonfim
Agency of departmental?	Departmental
Executive Authority (Line Minister)	Secretary of State for Trade and Industry Minister of Tourism, Culture, Commerce and Industry
Key International Memberships and Treaties	World Intellectual Property Organisation African Regional Industrial Property Organisation
Technology and Innovation Support Centres	1 – Service National de la Propriété Industrielle

National IP Laws			
Year of Version	**Type of Text**	**Title**	**Subject Matter**
2018	Main IP Laws	Decree No. 15/2018 of May 15, 2018, on the Creation of By-laws Establishing the National Intellectual Property and Quality Service (SENAPIQ-STP)	Patents (Inventions), Utility Models, Industrial Designs, Trademarks, Geographical Indications, Trade Names, Competition, Copyright and Related Rights (Neighboring Rights), IP Regulatory Body, Industrial Property
2017	Main IP Laws	Code on Copyright and Related Rights (approved by Decree-Law No. 02/2017)	Copyright and Related Rights (Neighboring Rights), Enforcement of IP and Related Laws, IP Regulatory Body

National IP Laws			
Year of Version	**Type of Text**	**Title**	**Subject Matter**
2017	Main IP Laws	Intellectual Property Code (approved by Decree-Law No. 23/2016)	Patents (Inventions), Utility Models, Industrial Designs, Trademarks, Geographical Indications, Trade Names, Layout Designs of Integrated Circuits, Competition, Undisclosed Information (Trade Secrets), Enforcement of IP and Related Laws, Alternative Dispute Resolution (ADR), IP Regulatory Body, Industrial Property
2016	IP-related Laws	Code on Investment (approved by Decree-Law No. 19/2016 of November 17, 2016)	Other, Industrial Property
2004	Implementing Rules/ Regulations	Regulation on Industrial Property (Decree No. 6/2004 of June 30, 2004)	Patents (Inventions), Industrial Designs, Trademarks, Geographical Indications, Trade Names, Enforcement of IP and Related Laws, Industrial Property
2003	Constitution / Basic Law	Constitution of the Democratic Republic of Sao Tome and Principe	Other
1992	IP-related Laws	Code on Investment (Law No. 13/92 of October 15, 1992)	Patents (Inventions), Trademarks, Transfer of Technology, Other

Annexure 1i: Seychelles

Institutional Component	Relevant Details
National IP Offices	• Intellectual Property Office, Registration Division, Department of Legal Affairs, President's Office
Website	
Accounting Authority **(Head of Office)**	• Registrar General: Ms. Wendy Pierre • Deputy Registrar General : Mr. Fred Hoareau
Agency of departmental?	Departmental
Executive Authority (Line Minister)	President of the Republic of Seychelles
Key International Memberships and Treaties	World Intellectual Property Organisation African Regional Industrial Property Organisation
Technology and Innovation Support Centres	1 – Service National de la Propriété Industrielle

National IP Laws			
Year of Version	**Type of Text**	**Title**	**Subject Matter**
2015	Implementing Rules/ Regulations	Copyright (Voluntary Registration) Regulations, 2015	Patents (Inventions), Utility Models, Industrial Designs, Trademarks, Geographical Indications, Trade Names, Competition, Copyright and Related Rights (Neighbouring Rights), IP Regulatory Body, Industrial Property
2015	Main IP Laws	Industrial Property Act 2014 (Act No. 7 of 2014)	Copyright and Related Rights (Neighbouring Rights), Enforcement of IP and Related Laws, IP Regulatory Body

