

## Repair and Reuse (R&R):

Exploring the feasibility of R&R business model in Hong Kong

December 2023

# Executive Summary

## R&R implementation in international setting



## R&R Local Context



## Challenges of promoting R&R



## Opportunities and Recommendations to promote R&R



- With strong government backing to promote Repair and Reuse (R&R), a growing number of businesses within the EU are adopting new circular business models.
- These models allow them to generate profits throughout the entire lifespan of their products by offering a combination of products and services.

- Hong Kong is known for its fast-paced consumer culture and emphasis on acquiring new and trendy products. The culture of constant consumption often discourages individuals from considering repair or reuse.
- Local cases may not generate significant profits over the product lifespan, but they could minimise the amount of e-waste sent to landfills.

- Limited spaces, consumer culture, incomprehensive regulation, cost consideration and lack of awareness & education are challenges that need to be addressed to promote Repair and Reuse culture in Hong Kong.
- The city needs to be open and anticipatory the establishment of Repair and Reuse as the leading role of circular economy in Hong Kong.

- To foster the development of Repair and Reuse culture in Hong Kong, the Government needs to establish comprehensive policy and regulations to promote R&R.
- To promote the R&R culture, stakeholders could explore the feasibility of collaboration and partnership.

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# 1 Introduction

## 1.1 Project Background, Objective and Activities

### Project Background

Cities play a crucial role in the circular economy. As urbanisation and economic growth continue, carbon emissions and resource use also increase. It is estimated that by 2030, 60% of the world's population will live in cities, accounting for 70% of global carbon emissions and over 60% of resource use. Over the years, the Hong Kong Government ('Government' hereof) proactively implemented and promoted measures to tackle waste challenges in Hong Kong. In 2021, the Government announced, "Waste Blueprint for Hong Kong 2035" (Blueprint) with the basis of "Use Less, Waste Less" and advocated the vision of "Waste Reduction • Resources Circulation • Zero Landfill"<sup>1</sup>. To achieve carbon neutrality by 2050 in Hong Kong, building up a circular economy would be able to reduce both waste and carbon emissions. The disposal of E-waste and furniture in Hong Kong has become a growing issue in recent years. According to the International Telecommunication Union (ITU), Hong Kong produced over 150,000 tonnes of electronic waste in 2019, which is approximately 0.29% of global e-waste<sup>2</sup>. Additionally, around 1,800 tonnes of furniture waste are disposed of in Hong Kong every day, making up nearly 16.1% of municipal solid waste by weight in 2021<sup>3</sup>.

In order to reduce the amount of e-waste and furniture that is thrown away in Hong Kong, the Government should encourage the circular economy and discourage products from becoming waste. Repair and reuse (R&R) should be an integral part of the circular economy, as it prolongs the lifespan of products, keeps them in use for a longer period of time, and reduces the need for raw materials used to make replacement products. However, promoting the concept of repair and reuse in Hong Kong comes with its own set of challenges. There are currently no regulations regarding R&R, and companies generally do not prioritise making their products easy to repair. Their business models mostly rely on selling new products, and there is also a lack of infrastructure for repair

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<sup>1</sup> [https://www.eeb.gov.hk/sites/default/files/pdf/waste\\_blueprint\\_2035\\_eng.pdf](https://www.eeb.gov.hk/sites/default/files/pdf/waste_blueprint_2035_eng.pdf)

<sup>2</sup> <https://foodmadegood.hk/recycling-e-waste-in-hong-kong-make-it-easy-make-it-obvious/>

<sup>3</sup> <https://www.wastereduction.gov.hk/sites/default/files/msw2021.pdf>

due to space limitations and high labour costs. To achieve the goal of transitioning to a circular economy, it is important to promote a culture of R&R to the public in Hong Kong.

### **Project Objective**

Business Environment Council supports Hong Kong's transition from linear to circular economy through the engagement with member community through the Circular Economy Advisory Group and research projects. This research aims to raise awareness of the benefits of R&R for businesses and the wider community and to provide recommendations to businesses that will assist them in incorporating R&R elements into their business models by:

- (i) Overlooking R&R regulations in foreign countries such as in the European Union, the United Kingdom and the United States,
- (ii) Identifying and summarising the current business model in the retail industry (e.g. consumer electronics, consumer goods, home & furniture and lightings) in Hong Kong and cases from overseas (such as those jurisdictions mentioned above) that adopt R&R in their business model;
- (iii) Explore the performance and feasibility of R&R business model including Product-as-a-Service (PaaS); and
- (iv) Opportunities and challenges of promoting R&R business model in Hong Kong.

### **Project Activities**

BEC Policy and Research team conducted desktop research, stakeholder interviews and consultations with the Circular Economy Advisory Group to generate insights for this report.

## **1.2 Repair and Reuse**

For centuries, industrialised societies have been characterised by a linear economic model that revolves around a process of extraction, production, and consumption. This model is deeply ingrained in the global economy and involves the extraction of natural

resources, their transformation into goods and products, and the subsequent sale to consumers. Once these goods and products are no longer desirable or functional, they become waste. Unfortunately, the linear economy prioritises profit over sustainability, relying on producing and selling as many products as possible. The linear economy has led to the mass production of goods, which has resulted in negative impacts such as environmental damage and loss of valuable, finite raw materials<sup>4</sup>.

Recently, there has been an increasing interest among governments, researchers, and businesses in investigating detrimental effects of the linear economic approach. This approach involves short lifespan of consumer goods and concerns about embedded carbon for climate change. It has been clear that there is a demand for slower throughput of materials in the economy<sup>56</sup>. Many companies now need to transition from mass production of cheap products to optimising the utilisation of materials, as the current economic model is no longer sustainable. The circular economy is playing a more critical role in solving different complex issues, such as minimising waste, mitigating climate change, and promoting sustainable resource utilisation. In a circular economy, products and materials are kept in circulation through maintenance, reuse, refurbishment, remanufacturing and recycling<sup>7 8 9</sup>.

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<sup>4</sup> <https://sciendo.com/article/10.1515/vjbsd-2017-0005>

<sup>5</sup> <https://www.sciencedirect.com/science/article/pii/S0959652622005030>

<sup>6</sup> <https://www.sciencedirect.com/science/article/abs/pii/S095965262101430X>

<sup>7</sup> <https://ellenmacarthurfoundation.org/topics/circular-economy-introduction/overview>

<sup>8</sup> <https://www.elgaronline.com/display/edcoll/9781788972710/9781788972710.00028.xml>

<sup>9</sup> <https://www.sciencedirect.com/science/article/abs/pii/S0016718517300313>

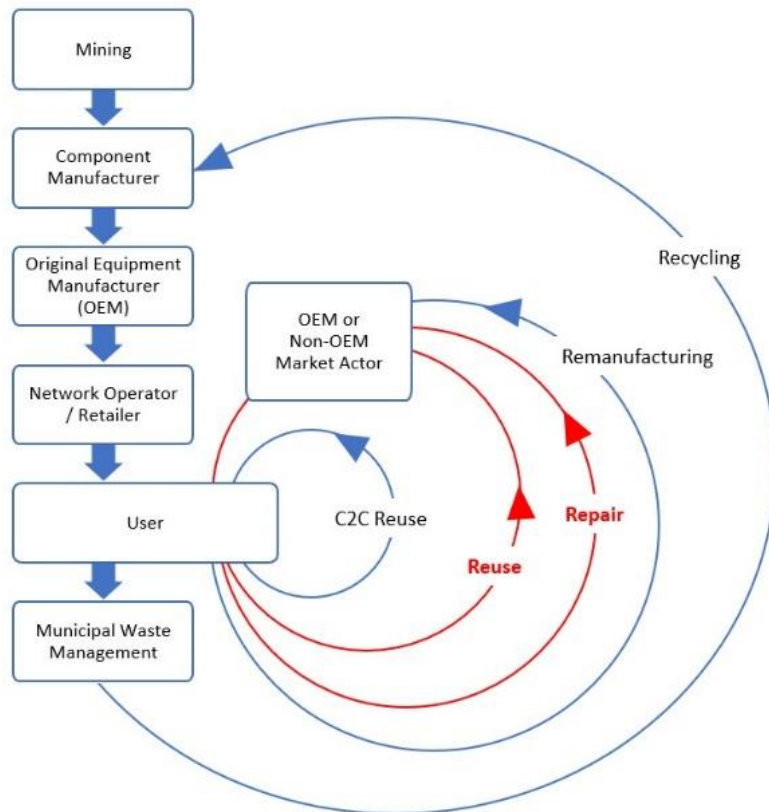


Figure 1: Illustration of Circular Economy. Repair and Reuse highlighted in red. Inspired by (Ellen MacArthur Foundation, 2019)<sup>10</sup>

The circular economy prioritises reuse, repair, and remanufacturing over recycling which should only be used when there are no other options. Reusing and repairing products and materials is more beneficial for the following reasons:

- 1) It maintains their function and extends their lifetime, minimising waste.
- 2) It reduces material and energy consumption and lowering carbon impacts.
- 3) It offers opportunities to promote reuse as R&R maintain the functionality, durability, and safety of products.