National IP Laws			
Year of Version	**Type of Text**	**Title**	**Subject Matter**
2014	IP-related Laws	Companies Ordinance, 1972 (Chapter 40) (as consolidated to June 30, 2014)	Patents (Inventions), Utility Models, Industrial Designs, Trademarks, Geographical Indications, Trade Names, Layout Designs of Integrated Circuits, Competition, Undisclosed Information (Trade Secrets), Enforcement of IP and Related Laws, Alternative Dispute Resolution (ADR), IP Regulatory Body, Industrial Property
2014	Implementing Rules/ Regulations	Copyright Act (Commencement) Notice, 2014	Other, Industrial Property
2014	Main IP Laws	Copyright Act, 2014 (Act No. 5 of 2014)	Patents (Inventions), Industrial Designs, Trademarks, Geographical Indications, Trade Names, Enforcement of IP and Related Laws, Industrial Property
2014	Implementing Rules/ Regulations	Customs Management Regulations, 2014	Other
2014	Implementing Rules/ Regulations	Industrial Property (Geographical Indication) Regulations, 2014	Patents (Inventions), Trademarks, Transfer of Technology, Other
2014	Implementing Rules/ Regulations	Industrial Property (Industrial Design) Regulations, 2014	Industrial Designs, Enforcement of IP and Related Laws, IP Regulatory Body
2014	Implementing Rules/ Regulations	Industrial Property (Marks) Regulations, 2014	Trademarks, IP Regulatory Body
2014	IP-related Laws	International Business Companies Act, 1994 (Chapter 100A) (as consolidated to June 30, 2014)	Trademarks, Trade Names, Enforcement of IP and Related Laws, Other

National IP Laws			
Year of Version	**Type of Text**	**Title**	**Subject Matter**
2014	IP-related Laws	Licences Act, 2010 (Chapter 113) (as consolidated to June 30, 2104)	Patents (Inventions), Trademarks, Enforcement of IP and Related Laws, Other
2014	IP-related Laws	Penal Code (Chapter 158) (as consolidated to December 1, 2014)	Other
2014	Implementing Rules/ Regulations	The Industrial Property (Layout-Design) Regulations, 2014	Layout Designs of Integrated Circuits, IP Regulatory Body
2014	Implementing Rules/ Regulations	The Industrial Property (Patents) Regulations, 2014	Patents (Inventions), Utility Models, IP Regulatory Body
2014	Implementing Rules/ Regulations	The Industrial Property Act (Commencement) Notice, 2014	Industrial Property
2012	IP-related Laws	Customs Management Act, 2011 (Act No. 22 of 2011)	Enforcement of IP and Related Laws, Other
2012	IP-related Laws	Penal Code (Amendment) Act 2012 (Act No. 5 of 2012)	Other
2011	Constitution / Basic Law	Constitution of the Republic of Seychelles	Other
2010	IP-related Laws	Business Tax Act, 2009	Other
2010	IP-related Laws	Consumer Protection Act, 2010	Patents (Inventions), Trademarks, Geographical Indications, Trade Names, Copyright and Related Rights (Neighbouring Rights), Enforcement of IP and Related Laws, Industrial Property
2010	IP-related Laws	Seychelles Investment Act, 2010	Copyright and Related Rights (Neighbouring Rights), Other, Industrial Property
2009	IP-related Laws	Fair Competition Act, 2009 (Act No. 18 of 2009)	Competition, Copyright and Related Rights (Neighbouring Rights), Enforcement of IP and Related Laws, Industrial Property

National IP Laws			
Year of Version	**Type of Text**	**Title**	**Subject Matter**
2005	IP-related Laws	Civil Aviation Act, 2005 (Act No. 4 of 2005	Patents (Inventions), Utility Models, Industrial Designs, Enforcement of IP and Related Laws
1996	IP-related Laws	Plant Protection Act (Chapter 171A)	Other
1969	IP-related Laws	Penal Code (Title V B, Chapter 73) (as amended up to Act No. 11 of 1969)	Other

Annexure 2: SWOT analysis of circular innovation landscape in the individual countries

Annexure 2a: Cape Verde

Strength	Weakness
- Stable government - Relatively good education outcomes up to secondary level - Stable economy with net FDI inflows - Good new business activity - Good generation of industrial designs relative to economic size - Good level of cultural and creative services exports - Sizeable service sector bodes well for abilities to undertake CE services - IP authorities contained in separate agency from executive line department	- High barriers for new business start-ups - Low R&D expenditure and financing - Lacking university education options - Competitiveness of domestic market - Poor innovation linkages and support - Low high-tech manufacturing capacity - Poor resource efficiency
Opportunities	**Threat**
- Alignment with SDG's - Leveraging green financing options - Existing IP independent authorities - Existing IP laws in place	- Reputation as an investment destination - Weak reputation as an IP destination (innovation and IP registration) - Not affiliated to regional IP organisation - Size of domestic market - Insularity