While promoting R&R can have positive effects on the environment, changing the way businesses operate can be a challenging task. It is necessary to introduce innovative and profitable business models to the market to incentivise the business sector to adopt

<sup>10</sup> <https://emf.thirdlight.com/link/7kvazph93afk-owveai/@/preview/1?o>

sustainable practices. Those new models that allow businesses to generate profits throughout the lifespan of their products by offering a combination of products and services (Figure 2). The classic long-life model, the hybrid model, the gap exploiter model, the access model, and the performance model are the business models that could potentially transform the global economy into a circular economy<sup>11</sup>.

|                            |        | <b>Resource strategy</b>   |  |   |
|----------------------------|--------|--|--|---|
|                            |        | Narrowing loops  | Slowing loops  | Closing loops   |
| <b>Innovation strategy</b> | Open   | <p><i>Open-narrowing</i></p> <p><b>Value proposition (example):</b><br/>Reduce waste and resources in design and production processes</p> <p><b>Value creation and delivery:</b> Reduce cost and negative impact through new technologies and processes in collaboration with suppliers, customers and others</p> <p><b>Value capture logic:</b><br/>Save cost and resources</p> <p><b>Case examples:</b><br/>industry collaboration on cleaner refrigeration technology; Sony and Samsung collaboration on LCD efficiency</p> | <p><i>Open-slowng</i></p> <p><b>Value proposition (example):</b><br/>Reuse resources to broaden the offerings to the customer (e.g. vintage, second-hand)</p> <p><b>Value creation and delivery:</b> Create value by connecting internal and external resource flows via generative models</p> <p><b>Value capture logic:</b><br/>Increase the number of transactions in an ecosystem via reuse of products</p> <p><b>Case examples:</b><br/>H&amp;M – Sellpy collaboration on second-hand clothes market; iFixit repair platform; ResQ Club excess food sales model</p> | <p><i>Open-closing</i></p> <p><b>Value proposition (example):</b><br/>A circular offering which involves lower environmental footprint and resource burden</p> <p><b>Value creation and delivery:</b><br/>Combine resource flows from external ecosystem into customer offerings</p> <p><b>Value capture logic:</b><br/>Lower the cost of resources used in customer offerings, improve brand and corporate image</p> <p><b>Case examples:</b><br/>Interface Networks for 'circular carpets' with ZSL, Aquafil and fishery communities; JLR and Novelis closing the aluminum loop</p> |
|                            | Closed | <p><i>Closed-narrowing</i></p> <p><b>Value proposition (example):</b><br/>Reduce waste and resources in design and production processes</p> <p><b>Value creation and delivery :</b> Reduce cost and negative impact through internal technology, process and design innovations</p> <p><b>Value capture logic:</b><br/>Save cost and resources</p> <p><b>Case examples:</b><br/>Companies like Apple minimising packaging and using recycled materials; McDonald's "fried for fuel"</p>  | <p><i>Closed-slowng</i></p> <p><b>Value proposition (example):</b><br/>High quality products with high customer value</p> <p><b>Value creation and delivery :</b><br/>Long lasting design, repair services; Create more value from less resources</p> <p><b>Value capture logic:</b><br/>Price premium through achieving quality leadership and customer loyalty; create value from same product multiple times</p> <p><b>Case examples:</b><br/>Long-life warranties; hotel linen rental services focused on product longevity</p>                                      | <p><i>Closed-closing</i></p> <p><b>Value proposition (example):</b><br/>Connect with customers by using, recovering, and maintaining post-consumer materials</p> <p><b>Value creation and delivery :</b><br/>Increase customer retention and repurchases via take-back plans</p> <p><b>Value capture logic:</b><br/>Resource efficiency, improve brand and reputation, reduce cost for materials</p> <p><b>Case example:</b><br/>Take-back, rental and lease models to recover the company's own materials such as MUD Jeans Lease and Philips pay per lux</p>                        |

Figure 2: Circular business model strategy framework<sup>12</sup>

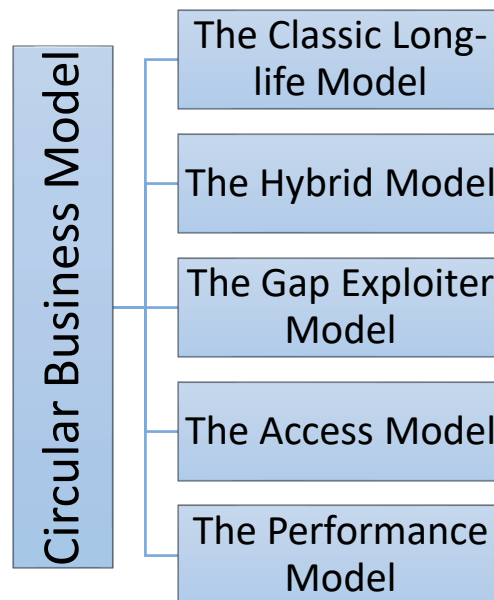


Figure 3: Circular Business Models

<sup>11</sup> Products That Last: Product Design for Circular Business Models

<sup>12</sup> <https://www.emerald.com/insight/content/doi/10.1108/JBS-11-2020-0258/full/html>



### The Classic Long-Life Model

The classic long-life model is a traditional business approach that focuses on providing high-quality products designed to last for a long time. This model generates revenue by selling durable and high-quality products at a premium price point. Additionally, they provide long warranties, customer assistance, and technical support to address customer concerns, ensuring a positive ownership experience and encouraging customers to keep their products for longer. This model focuses on reducing waste, extending product lifespans, and promoting a shift towards a more responsible and sustainable consumption pattern.

### The Hybrid Model

The hybrid model combines a durable product with affordable, short-lived consumables to perform specific tasks. The main source of revenue is primarily generated through repeat purchases of disposable materials. The hybrid model offers consumers a combination of an investment in a durable product that provides long-term functionality and convenience, along with the availability of inexpensive consumables that allow for ongoing usage and optimising the performance.

### The Gap Exploiter Model

The gap exploiter model involves taking unused resources or business opportunities from one production chain and using them in another to create value. These gaps are identified and leveraged to develop new products or services that utilise underutilised resources in innovative ways to generate revenue and meet market demand. The original producer does not take advantage of these resources, leaving them available for others to utilise. Revenue is usually generated from providing repair services or sales of refurbished units.

### The Access Model

The access model is a business model which customers are provided with access to goods, services, or experiences, while the ownership remains with the provider. With the progression of the Internet of Things and 5G technology, products are poised to become "smart" as PaaS providers attach sensors to their products. These sensors can detect product activity and communicate with smartphones upon scanning, allowing company

to track and monitor these smart products in real-time. From the resulting smart data, optimised business decisions can then be made<sup>13</sup>. This model offers customers flexibility and convenience, allowing them to access goods or services whenever they need them, without the burden of ownership. The concept of sharing economy is leveraged where multiple users can access the same asset or resource at different times, leading to efficient use of resources, and reduced waste. The access model has gained popularity with the rise of digital platforms and sharing economy platforms, and revenue is generated from providing access to a product for a limited period of time.

### The Performance Model

The performance model emphasises providing performance or functionality instead of selling products. Companies retain ownership of the products and deliver the desired outcomes or services to customers. They are also responsible for maintaining and managing the products or services until the end of their life cycle. Companies earn profits based on the performance they provide. This approach encourages manufacturers to design products that are more durable, easily repairable, and recyclable. The performance model also promotes a more sustainable and resource-efficient approach in the circular economy.

## 2 Repair and Reuse implementation in international setting

The worldwide adoption of circular economy and circular business models is gaining popularity as countries recognise the importance of sustainable and resource-efficient economic practices. However, when goods become defective, they are often discarded prematurely instead of being repaired and reused. Once the warranty of products has expired, consumers are discouraged from repairing because it is difficult to identify a suitable repair service at an acceptable price with trustable and convenient options. While there are various approaches and initiatives, many corporations in different countries are actively promoting and supporting the transition towards a circular economy. In the upcoming session, we will discuss and list some regulations in foreign countries and

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<sup>13</sup> <https://onlinelibrary.wiley.com/doi/epdf/10.1002/spe.2825>

explore international case studies of business sectors implementing circular business models in their operations.

## 2.1 Overview Repair and Reuse Policies and Regulations in Foreign Countries

Table 1: R&R Regulation

| Countries and regions | Regulations and initiatives  |
|-----------------------|--|
| European Union        | <p>Right to repair</p> <ul style="list-style-type: none"> <li>• The proposal on common rules promoting the repair of goods</li> <li>• The proposal for a Regulation on Ecodesign for Sustainable Products</li> <li>• The proposal for a Directive on Empowering Consumers for the Green Transition</li> <li>• The proposal for a Green Claims Directive</li> </ul> |
| United Kingdom        | Ecodesign for Energy-Related Products and Energy Information Regulations 2021  |
| United States         | <ul style="list-style-type: none"> <li>• Digital Fair Repair Act (New York State)</li> <li>• California’s right-to-repair law (SB 244)</li> <li>• Washington’s Fair Repair Act (ESHB 1392)</li> </ul>  |
| France                | <p>"Loi sur la Transition Énergétique pour la Croissance Verte" (Energy Transition for Green Growth Law)<sup>14</sup></p> <p>"Repairability Index"</p>   |
| Austria               | "Förderaktion Reparaturbonus"  |
| Belgium               | Repair Index   |
| Taiwan                | Pilot the implantation of the "Repairability Index" to mobile phone and laptop computer enterprises <sup>15</sup>  |

<sup>14</sup> <https://shs.hal.science/hal-03311166/>

<sup>15</sup> <https://www.moenv.gov.tw/en/375192F88A851A76/4d57723e-120a-4e9e-abe6-718a8310a7ee>

## European Union (EU)

The EU is at the forefront of promoting and regulating the right to repair and improve product sustainability through various initiatives. Under the European Green Deal<sup>16</sup>, the European Commission adopted a new *proposal on common rules promoting the repair of goods (annex 1)*, ensuring goods could be repaired both within and beyond the legal guarantee, for consumer goods (any tangible movable item). **During the guarantee period**, consumers can request that the seller **repair or replace a product free of charge** (when repair is cheaper or equal in cost) if defects are due to non-conformity with the contract of sale. **Beyond the legal guarantee**, producers of goods will be obliged to **repair a product for 5-10 years after purchase**, unless repair is technically impossible. The proposed rules help consumers find suitable repair services and compare them based on different key aspects such as price, duration of repair, or availability of a replacement product during repair.

The proposal is closely related to other initiatives of the Commission that aim to promote sustainable consumption and ensure that consumers have the "right to repair". The EU's proposal for a *Regulation on Ecodesign for Sustainable Products* requires manufacturers to design products that can be repaired. The proposal for a *Directive on Empowering Consumers for the Green Transition* helps consumers get more information about the durability and repairability of products when they are purchasing them. The proposal for a *Green Claims Directive* establishes specific requirements for proving, verifying, and communicating environmental claims, which encourages sustainable consumption.

## United Kingdom (UK)

The UK government has introduced the *Ecodesign for Energy-Related Products and Energy Information and Regulations 2021*, which imposes eco-design and energy labelling requirements on certain energy-related products sold in the UK. These regulations are similar to EU regulations and aim to reduce the amount of e-waste by extending the life of certain products, such as washing machines, dishwashers,

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<sup>16</sup> [https://ec.europa.eu/commission/presscorner/detail/en/qanda\\_23\\_1795](https://ec.europa.eu/commission/presscorner/detail/en/qanda_23_1795)

refrigerators, and electronic displays<sup>17</sup>. In adherence with relevant regulations, manufacturers and importers are required to provide **spare parts** for these products for a **minimum of 7 to 10 years** after the last unit of the model has been sold. This enables professional repairers and end-users to acquire the necessary spare parts and repair information to prolong the lifespan of these products. Nonetheless, these regulations do not encompass popular electronic devices such as laptops, smartphones, cookers, and microwaves, which drastically contribute to e-waste issue. Consequently, additional legislative amendments are necessary to address this predicament.

### United States (US)

Currently, there is no federal law in the US that specifically addresses the right to repair. Several states have implemented or proposed laws to promote consumer rights and support repair businesses in response to e-waste issues. These state-level initiatives vary in goals and scopes, but ultimately aim to raise awareness about the right to repair. New York has become the first state to mandate the right to repair for electronic devices. The *Digital Fair Repair Act* requires manufacturers to provide consumers and independent repairers with **spare parts, tools, manuals, and other information** for the repair of their devices<sup>18</sup>. The law also allows New York consumers to choose repair service providers instead of being compelled to have their devices repaired by the manufacturers, potentially amplifying competition for repair work. Other states, such as *California (SB 244)*<sup>19</sup> and *Washington (ESHB 1392)*<sup>20</sup>, are also considering right to repair bills that would require manufacturers to provide parts, tools, and documentation to independent shops and product owners to increase access to affordable and reliable digital electronics equipment by promoting fair servicing and repair in a safe, secure, reliable, and sustainable manner.

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<sup>17</sup> <https://researchbriefings.files.parliament.uk/documents/CBP-9302/CBP-9302.pdf>

<sup>18</sup> <https://www.nysenate.gov/legislation/bills/2021/S4104>

<sup>19</sup> [https://leginfo.legislature.ca.gov/faces/billTextClient.xhtml?bill\\_id=202320240SB244](https://leginfo.legislature.ca.gov/faces/billTextClient.xhtml?bill_id=202320240SB244)

<sup>20</sup> <https://app.leg.wa.gov/bills/summary?BillNumber=1392&Year=2023&Initiative=false>

## France

In 2021, France took a pioneering step by introducing a legally binding repairability index, with a new set of criteria for manufacturers spanning five types of electronics and home appliances. The *Energy Transition for Green Growth Law (La loi anti-gaspillage pour une économie circulaire)* is described as the law against waste and supports the circular economy which requires producers of electronic devices (such as smartphones, TVs, and laptops) to disclose how repairable their products are on the scale of one to ten. **The Repairability Index** counters the practice of ‘planned obsolescence’, in which deliberately limited product life cycles compel consumers to purchase newer models of equipment instead of repair existing ones<sup>21</sup>. The repairability score of each product is based on a range of criteria, including the **availability of spare parts** and **ease of disassembly**. Figure 4 shows the scoresheet of Fairphone 4, the smartphone that is widely known for its modular design and provision of replacement parts, allowing users to easily repair their own devices. By 2024, France intends to replace its Repairability Index with a Durability Index, whereby manufacturers will disclose not only how repairable their goods are but also describe the full lifecycle for each product. The regulation aims to exert pressure on manufacturers to make devices and appliances with an enhanced lifespan while simultaneously giving consumers the option to choose longer lasting products.

| Criteria   | Sub-criteria   | Score of subcriterion /10 | Weighting factor of subcriterion | Score of criterion /20 | Total criteria scores /100 |
|--|--|---------------------------|----------------------------------|------------------------|----------------------------|
| CRITERION 1 : DOCUMENTATION                                | 1.1 Availability of the technical documentation and other documentation related to user and maintenance instructions | 10,0                      | 2                                | 20,0                   | 93,1                       |
| CRITERION 2 : DISASSEMBLY, ACCESSIBILITY, TOOLS, FASTENERS | 2.1 Ease of disassembly parts from List 2*   | 10,0                      | 1                                | 19,0                   |                            |
|  | 2.2 Necessary tools (List 2)   | 10,0                      | 0,5                              |                        |                            |
|  | 2.3 Fasteners characteristics parts from List 1** and List 2   | 8,0                       | 0,5                              |                        |                            |
| CRITERION 3 : AVAILABILITY OF SPARE PARTS                  | 3.1 Availability over time parts from List 2   | 7,9                       | 1                                | 14,1                   |                            |
|  | 3.2 Availability over time parts from List 1   | 4,3                       | 0,5                              |                        |                            |
|  | 3.3 Delivery time parts from List 2  | 10,0                      | 0,3                              |                        |                            |
|  | 3.4 Delivery time parts from List 1  | 5,4                       | 0,2                              |                        |                            |
| CRITERION 4 : PRICE OF SPARE PARTS                         | 4. Ratio between price of parts from list 2 to the price of the product  | 10,0                      | 2                                | 20,0                   |                            |
| CRITERION 5 : SPECIFIC CRITERION                           | 5.1 Information about type of updates  | 10,0                      | 1                                | 20,0                   |                            |
|  | 5.2 Free remote assistance   | 10,0                      | 0,5                              |                        |                            |
|  | 5.3 Possibility to reset softwares   | 10,0                      | 0,5                              |                        |                            |
| <b>Repairability index on 10</b>                           |  |                           |                                  |                        |                            |

\* list 2: list of a maximum of 3 to 5 spare parts (depending on the category of equipment concerned) whose broken or malfunctioning parts are the most frequent;

\*\* list 1: list of a maximum of 10 other spare parts (depending on the category of equipment concerned) whose good condition is necessary for the operation of the equipment.

Figure 4: Repairability index Scoresheet for Fairphone 4<sup>22</sup>

<sup>21</sup> <https://www.itu.int/hub/2021/10/frances-repairability-index-inches-toward-circular-economy/>

<sup>22</sup> <https://www.indicereparabilite.fr/produit/smartphone-fairphone-4-5g-8gb-256gb/>

## Austria

The Austrian government has initiated a nationwide scheme, known as the "*Förderaktion Reparaturbonus*", to foster the culture of R&R, and provide affordable and easily accessible repair services to all citizens<sup>23</sup>. The programme covers a wide range of commonly used electrical and electronic devices in private households and will contribute up to €200 towards the cost of repairing such devices. Austrian consumers can apply for the programme online and receive a voucher that can be used at participating repair companies. The voucher will cover **50% of the repair cost**, up to a maximum of €200 per repair. The programme involves a large number of repair businesses and independent repairers, with almost 3,500 locations throughout Austria participating. Consumers can easily visit their local repair shop to have their devices fixed. This initiative endorses the EU's right to repair and aims to lead the way towards a more sustainable and environmentally conscious EU.

## 2.2 Global Success Stories

With strong government backing to promote R&R, a growing number of businesses within the EU are adopting new circular business models. These models allow them to generate profits throughout the entire lifespan of their products by offering a combination of products and services. In the upcoming session, we will examine successful global business examples that have embraced these circular business models. The goal is to inspire and provide practical insights for businesses seeking to integrate sustainability into their operations and foster a positive environmental impact.

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<sup>23</sup> <https://www.reparaturbonus.at/>

## Signify (The Performance Model)<sup>24</sup>



### Circular Lighting @ Schiphol Airport Amsterdam

Signify, formerly known as Philips Lighting, has adopted a circular business model as part of its sustainability strategy. The company has taken substantial steps to advance circularity in its operations, products, and services. An example of this forward-thinking approach is "Light as a Service" (LaaS), whereby Signify provides lighting solutions on a subscription basis instead of customers having to purchase and own the fixtures themselves. This approach guarantees high-quality performance of the lighting products and allows for system upgrades when necessary. Additionally, Signify takes responsibility for maintaining and recycling the lighting products through a comprehensive recycling system, recovering valuable resources for reuse, and minimising waste as well as creating long-lasting value for its clientele and the environment.

Schiphol Airport aims to become the world's most sustainable airport through a focus on energy reduction. To achieve this goal, the airport has identified the installation of energy-efficient LED lighting as a promising opportunity. Signify provides circular light services to Schiphol Airport, enabling the airport to pay solely for the light service rather than purchasing the luminaire itself. This approach eliminates the need for upfront investment and includes both energy and maintenance costs. Signify's light solutions consume 50% less power and have a 75% longer lifespan compared to previous luminaires. The innovative design of the new luminaire unit enables the replacement of specific components instead of changing the entire fixture in case of premature failure.



Figure 5: Schiphol Airport Amsterdam using Signify's light services.

<sup>24</sup> <https://www.signify.com/global/case-studies/schiphol-airport>





### Hilti Fleet Management – Construction tools

The construction industry is widely known for its heavy dependence on natural resources. In response to this challenge, Equipment as a Service (EaaS) presents a viable alternative by enabling equipment access through a subscription model instead of outright purchase. Hilti, a company in this sector, provides fleet management services wherein a fixed monthly fee covers the costs of construction tools. This fee incorporates expenses for tool repairs, servicing, and replacements for stolen tools. If a tool requires repairs, clients may obtain a loan tool delivered on the next working day at no cost. Hilti also manages the tool fleet, which significantly reduces administrative work and financial risk for clients. Moreover, customers have the option to rent Hilti tools for a specific time span, enabling them to only pay for the equipment they require and exchange them for the latest models upon completion of their contract. Hilti offers a customised service which optimises productivity to meet individual needs. Despite the higher cost, clients are willing to pay for this tailored and convenient service.

OZZ Electric, one of the largest electrical companies in Canada, encounters issues concerning tool management such as availability, maintenance, and tracking. To tackle these challenges, they opted for Hilti Fleet Management Service. Within one week, Hilti supplied 2700 tools to more than 60 sites situated across various locations. Along with the logistical support, free maintenance and repairs, Hilti also provided software training to ensure a seamless experience for clients.