Annexure 2b: Comoros

Strength	Weakness
- Sizeable manufacturing contribution to GDP bodes well for capabilities to undertake CE material processing and conversion activities - Significant biomass availability from primary sectors as feedstock for CE activities	- Difficult environment for business and start-ups - Low R&D expenditure and financing - Lacking university education options - Small size and lack of competitiveness of domestic market - Weak innovation linkages - Poor support for innovation - Low manufacturing capacity - Poor resource efficiency - Low levels of socio-economic development - Lack of innovation and technology support centres
Opportunities	**Threat**
- Alignment with SDG's - Leveraging green financing options - Affiliation to regional IP organisation - Existing IP authorities - Existing IP laws in place	- Lack of natural resources - Poor reputation as an investment destination (companies owned by non-Comorian citizens not allowed) - Weak reputation as an IP destination (innovation and IP registration) - Insularity

Annexure 2c: Guinea-Bissau

Strength	Weakness
- Flexible labour market - Relative resource efficiency - Sizeable manufacturing contribution to GDP bodes well for capabilities to undertake CE material processing and conversion activities - Significant biomass availability from primary sectors as feedstock for CE activities	- Low R&D expenditure and financing - Lacking university education options - Low levels of ICT access and use - Low knowledge intensive employment - Poor innovation linkages - Low levels of socio-economic development - Lack of innovation and technology support centres
Opportunities	**Threat**
- Alignment with SDG's - Leveraging green financing options - Affiliation to regional IP organisation - Relative abundance of natural resources - Existing IP authorities and laws in place	- Negative perceptions of government effectiveness - Reputation as an investment destination - Poorly developed IP laws - IP authorities not independent

Annexure 2d: Madagascar

Strength	Weakness
- Flexible labour market - High % of graduates in science and engineerin - Microfinance availability - Good IP activity (IP receipts, trademarks, industrial design) - Relative resource efficiency - Sizeable manufacturing contribution to GDP bodes well for capabilities to undertake CE material processing and conversion activities - Sizeable service sector bodes well for abilities to undertake CE services - Significant biomass availability from primary sectors as feedstock for CE activities	- Low R&D expenditure and financing - Low university education rankings - Low levels of ICT access and use - Poor environmental performance - Low knowledge intensive employment - Poor innovation linkages as a function of market prioritisation for the protection of patents - Low numbers of Patent Cooperation Treaty patents - Low levels of socio-economic development - Poor reputation for protection of IPR
Opportunities	**Threat**
- Alignment with SDG's - Leveraging green financing options - Abundance of natural resources - Existing IP laws and authorities	- Negative perception of government effectiveness - Degradation of environmental resources - Weak reputation as an IP destination (innovation and IP registration) - Not affiliated to a regional IP organisation - IP authorities not independent - Insularity

Annexure 2e: Maldives

Strength	Weakness
- Stable government - Business-friendly environment - Good secondary education resourcing - Relative energy efficiency - Low trade tariffs - Good trademark generation - Relative resource efficiency - Good levels of socio-economic - Sizeable service sector bodes well for abilities to undertake CE services - Significant biomass availability from primary sectors as feedstock for CE activities	- Low R&D expenditure and financing - Lacking university education options - Small domestic market - Poor innovation linkages - Low knowledge intensive employment - Low levels of high- and medium tech manufacturing output - Lack of innovation and technology support centres
Opportunities	**Threat**
- Alignment with SDG's - Leveraging green financing options - Abundance of natural resources - Existing IP laws and authorities	- Not affiliated to a regional IP organisation - IP authorities not independent - Poorly developed IP regime - Insularity - Lack of natural resources