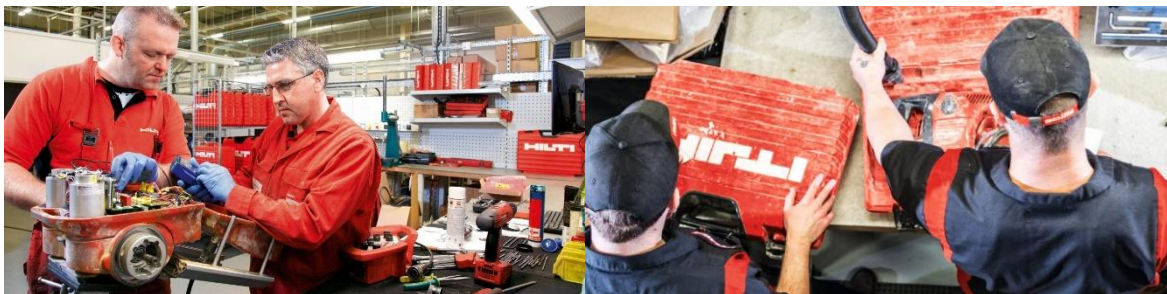


Figure 6: Hilti Fleet Management Service – Construction Tools

<sup>25</sup> <https://www.hilti.co.uk/content/hilti/E1/GB/en/business/business/equipment/fleet-management.html>

## iFixit (The Gap Exploiter Model<sup>26</sup>)



### iFixit – Together We Can Fix Any Thing

iFixit is a company that specialises in providing repair guides, tools, and replacement parts for a range of electronic devices. The company is renowned for its vast online database of repair guides that enable individuals to fix their devices instead of replacing them. iFixit seeks to identify untapped opportunities in the consumer electronics repair industry to create value. Specialised tools and repair kits that are necessary for repairing electronic devices, such as precision screwdrivers, tweezers, and other necessary accessories are available for purchase. Repair kits usually include replacement parts such as screens, batteries, connectors, and other components that are needed to complete the repair. iFixit generates revenue and meets market demand by making use of underutilised resources in electronic repair services. iFixit collaborates with Logitech through the iFixit Logitech Repair Hub to supply replacement parts and batteries for specific Logitech products.

In addition to repair tools and parts, iFixit offers step-by-step repair guides for a wide range of electronic devices, such as smartphones, tablets, laptops, and gaming consoles. These guides provide detailed instructions, accompanied by photos and videos, to assist users in diagnosing and resolving common issues with their devices. The guides cover various brands and models, making it easier for users to find specific instructions. iFixit also fosters an active online community where users can ask questions, share their repair experiences, and seek advice from other members. This community aspect promotes collaboration and knowledge sharing among individuals interested in do-it-yourself repairs. Additionally, iFixit provides customer support to assist users with any questions or concerns they may arise during the repair process.



Figure 7: Repair tools and replacement parts from iFixit

<sup>26</sup> <https://www.ifixit.com/about-us>

## IKEA (The Access Model<sup>27</sup>)



### **IKEA – Circular Furniture project**

Up to 7% of the global landfill consists of abandoned furniture waste, making it a prevalent global waste issue. To address the furniture waste issue, IKEA Taiwan is fully committed to promoting the circular economy business model. Rather than purchasing furniture as an asset, IKEA Taiwan encourages consumers to view it as a service, providing product maintenance, repair, and replacement during the period. At the end of the lease term, IKEA will either recycle and repurpose the furniture or sell it, significantly reducing the amount of disposable waste generated while simultaneously satisfying customer demands.

In partnership with IKEA Taiwan, Taiwan Power Company has initiated a circular furniture project, and jointly renovated the staff restaurant of Taiwan Power Company's headquarters. Through well-designed, durable, and easy-to-maintain IKEA furniture and home decor products designed with the circular economy in mind, the 40-year-old cooperative-style staff restaurant of Taiwan Power Company is renovated and transformed into a stylish European-style restaurant utilising IKEA furniture. The rental service model can reduce the expense of purchasing, maintenance, and disposal, which is estimated to reduce about 6 tons of furniture waste. This is equivalent to a reduction of about 20 tons of carbon emissions.



Figure 8: Restaurant of Taiwan Power Company using leased furniture from IKEA Taiwan

<sup>27</sup> <https://www.ikea.com.tw/en/sustainability-report-2022/tpc-lease-recycle>

## 3 Repair and Reuse Local Context

The right to repair legislation has gained widespread recognition and global acceptance in recent years. This regulation advocates the adoption of R&R practices by both the public and business sectors, with the goal of elongating the lifespan of products. Embracing repairability and sustainability not only helps reduce electronic waste but also fosters the development of the circular economy. By granting consumers and independent repair shops access to repair information, tools, and spare parts, the right to repair regulation empowers individuals to take ownership of their devices and minimise their environmental impact. Hong Kong's R&R development remains lagging behind the EU and other Asian countries. The following session will discuss the current R&R situation in Hong Kong.

### 3.1 Overview of local Repair and Reuse background

Hong Kong is known for its fast-paced consumer culture and emphasis on acquiring new and trendy products. Unfortunately, this culture of constant consumption often discourages individuals from considering repair or reuse when items break or become obsolete.

In Hong Kong, there are laws and ordinances that regulate the disposal, removal, and recycling of electrical and electronic equipment. These include the Product Eco-responsibility Ordinance (PERO) (Cap 603)<sup>28</sup>, the Promotion of Recycling and Proper Disposal (Electrical Equipment and Electronic Equipment) (Amendment) Ordinance 2016 Part 4 Regulated Electrical Equipment Division 4<sup>29</sup>, and the Producer Responsibility Scheme on Waste Electrical and Electronic Equipment (WPRS)<sup>30</sup>. To implement the WPRS, the Government has established the WEEE · PARK facility which has processed

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<sup>28</sup> <https://www.gov.hk/en/residents/environment/waste/management/prs.htm>

<sup>29</sup> <https://www.legco.gov.hk/yr15-16/english/ord/ord003-2016-e.pdf>

<sup>30</sup> <https://weee.gov.hk/en/background/regulatory-measures/>

more than 4,000,000 waste electrical and electronic equipment in Tuen Mun EcoPark for the treatment and recycling of Waste Electrical and Electronic Equipment<sup>31</sup>.



Figure 9: WEEE Recycling Scheme<sup>32</sup>

Although the Government has taken steps to address the issue of e-waste by establishing a comprehensive recycling and treatment system, there is still room for improvement in terms of regulations that encourage R&R practices, especially when compared to other cities that have successfully implemented such policies. In Hong Kong, companies currently have the option to provide voluntary warranties for their products, but these warranties often come with varying restrictions and durations, ranging from as short as 3 months to as long as 10 years. In addition, some manufacturers even charge a non-refundable inspection fee for malfunctioning products, regardless of whether they can be repaired or not. These barriers discourage individuals from considering repair services for their faulty products, leading them to buy new items rather than trying to repair their existing ones. As a result, the lack of regulations promoting R&R practices in Hong Kong remains a significant factor contributing to the city's ongoing e-waste issue.

<sup>31</sup> <https://weee.com.hk/2023/06/15/alba-integrated-waste-solutions-recycled-4-million-pieces-of-regulated-e-waste-in-hong-kong/>

<sup>32</sup>

<https://www.google.com/url?sa=i&url=https%3A%2F%2Fweee.gov.hk%2Fen%2F&psig=AOvVaw3xhysgFif4L7tLI4zkK-Zz&ust=1700885502943000&source=images&cd=vfe&opi=89978449&ved=0CBMQjhxqFwoTCNCu-Pfh24IDFQAAAAAdAAAAABAE>

## 3.2 Current Efforts

Despite the lack of government support to promote R&R in Hong Kong, a few local businesses have adopted circular business models. While these local cases may not generate significant profits over the product lifespan, they have a positive impact on the environment by minimising the amount of e-waste sent to landfills.

### ChargeSpot (The Access Model)

ChargeSpot is the leading local power bank rental service provider in Hong Kong. It operates over 5000 rental stations in convenience stores, shopping malls, restaurants, and other locations. The service has expanded to other jurisdictions such as Japan, Thailand, and Taiwan, with over 35,000 stations worldwide<sup>33</sup>. INFORICH INC., the operator of ChargeSpot, was listed on the Tokyo Stock Exchange Growth Market on 20 December 2022<sup>34</sup>.

To access the service, users simply need to download the app, register an account, and scan the QR code at a rental station. They can then pay a rental fee of \$6 per hour or \$30 per day. ChargeSpot operates on an access model, generating revenue by providing power banks for a limited period of time.



Figure 10: Examples of ChargeSpot power bank rental stations<sup>35</sup>

<sup>33</sup> <https://www.charge-spot.net/about-us#chargespot>

<sup>34</sup> <https://inforich.net/en/3111/regarding-the-listing-on-the-tokyo-stock-exchange-growth-market>

<sup>35</sup> [https://news.hongkongdisneyland.com/en/press/2023-09-15\\_2/](https://news.hongkongdisneyland.com/en/press/2023-09-15_2/)

In addition to its rental service, ChargeSpot also provides power bank recycling services. Users who participate in the recycling programme receive a voucher for the power bank rental service. ChargeSpot collects all used power banks and sends them to the battery recycling company for the dismantling. The useful raw materials are then refabricated and resold in the market, minimising the environmental impact of waste power banks<sup>36</sup>.

ChargeSpot promotes the concept of "renting instead of buying" to reduce waste and implement a circular economy. By renting power banks instead of purchasing them, it helps reduce the production and sales of traditional power banks, minimising electronic waste, and contributing to a more sustainable future. Power banks are an ideal product to turn into a service due to their easy transferability, high added value of services, and long idle time.

***Easy to transfer:*** The compactness of the power bank makes it easy to rent and return at over 5000 rental stations in Hong Kong and other countries where ChargeSpot operates. Its small size also facilitates repairs by ChargeSpot's team and efficient distribution to cater to the needs of various locations and users.

***High value-added services:*** ChargeSpot can enhance its service value by offering more than just products. For instance, they could offer advertising space on rental machines and collaborate with businesses to allow customers to rent power bank.

***Long idle time:*** Power banks are often bought and intermittently used, leading to long periods of inactivity. ChargeSpot turns these idle power banks into services for customers, optimising power bank usage and minimising downtime. This is essential given the significant carbon emissions associated with the extraction of resources and the manufacturing of power banks. By promoting the concept of 'product as a service', we can reduce the production of new power banks, and consequently, reduce carbon emissions.

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<sup>36</sup> <https://www.charge-spot.tw/greening>

ChargeSpot's success is a compelling example of how the implementing the Circular Business model can deliver significant benefits. Not only does it have a positive impact on the environment by fostering sustainability and reducing waste, but it also bolsters the company's financial performance and contributes to rapid economic growth. This dual benefit underlines the potential of the Circular Business Model as a viable and lucrative strategy for enterprises seeking to improve both their environmental stewardship and boost their economic progress.

### **Community Repair Network (The Gap Exploiter Model)**

Community Repair Network, including Repair Cafes, Restart Parties, Share & Repair, are part of an increasingly popular movement within society that advocates for repair as a means of extending the life of consumer products and ultimately working towards a circular economy<sup>3738</sup>. The first Repair Café was held in the Netherlands in 2009, with the aim of creating a venue that would provide a platform for the community to gather and repair items including electronics, computers, bicycles, and clothing<sup>39</sup>. The first Repair Café was introduced into Hong Kong by Community Leap in 2019. Currently, there are two main platforms in Hong Kong, Vessel Repair (復修號) in Kwai Chung (along with pop-up locations in different districts at community centres or halls) and Repair Cafe (復修辦館) in San Po Kong.

Like their counterparts in other countries, these platforms bring together general publics, volunteers and repairers who have the expertise to fix broken items and provide repair services. The general public can register and reserve a time slot for repair services and bring their faulty small appliances to the repair venues at the scheduled time. Repair services are offered free of charge or on a pay-as-you-wish basis, with visitors only having to cover the cost of any required replacement parts or batteries. However, due to the limited availability of repair tools and parts on the market, Vessel Repair and Repair Cafe, focus on repairing items such as luggage, watches, electric fans, rice cookers, blenders,

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<sup>37</sup> A Critical Review of the Role of Repair Cafés in a Sustainable Circular Transition

<sup>38</sup> <https://communityrepairnetwork.org.uk/about-us/>

<sup>39</sup> Designing for the Circular Economy- Repair Cafés, Potential implications for product design and development



and other small appliances. Over the past two years, Vessel Repair have achieved a 70% success rate by successfully repairing more than 2000 small appliances.

While Vessel Repair and Repair Cafe may not operate as profitable models that generate significant revenue, their concept has had a profound impact on the mindset and actions of various practitioners. Such platforms serve multiple purposes, ranging from addressing environmental concerns to fostering social cohesion and promoting the preservation of repair skills and collaborative repairs, which also play a role in influencing changes in consumption behaviour.

***Waste Reduction and product longevity:*** Vessel Repair and Repair Cafe gather skilled volunteers with expertise in repairing a wide range of items, including electronics and furniture. These volunteers have the knowledge and experience to identify and solve problems, restoring functionality to products that would otherwise be thrown away. Many products become non-functional due to the failure of specific components. These repair platforms often have access to spare parts or can provide recommendations on where to find them, allowing volunteers to replace faulty components and restore the products to working order. This targeted approach to repairs helps avoid discarding items due to a single malfunctioning part. The platforms also emphasise the significance of regular maintenance and preventative measures to extend the lifespan of products. They educate individuals on proper care, cleaning, and maintenance practices that can prevent common issues and reduce the likelihood of premature product failure.

***Strengthening social cohesion:*** Vessel Repair and Repair Cafe promote sustainability and waste reduction, while fostering camaraderie and a sense of purpose. They encourage collaboration among volunteers and participants, creating a mentoring and learning environment. Participants can contribute their own skills to the table, facilitating an exchange of expertise<sup>40</sup>. Their approach attracts a diverse range of participants, enabling

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<https://paper.hket.com/article/2367215/%E5%BE%A9%E4%BF%AE%E5%86%B0%E5%AE%A4%20%E4%BF%AE%E5%BE%A9%E9%9B%A3%E5%BF%98%E5%9B%9E%E6%86%B6>

knowledge and skills transfer between generations<sup>41</sup>. This collaboration strengthens social bonds and addresses social isolation.

***Promoting the repair movement and Influencing changes in consumption behaviour:***

Vessel Repair and Repair Cafe strive to increase public awareness about the significance of repairing items and their positive impact on the environment. Their purpose is to educate the public about the detrimental effects of a throwaway culture and promote the value of repairing items instead of disposing them. They accomplish this through conducting workshops, organising events, and implementing outreach initiatives to inform the public about the repair movement and its role in bringing about a sustainable future, with an aim to alter consumer attitudes towards maintenance whilst fostering a caring atmosphere that prompts individuals to prioritise fixing rather than substitution. These Cafés motivate a repair-oriented mentality, framing fixing as a feasible choice for broken or flawed items<sup>4243</sup>.

Further to education, Vessel Repair and Repair Cafe support the fix-up campaign on a more extensive spectrum. They educate the public about planned obsolescence, restrictive repair practices, and the necessity for legislation to support the right to repair. By propounding repair-friendly policies, they facilitate systemic change and encourage manufacturers to prioritise repairability. This promotes the wider adoption of repair principles, which in turn fuels the growth of the repair movement.

These platforms are part of an expanding movement which advocates for the extension of consumer products' lifespan through repair, promoting a circular economy. They aim to reduce waste, promote the durability of products, strengthen social cohesion and influence changes in consumption behaviour. Their mission is to impart knowledge on correct maintenance practices, promote collaboration and transfer of knowledge, increase awareness regarding the repair movement, and campaign for policies that are conducive to repair, with the aim of compelling manufacturers to prioritise repairability.

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<sup>41</sup>

<https://www.am730.com.hk/column/%E6%96%B0%E8%81%9E/%E5%BE%A9%E4%BF%AE%E7%A4%BE%E5%8D%80-%E9%80%A3%E7%B9%AB%E8%A1%97%E5%9D%8A/312361>

<sup>42</sup> <https://www.repaircafehk.org/>

<sup>43</sup> [www.facebook.com/vesselrepair](http://www.facebook.com/vesselrepair)



Figure 11: Left: BEC's Circular Economy Advisory Group Site Visit to Vessel Repair in Kwai Chung on 12 April 2023



Figure 12: Right: Repair Workshop for Fans conducted by Repair Cafe in San Po Kong<sup>44</sup>

### Repair Shops (The Gap Exploiter Model)

Repair shops, also known as repair centres, specialise in the repair and maintenance of a wide variety of products, equipment, or devices. The repair process involves skilful handling, troubleshooting, and replacement of parts, if necessary, to ensure that the product or equipment works effectively and efficiently. Repair shops offer a cost-effective way of extending the lifespan of valuable assets and avoiding the high cost of replacement. They provide a designated location where individuals or businesses can bring their broken, malfunctioning, or damaged items to be professionally fixed. Whilst repair shops may specialise in a specific type of repair, such as washing machines, smartphones, electronics, appliances, or furniture, they may also offer a wider variety of repair services. In addition, they may provide further services such as maintenance, cleaning, and installation. Unlike Community Repair Network, repair shops necessitate customers to pay for each repair service they receive.

The repair process at a repair shop usually commences with customers paying an inspection fee to the technician. Afterwards, the technician offers a convenient door-to-door service to inspect the item and provide a quote for the necessary repairs. Upon receiving the customer's agreement of the quote, the technician will proceed to immediately repair the malfunctioning item. The cost of repair services may vary

<sup>44</sup> <https://www.repaircafehk.org/ourstory>

depending on factors such as the complexity of the repair, the cost of replacement parts, and the labour involved in the repair.

Most of repair shops are located in Sham Shui Po, Kwai Chung, and San Po Kong due to affordability, accessibility, and concentration of businesses. Compared to other districts in Hong Kong, Sham Shui Po, Kwai Chung, and San Po Kong offer relatively lower rental costs for commercial spaces. This *affordability factor* attracts repair businesses, allowing them to set up shop at a more reasonable cost compared to other areas in the district. These locations are *well-connected* and *easily accessible*, offering multiple transportation options, such as MTR stations and bus routes to visit repair shops. Moreover, these locations have *high concentrations of electronics-related businesses*, including wholesalers, retailers, and distributors. Hence, it creates a favourable ecosystem for repair shops to operate, as they can easily source spare parts and components and establish partnerships with suppliers.



Figure 13: Left: Repair shop specialises in repairing Dyson products<sup>45</sup>



Figure 14: Right: Repair shop specialises in repairing Television<sup>46</sup>

Not all devices can be repaired, especially if they are severely damaged or have reached the end of their lifespan. In such cases, a repair shop can provide guidance on replacement options or offer environmentally responsible recycling solutions.

<sup>45</sup> <https://dysonrepairshop.business.site/>

<sup>46</sup> [https://en.nicelocal.hk/kowloon/business/jie\\_wei\\_dian\\_shi\\_gong\\_si/](https://en.nicelocal.hk/kowloon/business/jie_wei_dian_shi_gong_si/)

All in all, electronic repair shops are crucial in extending the lifespan of electronic devices. They offer repair options to customers, helping them save money and reduce electronic waste by repairing and restoring electronics instead of replacing them.

## 4 Challenges of promoting Repair and Reuse business model in Hong Kong

### 4.1 Limited Space

Hong Kong is famous for its high population density and limited living areas, which present difficulties for storing and fixing items. Many citizens do not have adequate room to store and repair items in need of maintenance. The absence of space in small apartments hinders individuals from engaging in repair activities and instead motivates them to replace malfunctioning items with new products. The limited space also significantly affects the R&R industry in various ways.

Firstly, storing and organising items requiring repair or reuse becomes challenging, making it difficult to find specific components and missing opportunities for repair or reuse. In addition, there are restrictions on dedicated workspaces, particularly for larger items or projects requiring ample room. This hinders the effective use of tools, disassembly of items, and performing repairs. Furthermore, the limited space hinders the accommodation of numerous and sizeable tools, thereby posing a challenge for performing a broad spectrum of repair tasks. Additionally, the accommodation constraint represents one of the issues hindering the popularisation of PaaS in Hong Kong. It creates obstacles for PaaS providers to store and manage an extensive range of products efficiently. The inadequate storage space also inhibits their capability to offer a diverse array of products and constrains scalability. Furthermore, the delivery and collection of products become more intricate due to the narrow streets and towering buildings in Hong Kong. PaaS providers face the daunting task of navigating congested areas and coordinating timely deliveries.