Annexure 2f: Mauritius

Strength	Weakness
- Stable government - Business-friendly environment - Good secondary education outcomes - Relatively efficient energy usage - Good reputation as an investment and IP destination - Good trademark generation - Strong financial sector - Low trade tariffs - Good socio-economic levels of development - Sizeable manufacturing contribution to GDP bodes well for capabilities to undertake CE material processing and conversion activities - Sizeable service sector bodes well for abilities to undertake CE services	- Low investment in R&D by private sector - Lacking university education options - Small domestic market - Low levels of finance for R&D by business - Low levels of R&D finance access from international sources - Poor university/industry collaboration - Low levels of research talent being absorbed by business - Low productivity and citation impact of scholars - Low levels of high- and medium tech manufacturing output - Poor resource efficiency - Emerging reputation for protection of IPR
Opportunities	**Threat**
- Alignment with SDG's - Leveraging green financing options - Existing IP laws and authorities	- Not affiliated to a regional IP organisation - IP authorities not independent - Relative scarcity of natural resources

Annexure 2g: Reunion

Strength	Weakness
- High levels of ICT access and online services - to generate wealth and jobs through innovation and value-added industries in the globalised markets - Sizeable service sector bodes well for abilities to undertake CE services - IP authorities contained in separate agency from executive line department - Existing CE programme being rolled out	- High pupil-teacher ratio in secondary education - Difficulty of accessing credit - High tariff barriers - Low net FDI inflows - Strong reputation for protection of IPR
Opportunities	**Threat**
- Alignment with SDG's - Leveraging green financing options - Well-developed IP laws and authorities - Good reputation environmental performance of continental France - Leveraging access to the French market, market scale and competitiveness - High levels of investment in R&D in continental France - High university education rankings in greater France - Good IP generation by continental France - Affiliation to regional IP organisation - Right to repair regulations issued by EU	- Relative scarcity of natural resources - Insularity

Annexure 2h: São Tomé and Príncipe

Strength	Weakness
- Stable political environment with political and operational stability and strong rule of law - Relative resource efficiency - Sizeable service sector bodes well for abilities to undertake CE services - Affiliation to regional IP organisation	- Low expenditure and finance of R&D - Lacking university education options - Low levels of competition in the local market - Size and competitiveness of domestic market - Poor innovation linkages - High-tech manufacturing capacity - Socio-economic development - Resources to incentivise innovation - Lack of innovation and technology support centres
Opportunities	**Threat**
- Affiliation to regional IP organisation - Alignment with SDG's - Leveraging green financing options - Relative abundance of natural resources	- Reputation as a business destination - Reputation as an IP destination - Insularity - Poorly developed IP laws - IP authorities not independent

Annexure 2i: Seychelles

Strength	Weakness
- Political stability - Business-friendly environment - Good secondary education resourcing - Emerging capability to generate wealth and jobs through innovation and value-added industries in the globalised markets - Sizeable manufacturing contribution to GDP bodes well for capabilities to undertake CE material processing and conversion activities - Sizeable service sector bodes well for abilities to undertake CE services - Significant biomass availability from primary sectors as feedstock for CE activities	- R&D investment and financing - Lacking university education options - Small domestic market - Innovation linkages - Low knowledge-intensive employment - Poor resource efficiency - Lack of innovation and technology support centres
Opportunities	**Threat**
- Affiliation to a regional IP organisation - Alignment with SDG's - Leveraging green financing options - Relative abundance of natural resources	- Relative scarcity of natural resources - Reputation as an IP destination

Annexure 3: Indicative Action Plan with Regional and Country-level Actions

The proposed IOC project can be considered once the consultancy from which it is originated will be completed in June of 2021. Approval of the consultancy findings will be done by AIODIS National Focal Points and national consultants appointed to consist with the broader CE project under SWIOFish2, of which this consultancy is a part. Internally, the proposal will be produced by the head of the relevant directorate (Officer-in-Charge) with the assistance of a project manager and signed off by the IOC Secretary-General, before being presented to funders for approval.