Community Repair Network in Hong Kong have identified the dearth of storage space as a key challenge. Due to this constraint, they are *unable to increase their quota for repair services*. The limited space prevents them from storing repaired items and malfunctioning products. It also poses challenges in storing repaired or reusable items, restricting their capacity to handle larger volumes of repairs or stock refurbished items for reuse. Moreover, the limited space affects the effective display or showcasing of refurbished or repaired items, potentially impacting their marketability and dissuading consumers from choosing repair as an alternative option for malfunctioning items. The sorting and categorisation of items for repair or reuse also become more difficult, resulting in inefficiencies and workflow delays. Finally, the confined environment heightens the likelihood of mishaps and harm when fixing or repurposing, prompting apprehension about safety.

To tackle these challenges, creative solutions can be applied. These include optimising storage systems, implementing efficient workspace layouts, and utilising vertical storage options. Additionally, exploring off-site storage facilities, collaborating with larger spaces, or forging alliance with other organisations can also help surmount space constraints and encourage effective R&R practices while ensuring a safe working environment.



Figure 15: Repair Cafe in San Po Kong<sup>47</sup>

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<sup>47</sup> <https://www.facebook.com/photo.php?fbid=305246899062891&set=pb.100087327489385.-2207520000&type=3>

## 4.2 Consumer Culture

Hong Kong's consumer culture presents several challenges to the practice of repairing and reusing items. The culture is characterised by an intense focus on the latest trends, brand names, and constant consumption of new products. This mindset fosters an attitude of disposal, where items are promptly discarded in favour of more modern and stylish alternatives. As a consequence, the importance of repairing and reusing items is frequently undervalued and disregarded.

The fast-paced Hong Kong consumer culture causes individuals to avoid spending time and energy on repairing and reusing goods. With busy lifestyles and a preference for convenience, many prioritise the speed and ease of buying new items instead of the time-consuming process of repairing or repurposing existing ones. Furthermore, the wide availability and affordability of assorted goods in Hong Kong makes replacing rather than repairing a more convenient option for consumers. The wide range of shopping options available at competitive prices allures individuals to discard and replace items rather than considering repair services or exploring reuse alternatives. A survey conducted by the Consumer Council revealed that consumers replaced or disposed of home appliances because of reasons like complicated maintenance processes, items being out of fashion, or the price reduction for newer models<sup>48</sup>.

Advertising and marketing campaigns in Hong Kong's consumer culture uphold the pursuit of novelty and newness. Brands often promote the idea that owning the latest products is pivotal for social acceptance and status. As a result, the perceived importance of R&R is diminished, as individuals prioritise acquiring new items rather than extending the lifespan of existing ones or temporary usage.

A shift in mindset and increased awareness of the environmental and social impacts of excessive consumption are crucial to promote the practice of repair and reuse in Hong Kong's consumer culture. Education and awareness campaigns can help highlight the

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<sup>48</sup> <https://www.consumer.org.hk/en/press-release/513-appliance-reliability-survey>

sustainability and responsible consumption benefits of R&R, playing a significant role. Collaborating with repair service providers, promoting local repair initiatives, and providing incentives or subsidies for repair services can also help cultivate a culture that appreciates and prioritises R&R over continuous consumption and disposal.



Figure 16: Promotion of beauty electronics during 11 November day (光棍節)<sup>49</sup>

### 4.3 Incomprehensive Regulation in Promoting Repair and Reuse

The absence of comprehensive regulations is a major obstacle to promote R&R initiatives in Hong Kong. To achieve a prosperous and sustainable repair ecosystem, it is necessary to implement comprehensive regulations that encourage and facilitate repair and reuse.

One key issue is the absence of regulations that mandate manufacturers to design products with accessible repairability. Without specific requirements, manufacturers often place priority upon cost-effective production methods that favour disposal over repairability. As a result, products can be difficult or even impossible to repair due to design decisions such as integrated components, glued parts, or lack of access to repair information or guidelines. Subsequently, the lack of regulation fosters a throwaway culture of consumerism, where products are designed to have short lifespans and limited repair options.

<sup>49</sup>

<https://www.hk01.com/%E7%A9%BF%E6%90%AD%E7%AD%86%E8%A8%98/698894/%E9%9B%9911%E5%84%AA%E6%83%A02021-%E5%85%89%E6%A3%8D%E7%AF%80%E5%84%AA%E6%83%A0%E5%90%88%E9%9B%86-%E5%90%8D%E7%89%8C%E6%9C%8D%E9%A3%BE-%E7%BE%8E%E5%A6%9D%E5%BF%85%E8%B2%B7%E6%94%BB%E7%95%A5>



Furthermore, the absence of regulations may contribute to a lack of standardisation in repair practices. Without clear guidelines or certification requirements for repair technicians, there is potential for variations in the quality of repair work and the use of appropriate techniques and materials. This lack of regulation can undermine consumer trust in repair services and discourage individuals from seeking professional repair options.

In addition, since there is no regulation in Hong Kong akin to the right to repair in the EU, manufacturers have no obligation to provide spare parts to consumers and third-party repairers for repair services. Community Repair Network face difficulty in repairing defective products due to inadequate spare parts, or the excessive cost of such parts. Enforcement of regulations comparable to the EU's right to repair shall guarantee spare parts accessibility for a minimum of 10 years following the product sale. Such regulations would not only favour the interests of consumers and repair experts, but also aid in reducing electronic waste and promoting sustainability. Through extending the durability of products using repair techniques and making spare parts available, we can curtail the incessant consumption and disposal of electronic equipment.

To overcome these barriers, it is crucial to introduce comprehensive regulations that encourage R&R practices. This could involve measures such as mandatory eco-design specifications that prioritise repairability, regulations that promote extended producer responsibility and the availability of spare parts, and certifications or standards for repair technicians. With the help of supportive regulations, Hong Kong can effectively create an environment that encourages repair and reuse, decreases waste, and facilitates sustainable consumption practices.

#### 4.4 Cost Consideration by Consumers

Costs are a major barrier to the adoption of R&R practices in Hong Kong. The city's high cost of living means that repair services are not always financially viable when compared to purchasing new products. Some people consider repair costs, including labour and

replacement parts, to be prohibitively expensive, leading them to opt for replacement rather than repair. Hong Kong's consumer culture is characterised by the abundance of low-priced imported goods and a fiercely competitive market. Novel products are frequently attractively and reasonably priced, whereas repair services are often deemed expensive and untrustworthy with regard to quality and durability.

The cost consideration is further exacerbated by the limited availability of affordable repair options. The scarcity of repair centres and specialised technicians often leads to higher service charges, as the demand for repair services outweighs the supply. This asymmetry between supply and demand can render the repairing of certain items economically infeasible, particularly for low-value or large-scale produced commodities where the mending expense may be more than the replacement cost.

The absence of clarity in the pricing of repairs discourages people from considering repair options. As stated in the previous section, repair shops in Hong Kong typically charge inspection fees before issuing quotes for repair services. It might prove difficult to determine the expense of repairs beforehand as it usually depends on the particular issue, the availability of replacement parts, and the required expertise. Discrepancies between the actual cost and the quoted price often arise. Such inconsistency can deter individuals from viewing repair as a feasible option and instead they incline towards the more convenient choice of purchasing new items.

To overcome these challenges, it is essential to address the cost considerations associated with repair and reuse. This can be achieved through various measures, such as promoting transparency in repair pricing, establishing affordable repair centres or community-based repair initiatives similar to Community Repair Network, and offer incentives to manufacturers to deliver affordable and accessible repair services. Raising awareness of the long-term cost savings and environmental benefits of R&R can also help shift the perception that repair is more expensive than replacement. By addressing the cost considerations, Hong Kong can encourage a transition towards a more sustainable and circular economy, where R&R are valued and actively pursued.

## 4.5 Lack of Awareness and Education

The lack of awareness and education on R&R practices pose significant challenges to their widespread adoption in Hong Kong. Many individuals are unfamiliar with the environmental and economic benefits associated with R&R or do not have a clear understanding of how to effectively engage in these practices.

The absence of public awareness campaigns and educational initiatives focused on R&R contributes to the limited knowledge and understanding of these concepts. Individuals may not appreciate that repairing and reusing items extends their lifespan, saves money, and reduces waste without adequate information. There may also be a lack of awareness of resources supporting repair and reuse, including repair centres, Community Repair Network, or online platforms for repair knowledge.

Moreover, the deficiency of instruction in repair skills and techniques undermines the uptake of repair and re-utilisation practices. Individuals might not possess the essential knowledge or competencies to mend items by themselves, prompting them to solely depend on professional repair services or opt for replacement as an alternative. The lack of educational programmes or training opportunities targeting repair hinders the general population's ability to develop their repair skills and constrains the growth of a dynamic repair community.

# 5 Opportunities and Recommendations to promote Repair and Reuse

## 5.1 Policy and Regulation Promoting Repairability

Policy and regulations are essential factors in fostering the adoption of R&R practices (Figure 17) by establishing a supportive framework, incentivising their usage, and giving consumers the choice to repair malfunctioning items instead of replacing them.

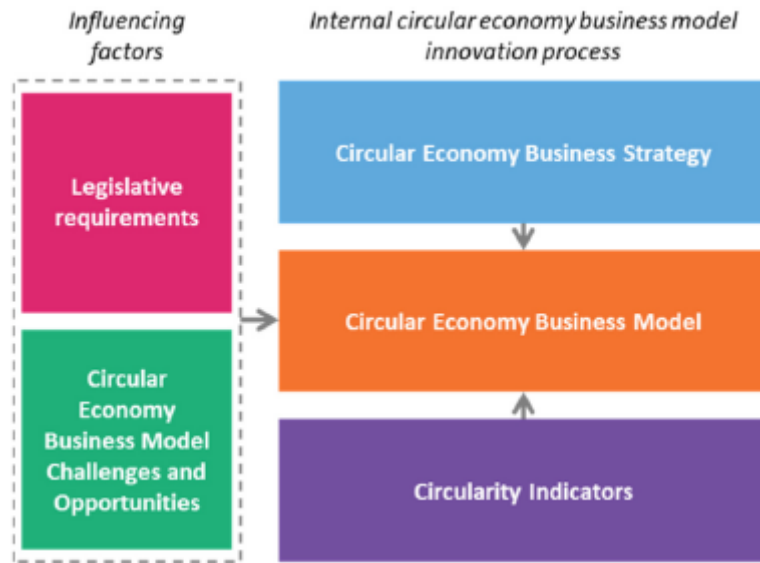


Figure 17: Circular Business Model Innovation Process for the EEE sector<sup>50</sup>

### Right to Repair

A growing number of countries are beginning to implement or consider regulations pertaining to the right to repair, as outlined in section 2.1. It is imperative for the Government to stay updated with jurisdictions that have already adopted this initiative. This ensures that consumer goods, encompassing any tangible movable object, can be fixed not only within the period of the legal guarantee but also thereafter.

During the warranty period, consumers should be entitled to request free repairs or replacements from the seller if they encounter any defects resulting from a failure to comply with the sales agreement. Consumers should have the choice to opt for the more cost-effective option. After the statutory warranty period, product manufacturers should be obliged to provide repair services for a period of 5-10 years after purchase, unless repair is technically infeasible.

The objective of these regulations is to assist consumers in finding suitable repair services and enable them to compare various aspects such as price, repair duration, or the availability of replacement products during the repair process.

<sup>50</sup> <https://www.sciencedirect.com/science/article/abs/pii/S095965262101430X>

## Repairability Index

The Government could introduce a Repairability Index alongside the Right to Repair, following the example of France and Taiwan have implemented. According to Consumer Council's study, two third of respondents are keen to know the durability of the product when making purchase decision<sup>51</sup>. The purpose of the Repairability Index is to address planned obsolescence, where intentionally limited product lifecycles compel consumers to replace or buy newer models instead of repairing their existing ones. The repairability score of each product is determined based on criteria such as the availability of spare parts and the ease of disassembly. Manufacturers should also provide a comprehensive description of the product's entire lifecycle.

This regulation seeks to incentivise manufacturers to produce devices and appliances with extended lifespans, giving consumers the choice of using their products for a longer period. The implementation of the Repairability Index could follow the successful adoption of the Mandatory Energy Efficiency Labelling Scheme, which helps the public in selecting energy-efficient products and raises awareness about energy-saving practices (Figure 18). The compulsory adoption of the Repairability Index for products sold in the Hong Kong market would offer consumers valuable information on the feasibility of repairing the product. This labelling system could heighten awareness amongst the public of the significance of repairing and repurposing items, and aid consumers in making informed decisions by selecting goods that are explicitly designed with ease of maintenance in mind.

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<sup>51</sup> [https://www.consumer.org.hk/f/initiative\\_detail/301150/407059/full\\_report\\_e.pdf](https://www.consumer.org.hk/f/initiative_detail/301150/407059/full_report_e.pdf)



Figure 18: Left: Mandatory Energy Efficiency Labelling Scheme<sup>52</sup>



Figure 19: Right: Repairability index of the AGEC French law<sup>53</sup>

## Regulations for licensed technicians

Consumers often lack knowledge or skills to fix their appliances and must rely on trained professionals. It is difficult for consumers to immediately assess the quality of service. In 2016, the Consumer Council received more than 2,000 complaints regarding maintenance and repair issues. Implementing regulations for licensed technicians is crucial to promote R&R practices in Hong Kong. By enforcing licensing requirements, the Government can ensure that repair technicians have the essential skills, knowledge, and training to carry out repairs effectively and safely. This helps build trust in repair services and encourages individuals to prioritise repair over disposal. Licensing regulations also lead to standardised training programmes and certification processes, ensuring technicians are qualified to work on a wide range of products. This promotes professionalism and quality assurance in the repair industry, protecting consumers from subpar or fraudulent repairs. In addition, licensing requirements facilitate continuous

<sup>52</sup> [https://www.emsd.gov.hk/en/energy\\_efficiency/mandatory\\_energy\\_efficiency\\_labelling\\_scheme/](https://www.emsd.gov.hk/en/energy_efficiency/mandatory_energy_efficiency_labelling_scheme/)


<sup>53</sup> <https://journals.openedition.org/factsreports/6599>

professional development, enabling technicians to stay abreast of the latest repair techniques and technologies. By recognising and supporting licensed technicians, regulations promote the growth of a skilled workforce and emphasise the importance of R&R in Hong Kong's circular economy.

## 5.2 Infrastructure Development

### Repair online platform (information for different repair shops/ cafés/ facilities in Hong Kong)

The lack of transparent repair information is often cited as a challenge for consumers. To tackle this issue, the Government could establish an online platform (Figure 20) similar to Hong Kong's Green Tableware Platform. This platform would serve as a central hub for repair information, providing repair guides, a directory of repair services, online repair events and workshops, and a marketplace for spare parts.

**Repair Platform** 

**Organisation Registration Number**

**Organisation Name**

**Type of Products**

**Website**

**Email Address**

**Districts**

**Search**

Figure 20: Imaginary Repair Platform with reference to Green Tableware Platform

The platform would offer step-by-step guides, tutorials, and troubleshooting resources for a wide range of products. It would also maintain a directory of repair service providers, including their expertise, locations, and customer reviews. This directory would help individuals find trusted repair professionals and promote the use of local repair services.

Additionally, the online platform could host virtual repair events and workshops where participants can learn practical repair skills from experts. These events would cover various topics, from basic repairs to specialised techniques, and would be accessible to a wider audience, promoting a culture of R&R beyond physical limitations. Moreover, the platform could facilitate the exchange of spare parts between individuals and companies by creating a marketplace for spare parts. This would enable the reuse of components from non-functional items.

The online platform would also collect data on repair activities, such as the types of products repaired, common issues, and success rates. This data could be analysed to identify trends, provide feedback to manufacturers for design improvements, and help policymakers implement effective repair-focused policies.

### **Turning Community centre/ Green @community to pop-up Community Repair Network**

Hong Kong is renowned for its dense population and limited living spaces, which creates difficulties in storing and fixing items. Providing repair services to the public, especially in Sham Shui Po, is a challenge for repair shops and the Community Repair Network due to their limited spaces and fixed locations. This lack of accessibility affects residents in other districts who need repair services.

To tackle the issue of fixed locations, community centres and GREEN@COMMUNITY can offer spaces for setting up Community Repair Network in all districts of Hong Kong, both on a pop-up and regular basis. These community centres are easily accessible to all Hong Kong citizens and can foster a culture of repair and reusing through hands-on experiences.





Figure 21: On November 12, 2023, Green@ Sai Kung partnering with Vessel Repair organised a Plug repair workshop exclusively for Sai Kung residents <sup>54</sup>

To further expand the availability of repair services, an ambulatory repair service could be established. This service would travel to different districts in Hong Kong and provide on-site repairs to residents, eliminating the need for them to travel long distances to access repair services.

By providing accessible repair information, facilitating connections between repair service providers and consumers, fostering community engagement, and promoting the reuse of spare parts, an online repair platform can significantly contribute to promoting R&R practices in Hong Kong. It empowers individuals, supports local businesses, reduces waste, and strengthens the culture of sustainability and resource conservation.

### 5.3 Collaboration and Partnerships

Collaboration and partnership play a pivotal role in promoting the transition to a circular economy. Collaboration enables for the pooling of resources, expertise, and perspectives

<sup>54</sup> <https://www.facebook.com/photo/?fbid=368625172182457&set=a.133251145719862>

from different sectors, including government, business, academia, and civil society. By working together, these stakeholders can drive systemic change, foster innovation, and create a supportive ecosystem for circular practices. Partnerships enable the sharing of best practices, lessons learned, and technological advances, facilitating the dissemination of knowledge and accelerating the uptake of circular economy principles. There are different forms of collaboration and partnerships among different stakeholders in promoting Repair and Reuse.

### **PaaS and Property Management Companies (PMCs)**

Collaboration and partnership between PaaS companies and PMCs can have a significant impact on promoting R&R practices in Hong Kong. By working together, these organisations can leverage their expertise and resources to foster the reuse culture in Hong Kong.

PMCs play a critical role by providing the necessary physical infrastructure for repair facilities, workshops, and product rental services. They can also incorporate PaaS offerings into their property packages, giving residents access to shared appliances, tools, and other household items. This cultivates a culture of sharing and reusing resources. Additionally, PMCs can assist in the collection and redistribution of items by acting as collection points and facilitating the logistics of picking up and delivering items.

One example of a successful collaboration between a PaaS company and a PMC is TULU. Operating in major cities such as New York City, London, and Tel Aviv, TULU offers an innovative in-building smart platform. This platform gives tenants on-demand access to appliances, groceries, micro-mobility devices, and more. TULU ensures that the products are up-to-date and sourced from trusted brands, and also takes responsibility for repairing the items as well<sup>55</sup>.

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<sup>55</sup> <https://tulu.io/why-tulu/>



Figure 22: Collaboration between PMC and TULU Platform, A PaaS platform<sup>56</sup>

Through joint communication efforts, awareness campaigns, and education initiatives, PaaS companies and PMCs can inform and engage residents about the benefits of R&R practices. This encourages residents to become active participants in sustainable consumption. Such collaboration creates a supportive environment that promotes the sharing economy, repair, waste reduction, and the extension of product lifespans, ultimately contributing to the development of a more circular economy in Hong Kong.

### **Community Repair Network x Repair Shops x PaaS platforms**

The partnership between PaaS companies and repair shops creates synergies that can be instrumental in promoting R&R practices in Hong Kong. Repair shops/cafés could collaborate with PaaS companies and provide repair services for products they offer as a service. This will ensure that all items are well maintained and repaired throughout their entire lifecycle.