Annexure 3A: Key Regional and Country-level Stakeholders

- Project Consultants (PCs): Consultants that will be contracted for the full period of the proposed project to assist with project management, stakeholder engagement, communications, and research.
- Legal Consultant (LC): It is anticipated one legal consultant will be required to assist with the drafting and progressing of model legislation on a block-release basis during the last eight months of the project
- IOC Blue Economy Directorate (IOC BED): The IOC Blue Economic Directorate is the responsible programme directorate for the proposed IOC project. It consists of an Officer-in-Charge, a programme coordinator, and other professional and administrative staff.
- IOC Secretary-General (IOC SG): The IOC Secretary-General is responsible for the sign-off of project mandates and needs to participate in the project as the highest level representative of the IOC where protocol requires, such as when meeting with Responsible Ministers (see below)
- National Focal Points (NFPs): The National Focal Points are AIODIS civil servants who act as representatives, facilitators, and coordinators for and advisors to AIODIS projects for the IOC. They assist on an ex-officio basis.
- National Consultants (NCs): National consultants are AIODIS residents who are contracted on a paid basis to act as representatives, facilitators, and coordinators for and advisors to AIODIS projects for the IOC in addition to the NFPs.
- Responsible Ministers (RMs): The Responsible Ministers are government ministers of the AIODIS who serve in portfolios responsible for innovation promotion and intellectual property governance across the AIODIS. In most cases, they are the ministers tasked with trade and industry portfolios.
- Responsible Secretaries (RSs): The Responsible Secretaries are the head civil servants or agency heads for the national IP authorities of the AIODIS.
- Responsible Legislators (RLs): The Responsible Legislators are the members of the AIODIS national legislative bodies who serve on legislative committees concerned with innovation promotion and IP. In most cases, these are the legislative committees that are tasked with trade and industry portfolios.

Annexure 3B: Proposed Project Timelines and Phases

The proposed key actions, responsible actors, project timelines and milestones are set out in the table below. The proposed project is divided into 5 phases, which corresponds to our synthesised change theory mapping (see figure 12) as follows:

- Phase 1 (2021/06 – 2022/01) – Project initiation: Will comprise the project proposal, securing funding, recruiting consultants, and establishing a project office. These activities precede actions in the change theory mapping.
- Phase 2 (2022/02) Project preparation: Will include 1.) stakeholder analysis and mapping; 2.) the project narrative and key messages; and, 3.) proof point research.
- Phase 3 (2022/03 – 2022/06) to repair and building a guiding coalition of the IOC and its AIODIS focal points. Outwardly, the priority will first be relationship development with key policy influencers.
- Phase 4 (2022/06 – 2023/04) – Alignment of objectives and legislation: Assistance is recruited to help draft model legislation for the institution of non-IP right to repair regulation across the AIODIS, which is then tabled with key stakeholders.
- Phase 5 (2023/04) – Strategic aim achievement, project review and way forward.

Annexure 3C: Table with Key Actions, Actors, Timelines, and Milestones

	Tasks	Actors	Timelines	Milestones
	Phase 1: Project Initiation			
I)	Finalise the project proposal and secure project funding with development funding partner	IOC BED IOC SG FTL	End of 2021/09	• Internal approval by IOC SG • External approval by funding TL • Funding contract signed and approval to commence project secured.
ii)	Project team recruitment	IOC BED PCs FTL	End of 2021/12	• Calls for expressions of interest • Shortlisting • Contracts signed and appointments finalised
iii)	Establishment of project office	IOC BED PCs	End of 2022/01	• Project consultants located in Mauritius • Project office established and operational at IOC office in Ebene • Right to repair project page on IOC website

	Tasks	Actors	Timelines	Milestones
	Phase 2: Project Design and Preparation			
iv)	Stakeholder analysis and mapping	PCs	End of 2022/02	• Completed stakeholder mapping, with full contact information, influence analysis and assessment of key motivations
v)	Narratives and messaging			• Overarching project narratives • Key messages per issue in relation to strategic aim • Key messages per swing stakeholder/grouping
vi)	Data gathering and research			• Document of proof points to support narratives and key messaging
vii)	Stakeholder engagement and communications planning			• Stakeholder engagement and communications plan completed until April 2023
	Phase 3: Coalition-building and Commitment			
viii)	Create sense of urgency and secure commitment of IOC internal stakeholders	PCs IOC BED IOC SG IOC Staff	End of 2022/03	• Project vision, data and research shared • Opportunities for clarification • Feedback session: staff understand what change means for them and their functions • Recognition system in place
ix)	Establish relationships with external stakeholders	PCs IOC BED IOC SG NFPs/NCs RMs RSs RLs	End of 2022/04	• Introductory meeting / event with RMs, RSs and RLs • Delivered presentation on IOC work on CE and value of CE to relevant AIODIS
X)	Introduce strategic aim, create sense of urgency and secure commitment of external stakeholders		End of 2022/06	• Project vision, data and research shared • Opportunities for clarification • Feedback session: external stakeholders understand what change means for them and their functions • Recognition system in place

	Tasks	Actors	Timelines	Milestones
	Phase 4: Alignment of Objectives and Legislation			
xi)	Legal drafting consultant recruitment	IOC BED PCs LC	End of 2022/06	• Calls for expressions of interest • Shortlisting • Contracts signed and appointments finalised
xii)	External stakeholder workshops to align on values, interests, and expectations re right to repair, IP, CE, and the role of IP in circular innovation and expectations of non-IP right to repair regulations	PCs LC IOC BED IOC SG NFPs/NCs RMs RSs RLs	Mid 2022/08	• Completion of workshops in all AIODIS • Assessment of interest and value alignments and expectations on right to repair
	Phase 4: Alignment of Objectives and Legislation (cont'd)			
xiii)	Model legislation is tabled with key stakeholders across the AIODIS to advance in their respective jurisdictions		Mid 2022/10	• Model legislation is finalised to promote right to repair • Model legislation is tabled with key stakeholders • Follow-up engagement with all key stakeholders to ensure satisfaction, clarity, maintain sense of urgency, and offer advice and support in advancing the legislation in their territory
xiv)	Maintenance and support		2022/10 – 2023/04	• Maintain stakeholder engagement and offer support and counsel in advancing legislation in their territory
	Phase 5: Strategic Aim Achievement, Project Review and Way Forward			
xv)	Non-IP right to repair successfully instituted	RMs RSs RLs	By 2023/04	• Non-IP right to repair legislation signed into law in the AIODIS
xvi)	Monitoring and evaluation system prepared to monitor impact of legislation	PCs IOC BED	By 2023/04	• Secure statistical data from the AIODIS on key right to repair indicators • Website with aggregated right to repair data and multiplier impacts set up as a public resource
xvii)	Project review and next steps	PCs IOC BED NFPs/NCs	By 2023/04	• Draft report • Validation workshop • Final report

Annexure 3D: Consideration of Risks, Barriers and Mitigations

The most significant anticipated risks and mitigation proposals are set out in the table below.

	Risk	Key features	Evidence	Mitigation proposal
1.	Unforeseen risks and the broad mandate of the IOC	Small secretariate running 5 directorates with wide-ranging mandates	Unforeseen events such as COVID-19 and MV Wakasho oil spill	Appoint 3 x full-time external project consultants
2.	Fear of opposition by OM's	Litigation used as defeat or delay tactic.	US litigation premised on denigration of services standards and safety	Involve the EU (an IOC observer member) to provide support and act as a leadership example in process of the project
3.	Lack of follow-through by AIODIS governments	Insufficient incentives for lead national policy influencers to progress legislation	Low consideration for IP as a CE emergence and growth enabler	
4.	Reputational harm from any potential conflicts with the AIODIS' founding principles	IOC founded on principals of subsidiarity of its actions and a respect for sovereignty of member states	Right to repair initiatives in other countries often accompanied by right to repair activism	Proposed incremental regulatory change rather than significant legal or institutional change.

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