Repair shops or Community Repair Network can also benefit from the partnership as they can have a steady supply of items in need of repair. This allows them to expand their customer base and leverage their expertise in repairing products. Additionally, PaaS

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<sup>56</sup> <https://www.linkedin.com/company/tulou/posts/?feedView=all>

companies can provide repair shops with specialised tools, spare parts, and technical knowledge to improve their repair capabilities and efficiency. This collaboration promotes a culture of repair and reuse, while also supporting local repair shops.

### **Community Repair Network x Design School**

Community Repair Network possess extensive experience in disassembling malfunctioning products, replacing spare parts, and reassembling them to their original condition. They can provide design schools with valuable insights into common repair problems, constraints in product design, and users' feedback. The feedback obtained from Community Repair Network about real-life situations can enrich the training and research in design, guiding students and faculty towards creating greener, more durable products.

Community Repair Network and design schools can collaborate by organising joint workshops, seminars, and design challenges that aim to extend the lifespan of products through repair and reuse. These collaborative events provide platforms for knowledge exchange and interdisciplinary collaboration, leading to the generation of innovative solutions.

## 5.4 Fostering the popularisation of Product-as-a-service in Hong Kong

### **Government choosing product-as-a-service during procurement process**

One of our interviewees noted that the conversion of company business model to PaaS would encounter numerous challenges including financial burden, absence of regulatory framework and market demand deficiency. To facilitate the adoption of PaaS in Hong Kong, the Government could execute various policy measures. Initially, they can establish a PaaS Support Programme that provides financial inducements and subsidies to companies that adopt PaaS models. These incentives can aid in offsetting initial expense and encourage the development of PaaS infrastructure. Additionally, the Government could establish a PaaS Procurement Policy, which mandates government agencies and public institutions to prioritise selecting of products through PaaS arrangements. This

policy not only stimulates market demand but also showcases the Government's commitment to sustainable consumption. Thirdly, the Government needs to establish a regulatory framework that addresses legal and operational hurdles relating to PaaS. This framework ought to elucidate liability matters, safeguard consumer welfare, and prescribe standards for data privacy and security concerning PaaS agreements. By providing regulatory clarity, the Government can instil confidence in PaaS providers and promote consumer trust. Lastly, the Government can facilitate partnerships between PaaS providers and traditional product manufacturers to encourage the integration of PaaS options into product design and development. The Government's adoption of such policies can establish a favourable milieu that backs the expansion of PaaS in Hong Kong, propelling a more sustainable and circular economy.

#### **Business choosing product-as-a-service during procurement process**

Hong Kong enterprises ought to consider implementing PaaS in their operations, given that it can bring both financial and environmental benefits. An exemplary practice is acquiring light as a service. Financially, companies do not need to make any upfront investments, as they can purchase a standard managed service that includes lighting design, without any capital expenditures or maintenance and replacement costs. This provides a hassle-free and guaranteed operation of their lighting equipment, with updates to new product upgrades.

In terms of the environment, the lighting company will use luminaires that are designed for easy reuse, recycling, and refurbishing. This allows companies to minimise their carbon footprint and material wastage, with the service provider taking care of the end of life of the luminaires. By embracing this approach, businesses have the ability to establish a favourable economic argument for the benefit of society, the environment, and their financial gain.

## 5.5 Education and Training

Through providing individuals with knowledge, skills, and awareness, these initiatives empower people to actively engage in R&R culture.

Education programmes can raise awareness of the environmental impact of consumption patterns and emphasise the advantages of repair and reuse. By incorporating topics related to sustainability, circular economy principles, and responsible consumption into school curricula at various levels, values relating to these subject areas can be instilled from an early age. Education cultivates a repair-oriented and sustainability-focused mindset by teaching students about the significance of repair and the value of extending product lifespan.

Targeted training programmes, such as workshops, courses and vocational training, impart practical repair and refurbishment skills, troubleshooting techniques, and equipment handling. These opportunities can be provided to professionals, such as repair technicians, as well as the general public, encouraging a do-it-yourself culture and empowering individuals to take charge of repairing their belongings.

Collaborations between educational institutions and Community Repair Network further enhance the impact of education and training initiatives. These partnerships offer hands-on learning experiences, mentorship opportunities, and access to repair facilities and tools. Engaging with repair experts and experienced practitioners enables individuals to gain valuable insights, practical knowledge, and a deeper understanding of R&R practices.

Moreover, education and training should extend to businesses, such as manufacturers and retailers, to promote product design that gives priority to repairability, modularity, and durability. Companies can develop a more sustainable approach to product development and supply chains by integrating circular economy principles into their business education and training programmes.

Education and training initiatives provide the foundation for promoting enduring behavioural change that prioritises repair, reuse, and responsible consumption. Such efforts cultivate a mindset that values the importance of extending the lifespan of products. Education and training are instrumental in reducing waste in Hong Kong, by imparting the knowledge and skills necessary for individuals to revitalise products and playing a critical role in promoting circular economy.

## 6 Conclusion

R&R practices are crucial in driving the development of a circular economy in Hong Kong. These practices enhance resource efficiency and sustainability by prolonging product life and mitigating waste generation.

R&R also aid in minimising the need for raw material mining and energy consumption that are commonly associated with manufacturing new goods. The refurbishment and repair of products conserve precious resources and lower the environmental impact of resource extraction. PaaS platforms enhance product usage throughout their lifecycle.

R&R is a vital factor in transitioning from the traditional linear "take-make-dispose" model to a circular economy. By repairing and reusing items instead of discarding them after a short period of use, products can continue to circulate within the economy, thereby reducing the burden on landfills and negating the need for further waste management infrastructure. Additionally, it ensures environmental concerns surrounding waste disposal, such as pollution, are addressed.

To maximise the potential of R&R in driving a circular economy, it is crucial to implement infrastructure and policies that support these practices. This requires the implementation of regulations that encourage the fixability of products and prompt manufacturers to offer repair services and spare parts. Collaboration among diverse stakeholders such as

Community Repair Network, repair Shops, PaaS platform, PMCs, Government, and businesses is pivotal to instilling a R&R ethos in Hong Kong. Moreover, funding for repair infrastructure, educational programs, and awareness campaigns amongst individuals, businesses, and communities will promote the uptake of R&R measures.

By adopting R&R as fundamental components of the circular economy, Hong Kong has the potential to decrease waste, conserve resources, alleviate environmental effects, and establish a more sustainable and robust economy for the forthcoming times.



## 7 Annex

### 7.1 Annex 1



#### European Commission - Press release



### **Right to repair: Commission introduces new consumer rights for easy and attractive repairs**

Brussels, 22 March 2023

Today, the European Commission adopted a new [proposal on common rules promoting the repair of goods](#), which will result in savings for consumers and support the objectives of the [European Green Deal](#) by reducing waste, among others. Over the last decades, replacement has often been prioritised over repair whenever products become defective and insufficient incentives have been given to consumers to repair their goods when the legal guarantee expires. The proposal will make it easier and more cost-effective for consumers to repair as opposed to replace goods. Additionally, more demand will translate into a boost to the repair sector while incentivising producers and sellers to develop more sustainable business models.

Today's proposal will ensure that more products are repaired within the legal guarantee, and that consumers have **easier and cheaper options to repair** products that are technically repairable (such as vacuum cleaners, or soon, tablets and smartphones) when the legal guarantee has expired or when the good is not functional anymore as a result of wear and tear.

#### **New measures to promote and facilitate repair and reuse**

The proposal introduces a new 'right to repair' for consumers, both within and beyond the legal guarantee.

**Within the legal guarantee**, sellers will be required to offer repair except when it is more expensive than replacement.

**Beyond the legal guarantee**, a new set of rights and tools will be available to consumers to make 'repair' an easy and accessible option:

- ◆ **A right for consumers to claim repair to producers, for products** that are technically repairable under EU law, like a washing machine or a TV. This will ensure that consumers always have someone to turn to when they opt to repair their products, as well as encourage producers to develop more sustainable business models.
- ◆ **A producers' obligation to inform consumers** about the products that they are obliged to repair themselves.
- ◆ **An online matchmaking repair platform** to connect consumers with repairers and sellers of refurbished goods in their area. The platform will enable searches by location and quality standards, helping consumers find attractive offers, and boosting visibility for repairers.
- ◆ **A European Repair Information Form** which consumers will be able to request from any repairer, bringing transparency to repair conditions and price, and make it easier for consumers to compare repair offers.
- ◆ **A European quality standard for repair services** will be developed to help consumers identify repairers who commit to a higher quality. This 'easy repair' standard will be open to all repairers across the EU willing to commit to minimum quality standards, for example based on duration, or availability of products.

#### **Next steps**

The Commission's proposal has to be adopted by the European Parliament and the Council.

#### **Background**

A [recent Eurobarometer](#) showed that 77% of Europeans feel a personal responsibility to act to limit climate change. Discarded products are often viable goods that can be repaired but are often tossed prematurely, resulting in 35 million tons of waste, 30 million tons of resources and 261 million tons of greenhouse gas emissions in the EU every year. Furthermore, the loss for consumers of opting for replacement instead of repair is estimated at almost 12 billion per year. Additionally, the initiative is estimated to bring EUR 4.8 billion in growth and investment in the EU.

## Acknowledgements

This project is the work of Business Environment Council (BEC)'s Policy & Research team, supported by the Circular Economy Advisory Group. BEC would like to express our gratitude to Konrad Adenauer Foundation - Regional Programme Energy Security and Climate Change Asia-Pacific as a long-time partner and the funder for this project, interviewees and other contributors that have assisted in the content and development of this research paper.

## Interviewees

*(by company name, listed alphabetically)*

ALBA Integrated Waste Solutions (Hong Kong) Limited

Community Leap Limited (Vessel Repair)

Hilti Asia Limited

Repair Cafe HK Limited

Signify Hong Kong Limited

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## About BEC

Business Environment Council Limited ('BEC') is an independent, charitable membership organisation, established by the business sector in Hong Kong. Since its establishment in 1992, BEC has been at the forefront of promoting environmental excellence by advocating the uptake of clean technologies and practices which reduce waste, conserve resources, prevent pollution and improve corporate environmental and social responsibility. BEC offers sustainable solutions and professional services covering advisory, research, assessment, training and award programs for government, business and the community, thus enabling environmental protection and contributing to the transition to a net-zero carbon economy.

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This project is funded by:

